Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
Tel (978) 683-0891
Fax (978) 683-0966
www.nobisengineering.com

EPA Region 1 RAC 2 Contract No. EP-S1-06-03

August 24, 2010
Nobis Project No. 80006
MA-2117-2009-F

Via Electronic Submittal

U.S. Environmental Protection Agency (EPA), Region 1
Attention: Mr. Ron Jennings, Task Order Project Officer
Post Office Square, Suite 100 (OSRR 07-1)
Boston, Massachusetts 02109-3912

Subject: Transmittal of the Final Feasibility Study Report Operable Unit (OU) 6
Raymark Industries, OU 6 – Additional Properties, Stratford, Connecticut
Remedial Investigation/Feasibility Study
EPA Task Order No. 0006-RI-CO-01H3

Dear Mr. Jennings:

By electronic submittal, the final OU6 Feasibility Study Report for the Raymark Industries, Inc. Superfund Site located in Stratford, Connecticut is submitted. As requested, this electronic submittal has been sent to the OSRR Records & Information Center. Also as requested, hard copies of the report will be submitted to EPA, Connecticut, and the Stratford Public Library (Administrative Record) under separate cover.

Should you have any questions or comments, please contact me at (978) 703-6013, or hford@nobisengineering.com.

Sincerely,

NOBIS ENGINEERING, INC.

Heather M. Ford
Senior Project Manager

Enclosure

c: File 80006/MA

SDMS DocID 469011

Feasibility Study

Raymark Industries, Operable Unit 6 – Additional Properties
Stratford, Connecticut

Remedial Investigation/Feasibility Study
EPA Task Order No. 0006-RI-CO-01H3

REMEDIAL ACTION CONTRACT
No. EP-S1-06-03

FOR

U.S. Environmental Protection Agency
Region 1

BY

Nobis Engineering, Inc.

Nobis Project No. 80006

August 2010

U.S. Environmental Protection Agency
Region 1
5 Post Office Square, Suite 100
Boston, Massachusetts 02109-3919

Nobis Engineering, Inc.
Lowell, Massachusetts
Concord, New Hampshire

Phone (800) 394-4182
www.nobisengineering.com

Feasibility Study

Raymark Industries, Operable Unit 6 – Additional Properties Stratford, Connecticut

Remedial Investigation/Feasibility Study
EPA Task Order No. 0006-RI-CO-01H3

REMEDIAL ACTION CONTRACT
No. EP-S1-06-03

For

U.S. Environmental Protection Agency
Region 1

By
Nobis Engineering, Inc.

Nobis Project No. 80006

August 2010

Program Manager

Heather M. Ford
Senior Project Manager

TABLE OF CONTENTS
FEASIBILITY STUDY
RAYMARK INDUSTRIES, OPERABLE UNIT 6 – ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

SECTION **PAGE**

AC ACRONYMS AC-1

1.0 INTRODUCTION 1
1.1 Organization of Report 1
1.2 Purpose of the Report 2
1.3 History of the Raymark Superfund Site 4
1.3.1 History of Raymark Facility and Environs 4
1.3.2 Raymark Superfund Site Description and Setting 6
1.4 Physical Characteristics of the OU6 Study Area 7
1.4.1 Topography and 100-Year Floodplain 7
1.4.2 Surficial Geology and Fill 7
1.5 Nature and Extent of Contamination 8
1.5.1 Potential Sources of Contamination 8
1.5.2 Overview of Chemical Compounds Detected 9
1.5.2.1 Volatile Organic Compounds (VOCs) 9
1.5.2.2 Semi-Volatile Organic Compounds (SVOCs) 9
1.5.2.3 Pesticides 10
1.5.2.4 Polychlorinated Biphenyls (PCBs) 10
1.5.2.5 Dioxins and Furans 10
1.5.2.6 Metals 11
1.5.2.7 Asbestos 11
1.5.2.8 Chemical Compounds Used or Handled at the Raymark Facility 12
1.6 Contaminant Fate and Transport 12
1.6.1 Sources of Soil Contaminants 12
1.6.2 Fate and Transport of Contaminants in Soils 13
1.7 Summary of OU6 Baseline Risk Assessments 14
1.7.1 Human Health Risk Assessment 14
1.7.2 Ecological Risk Evaluation 16

2.0 IDENTIFICATION AND SCREENING OF TECHNOLOGIES 17
2.1 ARARs and TBCs 17
2.1.1 Chemical-Specific ARARs and TBCs 19
2.1.2 Location-Specific ARARs 19
2.1.3 Action-Specific ARARs 20
2.2 Development of Remedial Action Objectives (RAOs) 20
2.2.1 Soil Contaminants of Concern 21
2.2.1.1 Asbestos 21
2.2.1.2 Lead 22
2.2.1.3 PCBs 22
2.2.1.4 Copper 22
2.2.1.5 Other Contaminants Co-Mingled with Raymark Waste 22

TABLE OF CONTENTS (cont.)
FEASIBILITY STUDY
RAYMARK INDUSTRIES, OPERABLE UNIT 6 – ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

SECTION **PAGE**

2.2.2 Soil Preliminary Remediation Goals 22
2.2.2.1 Definition of Raymark Waste 23
2.2.2.2 Asbestos 23
2.2.2.3 Lead 24
2.2.2.4 PCBs 25
2.2.2.5 Copper 25
2.2.3 Soil Remedial Action Objective 25
2.3 Development of General Response Actions 26
2.4 Volume of Contaminated Soil (Raymark Waste) 26
2.5 Identification and Screening of Technologies and Process Options 27
2.5.1 Preliminary Screening of Technologies and Process Options 27
2.5.2 Evaluation and Selection of Technologies and Process Options 28
2.5.3 Selection of Technologies and Process Options for Soils 29

3.0 DEVELOPMENT AND SCREENING OF ALTERNATIVES 32
3.1 Development of Alternatives 33
3.1.1 Property Groups Included in this Feasibility Study 33
3.1.2 Corrective Action Management Unit (CAMU) Rule 33
3.1.3 Treatment/Disposal of Raymark Waste During Remedial Actions 34
3.1.4 Wetlands Considerations 35
3.1.4.1 Delineation of the Wetlands 36
3.1.4.2 Evaluation of Practicable Alternatives 36
3.1.4.3 Wetland Mitigation 36
3.1.5 Floodplain Considerations 37
3.1.5.1 Delineation of the 100-Year Floodplain 38
3.1.5.2 Evaluation of Practicable Alternatives 38
3.1.5.3 Flood Storage Mitigation 39
3.2 Remedial Alternative Components 40
3.2.1 Excavation Volumes/Final Cover 40
3.2.1.1 Site Preparation 41
3.2.1.2 Raymark Waste Excavation 42
3.2.1.3 Backfill and Site Restoration 43
3.2.1.4 Low-Permeability Cap 44
3.2.1.4.1 Low-Permeability Cap in Vegetated Areas 45
3.2.1.4.2 Low-Permeability Cap in Paved Areas 48
3.2.1.5 Soil Cover 48
3.2.1.5.1 Permeable Soil Cover 48
3.2.1.5.2 Cover within a Wetland or Floodplain Area 49
3.2.1.6 Raymark Waste Disposal 51
3.2.2 Wetlands and Floodplains 53
3.2.3 Future Use Restrictions 53
3.2.4 Operation and Maintenance 54

TABLE OF CONTENTS (cont.)
FEASIBILITY STUDY
RAYMARK INDUSTRIES, OPERABLE UNIT 6 – ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

SECTION **PAGE**

3.2.4.1 Groundwater Monitoring....54
3.2.4.2 Cap/Final Cover....54
3.2.4.3 Five-Year Review....55
3.2.4.4 Maintenance of Existing Surfaces....55
3.3 Remedial Alternative Descriptions....55
3.4 Screening of Remedial Alternatives for the OU6 Property Groups....56
3.5 Description of Remedial Alternatives....57
3.5.1 Alternative 1: No Action....57
3.5.2 Alternative 2: Restrictions with Long-Term Monitoring....57
3.5.2.1 Future Use Restrictions....57
3.5.2.2 Operation and Maintenance....58
3.5.2.2.1 Groundwater Monitoring....58
3.5.2.2.2 Existing Surfaces....58
3.5.3 Alternatives 3 and 4: Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4)....58
3.5.3.1 General Assumptions....58
3.5.3.2 Excavation Volumes/Final Cover....60
3.5.3.2.1 Site Preparation....60
3.5.3.2.2 Raymark Waste Excavation....60
3.5.3.2.3 Backfill and Site Restoration....60
3.5.3.2.4 Raymark Waste Disposal....60
3.5.3.3 Floodplain and Wetlands....61
3.5.3.4 Future Use Restrictions....61
3.5.3.5 Operation and Maintenance....61
3.5.3.5.1 Groundwater Monitoring....61
3.5.3.5.2 Cap/Final Cover....61
3.5.4 Alternatives 5 and 6: Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6)....62
3.5.4.1 General Assumptions....62
3.5.4.2 Excavation Volumes/Final Cover....62
3.5.4.2.1 Site Preparation....63
3.5.4.2.2 Raymark Waste Excavation....63
3.5.4.2.3 Backfill and Site Restoration....63
3.5.4.2.4 Raymark Waste Disposal....63
3.5.4.2.5 Complete Excavation....63
3.5.4.3 Floodplain and Wetlands....64
3.5.4.4 Future Use Restrictions....64
3.5.4.5 Operation and Maintenance....64
3.5.4.5.1 Groundwater Monitoring....64
3.5.4.5.2 Cap/Final Cover....65
3.5.5 Alternatives 7 and 8: Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8)....65

TABLE OF CONTENTS (cont.)
FEASIBILITY STUDY
RAYMARK INDUSTRIES, OPERABLE UNIT 6 – ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

SECTION **PAGE**

3.5.5.1 General Assumptions 65
3.5.5.2 Excavation Volumes/Final Cover 66
3.5.5.2.1 Site Preparation 66
3.5.5.2.2 Raymark Waste Excavation 66
3.5.5.2.3 Backfill and Site Restoration 66
3.5.5.2.4 Raymark Waste Disposal 67
3.5.5.3 Floodplain and Wetlands 67
3.5.5.4 Future Use Restrictions 67
3.5.5.5 Operation and Maintenance 67
3.5.5.5.1 Groundwater Monitoring 67
3.5.3.5.2 Cap/Final Cover 68
3.5.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10) 68
3.5.6.1 General Assumptions 68
3.5.6.2 Excavation Volumes/Final Covers 69
3.5.6.2.1 Site Preparation 69
3.5.6.2.2 Raymark Waste Excavation 69
3.5.6.2.3 Backfill and Site Restoration 69
3.5.6.2.4 Raymark Waste Disposal 70
3.5.6.3 Floodplain and Wetlands 70
3.5.6.4 Future Use Restrictions 70
3.5.6.5 Operation and Maintenance 70
3.5.6.5.1 Groundwater Monitoring 70
3.5.6.5.2 Cap/Final Cover 71
3.6 Evaluation of Potential In-town Consolidation Areas/CAMUs 71

4.0 DETAILED ANALYSIS OF ALTERNATIVES 73
4.1 Format of the Detailed Analysis 73
4.2 Detailed Analysis Criteria 75
4.2.1 Overall Protection of Human Health and the Environment 76
4.2.2 Compliance with ARARs 77
4.2.3 Long-Term Effectiveness and Permanence 77
4.2.4 Reduction of Toxicity, Mobility, or Volume Through Treatment 77
4.2.5 Short-Term Effectiveness 78
4.2.6 Implementability 79
4.2.7 Cost 79
4.2.8 State Acceptance 80
4.2.9 Community Acceptance 80
4.3 Property-Specific Detailed Analysis of Alternatives 80
4.3.1 Lockwood Avenue Property 81
4.3.1.1 Lockwood Avenue Property Assumptions 83
4.3.1.1.1 Alternative 1 – No Action 83

TABLE OF CONTENTS (cont.)
FEASIBILITY STUDY
RAYMARK INDUSTRIES, OPERABLE UNIT 6 – ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

SECTION **PAGE**

4.3.1.1.2 Alternative 2 – Restrictions with Long-Term Monitoring....83
4.3.1.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4)....84
4.3.1.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6)....84
4.3.1.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8)....85
4.3.1.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8)....85
4.3.1.1.7 Treatment of Raymark Waste (applies to Alternatives 5 through 10)....86
4.3.1.2 Comparative Analysis of Alternatives for Lockwood Avenue Property....88
4.3.1.2.1 Overall Protection of Human Health and the Environment....88
4.3.1.2.2 Compliance with ARARs....88
4.3.1.2.3 Long-Term Effectiveness and Permanence....88
4.3.1.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment....89
4.3.1.2.5 Short-Term Effectiveness....89
4.3.1.2.6 Implementability....89
4.3.1.2.7 Cost....90
4.3.2 200 Ferry Boulevard Property....91
4.3.2.1 200 Ferry Boulevard Assumptions....92
4.3.2.1.1 Alternative 1 – No Action....93
4.3.2.1.2 Alternative 2 – Restrictions with Long-Term Monitoring....93
4.3.2.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4)....94
4.3.2.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6)....95
4.3.2.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8)....97

TABLE OF CONTENTS (cont.)
FEASIBILITY STUDY
RAYMARK INDUSTRIES, OPERABLE UNIT 6 – ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

SECTION **PAGE**

4.3.2.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10) 98
4.3.2.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10) 100
4.3.2.2 Comparative Analysis of Alternatives for 200 Ferry Boulevard 101
4.3.2.2.1 Overall Protection of Human Health and the Environment 101
4.3.2.2.2 Compliance with ARARs 102
4.3.2.2.3 Long-Term Effectiveness and Permanence 102
4.3.2.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment 103
4.3.2.2.5 Short-Term Effectiveness 103
4.3.2.2.6 Implementability 104
4.3.2.2.7 Cost 104
4.3.3 Ferry Boulevard Properties 105
4.3.3.1 Ferry Boulevard Properties Assumptions 107
4.3.3.1.1 Alternative 1 – No Action 107
4.3.3.1.2 Alternative 2 – Restrictions with Long-Term Monitoring 107
4.3.3.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-Of-Town Disposal (Alt. 4) 108
4.3.3.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6) 110
4.3.3.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8) 112
4.3.3.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10) 113
4.3.3.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10) 115
4.3.3.2 Comparative Analysis of Alternatives for Ferry Boulevard Properties 117
4.3.3.2.1 Overall Protection of Human Health and the Environment 117
4.3.3.2.2 Compliance with ARARs 117
4.3.3.2.3 Long-Term Effectiveness and Permanence 118

TABLE OF CONTENTS (cont.)
FEASIBILITY STUDY
RAYMARK INDUSTRIES, OPERABLE UNIT 6 – ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

SECTION **PAGE**

4.3.3.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment 118
4.3.3.2.5 Short-Term Effectiveness 118
4.3.3.2.6 Implementability 119
4.3.3.2.7 Cost 120
4.3.4 Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue Properties 121
4.3.4.1 The Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue Assumptions 123
4.3.4.1.1 Alternative 1 – No Action 123
4.3.4.1.2 Alternative 2 – Restrictions with Long-Term Monitoring 123
4.3.4.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4) 124
4.3.4.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6) 126
4.3.4.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8) 128
4.3.4.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10) 128
4.3.4.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10) 130
4.3.4.2 Comparative Analysis of Alternatives for The Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue 131
4.3.4.2.1 Overall Protection of Human Health and the Environment 131
4.3.4.2.2 Compliance with ARARs 131
4.3.4.2.3 Long-Term Effectiveness and Permanence 132
4.3.4.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment 132
4.3.4.2.5 Short-Term Effectiveness 133
4.3.4.2.6 Implementability 133
4.3.4.2.7 Cost 134
4.3.5 326 Ferry Boulevard Property 135
4.3.5.1 326 Ferry Boulevard Assumptions 136
4.3.5.1.1 Alternative 1 – No Action 137

TABLE OF CONTENTS (cont.)
FEASIBILITY STUDY
RAYMARK INDUSTRIES, OPERABLE UNIT 6 – ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

SECTION **PAGE**

4.3.5.1.2 Alternative 2 – Restrictions with Long-Term Monitoring 137
4.3.5.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4) 137
4.3.5.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6) 139
4.3.5.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8) 141
4.3.5.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10) 142
4.3.5.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10) 143
4.3.5.2 Comparative Analysis of Alternatives for 326 Ferry Boulevard 145
4.3.5.2.1 Overall Protection of Human Health and the Environment 145
4.3.5.2.2 Compliance with ARARs 145
4.3.5.2.3 Long-Term Effectiveness and Permanence 146
4.3.5.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment 146
4.3.5.2.5 Short-Term Effectiveness 146
4.3.5.2.6 Implementability 147
4.3.5.2.7 Cost 148
4.3.6 576 and 600 East Broadway Property 149
4.3.6.1 576 and 600 East Broadway Assumptions 150
4.3.6.1.1 Alternative 1 – No Action 151
4.3.6.1.2 Alternative 2 – Restrictions with Long-Term Monitoring 151
4.3.6.1.3 Alternatives 3 and 4 – Low- Permeability Cap with In-Town consolidation (Alt.3) and Out-of-Town Disposal (Alt.4) 151
4.3.6.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Atl. 5) or Out-of-Town Disposal (Alt.6) 154
4.3.6.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8) 155

TABLE OF CONTENTS (cont.)
FEASIBILITY STUDY
RAYMARK INDUSTRIES, OPERABLE UNIT 6 – ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

SECTION **PAGE**

4.3.6.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt.10) 157
4.3.6.1.7 Treatment of Raymark Waste (applies to Alternatives 5 through 10) 159
4.3.6.2 Comparative Analysis of Alternatives for 576/600 East Broadway 160
4.3.6.2.1 Overall Protection of Human Health and the Environment 160
4.3.6.2.2 Compliance with ARARs 161
4.3.6.2.3 Long-Term Effectiveness and Permanence 161
4.3.6.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment 162
4.3.6.2.5 Short-Term Effectiveness 162
4.3.6.2.6 Implementability 163
4.3.6.2.7 Cost 163
4.3.7 Vacant DOT Lot Abutting I-95 Property 164
4.3.7.1 Vacant DOT Lot Abutting I-95 Assumptions 165
4.3.7.1.1 Alternative 1 – No Action 166
4.3.7.1.2 Alternative 2 – Restrictions with Long-Term Monitoring 166
4.3.7.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4) 166
4.3.7.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6) 168
4.3.7.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8) 170
4.3.7.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10) 172
4.3.7.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10) 173
4.3.7.2 Comparative Analysis of Alternatives for Vacant DOT Lot Abutting I-95 175
4.3.7.2.1 Overall Protection of Human Health and the Environment 175
4.3.7.2.2 Compliance with ARARs 175
4.3.7.2.3 Long-Term Effectiveness and Permanence 176

TABLE OF CONTENTS (cont.)
FEASIBILITY STUDY
RAYMARK INDUSTRIES, OPERABLE UNIT 6 – ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

SECTION **PAGE**

4.3.7.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment 176
4.3.7.2.5 Short-Term Effectiveness 176
4.3.7.2.6 Implementability 177
4.3.7.2.7 Cost 178
4.3.8 Connecticut Right-of-Way Property 179
4.3.8.1 Connecticut ROW Assumptions 181
4.3.8.1.1 Alternative 1 – No Action 181
4.3.8.1.2 Alternative 2 – Restrictions with Long-Term Monitoring 181
4.3.8.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4) 182
4.3.8.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6) 183
4.3.8.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8) 185
4.3.8.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10) 187
4.3.8.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10) 188
4.3.8.2 Comparative Analysis of Alternatives for Connecticut ROW 190
4.3.8.2.1 Overall Protection of Human Health and the Environment 190
4.3.8.2.2 Compliance with ARARs 190
4.3.8.2.3 Long-Term Effectiveness and Permanence 191
4.3.8.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment 191
4.3.8.2.5 Short-Term Effectiveness 191
4.3.8.2.6 Implementability 192
4.3.8.2.7 Cost 193
4.3.9 250, 304, and 340 East Main Street Properties 194
4.3.9.1 250, 304, and 340 East Main Street Assumptions 196
4.3.9.1.1 Alternative 1 – No Action 196
4.3.9.1.2 Alternative 2 – Restrictions with Long-Term Monitoring 196

TABLE OF CONTENTS (cont.)
FEASIBILITY STUDY
RAYMARK INDUSTRIES, OPERABLE UNIT 6 – ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

SECTION **PAGE**

4.3.9.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4) 197
4.3.9.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6) 199
4.3.9.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8) 200
4.3.9.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10) 202
4.3.9.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10) 204
4.3.9.2 Comparative Analysis of Alternatives for 250, 304, and 340 East Main Street 205
4.3.9.2.1 Overall Protection of Human Health and the Environment 205
4.3.9.2.2 Compliance with ARARs 206
4.3.9.2.3 Long-Term Effectiveness and Permanence 206
4.3.9.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment 207
4.3.9.2.5 Short-Term Effectiveness 207
4.3.9.2.6 Implementability 207
4.3.9.2.7 Cost 208
4.3.10 380 East Main Street Property 209
4.3.10.1 380 East Main Street Assumptions 211
4.3.10.1.1 Alternative 1 – No Action 211
4.3.10.1.2 Alternative 2 – Restrictions with Long-Term Monitoring 211
4.3.10.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4) 212
4.3.10.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6) 213
4.3.10.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8) 214
4.3.10.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10) 215

TABLE OF CONTENTS (cont.)
FEASIBILITY STUDY
RAYMARK INDUSTRIES, OPERABLE UNIT 6 – ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

SECTION **PAGE**

4.3.10.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10) 216
4.3.10.2 Comparative Analysis of Alternatives for 380 East Main Street....217
4.3.10.2.1 Overall Protection of Human Health and the Environment 217
4.3.10.2.2 Compliance with ARARs 218
4.3.10.2.3 Long-Term Effectiveness and Permanence 218
4.3.10.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment....219
4.3.10.2.5 Short-Term Effectiveness....219
4.3.10.2.6 Implementability 219
4.3.10.2.7 Cost 220
4.3.11 Department of Public Works (DPW) Lot – Area of Concern (AOC) 1 Property 221
4.3.11.1 DPW Lot AOC 1 Assumptions 222
4.3.11.1.1 Alternative 1 – No Action....223
4.3.11.1.2 Alternative 2 – Restrictions with Long-Term Monitoring....223
4.3.11.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4) 224
4.3.11.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6) 225
4.3.11.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8) 227
4.3.11.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10) 228
4.3.11.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10) 229
4.3.11.2 Comparative Analysis of Alternatives for DPW Lot AOC 1 231
4.3.11.2.1 Overall Protection of Human Health and the Environment 231
4.3.11.2.2 Compliance with ARARs 231
4.3.11.2.3 Long-Term Effectiveness and Permanence 232
4.3.11.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment....232
4.3.11.2.5 Short-Term Effectiveness....232

TABLE OF CONTENTS (cont.)
FEASIBILITY STUDY
RAYMARK INDUSTRIES, OPERABLE UNIT 6 – ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

SECTION **PAGE**

4.3.11.2.6 Implementability 233
4.3.11.2.7 Cost 234
4.3.12 Department of Public Works (DPW) Lot – Area of Concern (AOC) 2 and 251 East Main Street Properties 235
4.3.12.1 DPW Lot AOC 2 and 251 East Main Street Assumptions 237
4.3.12.1.1 Alternative 1 – No Action 237
4.3.12.1.2 Alternative 2 – Restrictions with Long-Term Monitoring 237
4.3.12.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4) 238
4.3.12.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6) 239
4.3.12.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8) 241
4.3.12.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10) 242
4.3.12.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10) 244
4.3.12.2 Comparative Analysis of Alternatives for DPW Lot AOC 2 and 251 East Main Street 245
4.3.12.2.1 Overall Protection of Human Health and the Environment 245
4.3.12.2.2 Compliance with ARARs 245
4.3.12.2.3 Long-Term Effectiveness and Permanence 246
4.3.12.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment 246
4.3.12.2.5 Short-Term Effectiveness 247
4.3.12.2.6 Implementability 247
4.3.12.2.7 Cost 248
4.3.13 Beacon Point Area of Concern (AOC) 1 Property 249
4.3.13.1 Beacon Point AOC 1 Assumptions 251
4.3.13.1.1 Alternative 1 – No Action 251
4.3.13.1.2 Alternative 2 – Restrictions with Long-Term Monitoring 251
4.3.13.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4) 252

TABLE OF CONTENTS (cont.)
FEASIBILITY STUDY
RAYMARK INDUSTRIES, OPERABLE UNIT 6 – ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

SECTION **PAGE**

4.3.13.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6) 253
4.3.13.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8) 255
4.3.13.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10) 257
4.3.13.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10) 258
4.3.13.2 Comparative Analysis of Alternatives for Beacon Point AOC 1 259
4.3.13.2.1 Overall Protection of Human Health and the Environment 260
4.3.13.2.2 Compliance with ARARs 260
4.3.13.2.3 Long-Term Effectiveness and Permanence 260
4.3.13.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment 261
4.3.13.2.5 Short-Term Effectiveness 261
4.3.13.2.6 Implementability 262
4.3.13.2.7 Cost 263
4.3.14 Beacon Point Area of Concern (AOC) 2 Property 264
4.3.14.1 Beacon Point AOC 2 Assumptions 266
4.3.14.1.1 Alternative 1 – No Action 266
4.3.14.1.2 Alternative 2 – Restrictions with Long-Term Monitoring 266
4.3.14.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4) 267
4.3.14.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6) 267
4.3.14.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8) 267
4.3.14.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10) 267
4.3.14.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10) 267

TABLE OF CONTENTS (cont.)
FEASIBILITY STUDY
RAYMARK INDUSTRIES, OPERABLE UNIT 6 – ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

SECTION **PAGE**

4.3.14.2 Comparative Analysis of Alternatives for Beacon Point AOC 2 Property 267
4.3.14.2.1 Overall Protection of Human Health and the Environment 268
4.3.14.2.2 Compliance with ARARs 268
4.3.14.2.3 Long-Term Effectiveness and Permanence 268
4.3.14.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment 268
4.3.14.2.5 Short-Term Effectiveness 268
4.3.14.2.6 Implementability 268
4.3.14.2.7 Cost 269
4.3.15 Beacon Point Area of Concern (AOC) 3 Property 270
4.3.15.1 Beacon Point AOC 3 Assumptions 272
4.3.15.1.1 Alternative 1 – No Action 272
4.3.15.1.2 Alternative 2 – Restrictions with Long-Term Monitoring 272
4.3.15.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4) 273
4.3.15.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6) 273
4.3.15.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8) 275
4.3.15.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10) 275
4.3.15.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10) 276
4.3.15.2 Comparative Analysis of Alternatives for Beacon Point AOC 3 278
4.3.15.2.1 Overall Protection of Human Health and the Environment 278
4.3.15.2.2 Compliance with ARARs 278
4.3.15.2.3 Long-Term Effectiveness and Permanence 279
4.3.15.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment 279
4.3.15.2.5 Short-Term Effectiveness 279
4.3.15.2.6 Implementability 280
4.3.15.2.7 Cost 281
4.3.16 Airport Property North of Marine Basin Property 282

TABLE OF CONTENTS (cont.)
FEASIBILITY STUDY
RAYMARK INDUSTRIES, OPERABLE UNIT 6 – ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

SECTION **PAGE**

4.3.16.1 Airport Property North of Marine Basin Assumptions.....283
4.3.16.1.1 Alternative 1 – No Action.....284
4.3.16.1.2 Alternative 2 – Restrictions with Long-Term Monitoring.....284
4.3.16.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4).....284
4.3.16.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6).....286
4.3.16.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8).....288
4.3.16.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10).....288
4.3.16.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10).....289
4.3.16.2 Comparative Analysis of Alternatives for Airport Property North of Marine Basin.....291
4.3.16.2.1 Overall Protection of Human Health and the Environment.....291
4.3.16.2.2 Compliance with ARARs.....291
4.3.16.2.3 Long-Term Effectiveness and Permanence.....292
4.3.16.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment.....292
4.3.16.2.5 Short-Term Effectiveness.....293
4.3.16.2.6 Implementability.....293
4.3.16.2.7 Cost.....294
4.3.17 Wooster Park Property.....295
4.3.17.1 Wooster Park Assumptions.....296
4.3.17.1.1 Alternative 1 – No Action.....297
4.3.17.1.2 Alternative 2 – Restrictions with Long-Term Monitoring.....297
4.3.17.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4).....298
4.3.17.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6).....299

TABLE OF CONTENTS (cont.)
FEASIBILITY STUDY
RAYMARK INDUSTRIES, OPERABLE UNIT 6 – ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

SECTION **PAGE**

4.3.17.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8) 301
4.3.17.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10) 301
4.3.17.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10) 302
4.3.17.2 Comparative Analysis of Alternatives for Wooster Park 304
4.3.17.2.1 Overall Protection of Human Health and the Environment 304
4.3.17.2.2 Compliance with ARARs 304
4.3.17.2.3 Long-Term Effectiveness and Permanence 305
4.3.17.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment 305
4.3.17.2.5 Short-Term Effectiveness 305
4.3.17.2.6 Implementability 306
4.3.17.2.7 Cost 307
4.3.18 Third Avenue Property 308
4.3.18.1 Third Avenue Property Assumptions 309
4.3.18.1.1 Alternative 1 – No Action 309
4.3.18.1.2 Alternative 2 – Restrictions with Long-Term Monitoring 310
4.3.18.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4) 310
4.3.18.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6) 312
4.3.18.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8) 314
4.3.18.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10) 316
4.3.18.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10) 317
4.3.18.2 Comparative Analysis of Alternatives for Third Avenue Property 319
4.3.18.2.1 Overall Protection of Human Health and the Environment 319
4.3.18.2.2 Compliance with ARARs 319

TABLE OF CONTENTS (cont.)
FEASIBILITY STUDY
RAYMARK INDUSTRIES, OPERABLE UNIT 6 – ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

SECTION **PAGE**

4.3.18.2.3 Long-Term Effectiveness and Permanence 320
4.3.18.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment 320
4.3.18.2.5 Short-Term Effectiveness 320
4.3.18.2.6 Implementability 321
4.3.18.2.7 Cost 322

TABLES

NUMBER

2-1 Remedial Action Objectives, General Response Actions, Technology Types, and Process Options
2-2 Summary of Estimated Raymark Waste Areas and Volumes by Property
2-3 Preliminary Screening of Remedial Technologies and Process Options
2-4 Preliminary Screening of Remedial Technologies and Process Option for Soils
4-1 Summary of Detailed Analysis for Lockwood Avenue Property
4-1A Comparative Analysis of Alternatives for Lockwood Avenue Property
4-1B Cost Estimate Summary for Lockwood Avenue Property
4-1C Preliminary ARAR Summary – Lockwood Avenue Property
4-2 Summary of Detailed Analysis for 200 Ferry Boulevard
4-2A Comparative Analysis of Alternatives for 200 Ferry Boulevard
4-2B Cost Estimate Summary for 200 Ferry Boulevard
4-2C Preliminary ARAR Summary – 200 Ferry Boulevard
4-3 Summary of Detailed Analysis for Ferry Boulevard Properties
4-3A Comparative Analysis of Alternatives for Ferry Boulevard Properties
4-3B Cost Estimate Summary for Ferry Boulevard Properties
4-3C Preliminary ARAR Summary – Ferry Boulevard Properties
4-4 Summary of Detailed Analysis for Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue
4-4A Comparative Analysis of Alternatives for Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue
4-4B Cost Estimate Summary for Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue
4-4C Preliminary ARAR Summary – Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue
4-5 Summary of Detailed Analysis for 326 Ferry Boulevard
4-5A Comparative Analysis of Alternatives for 326 Ferry Boulevard
4-5B Cost Estimate Summary for 326 Ferry Boulevard
4-5C Preliminary ARAR Summary – 326 Ferry Boulevard
4-6 Summary of Detailed Analysis for 576/600 East Broadway

TABLE OF CONTENTS (cont.)
FEASIBILITY STUDY
RAYMARK INDUSTRIES, OPERABLE UNIT 6 – ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

TABLES (cont.)

NUMBER

4-6A Comparative Analysis of Alternatives for 576/600 East Broadway
4-6B Cost Estimate Summary for 576/600 East Broadway
4-6C Preliminary ARAR Summary – 576/600 East Broadway
4-7 Summary of Detailed Analysis for Vacant DOT Lot Abutting I-95
4-7A Comparative Analysis of Alternatives for Vacant DOT Lot Abutting I-95
4-7B Cost Estimate Summary for Vacant DOT Lot Abutting I-95
4-7C Preliminary ARAR Summary – Vacant DOT Lot Abutting I-95
4-8 Summary of Detailed Analysis for Connecticut Right-of-Way
4-8A Comparative Analysis of Alternatives for Connecticut Right-of-Way
4-8B Cost Estimate Summary for Connecticut Right-of-Way
4-8C Preliminary ARAR Summary – Connecticut Right-of-Way
4-9 Summary of Detailed Analysis for 250, 304, and 340 East Main Street
4-9A Comparative Analysis of Alternatives for 250, 304, and 340 East Main Street
4-9B Cost Estimate Summary for 250, 304, and 340 East Main Street
4-9C Preliminary ARAR Summary – 250, 304, and 340 East Main Street
4-10 Summary of Detailed Analysis for 380 East Main Street
4-10A Comparative Analysis of Alternatives for 380 East Main Street
4-10B Cost Estimate Summary for 380 East Main Street
4-10C Preliminary ARAR Summary – 380 East Main Street
4-11 Summary of Detailed Analysis for DPW Lot AOC 1
4-11A Comparative Analysis of Alternatives for DPW Lot AOC 1
4-11B Cost Estimate Summary for DPW Lot AOC 1
4-11C Preliminary ARAR Summary – DPW Lot AOC 1
4-12 Summary of Detailed Analysis for DPW Lot AOC 2 and 251 East Main Street
4-12A Comparative Analysis of Alternatives for DPW Lot AOC 2 and 251 East Main Street
4-12B Cost Estimate Summary for DPW Lot AOC 2 and 251 East Main Street
4-12C Preliminary ARAR Summary – DPW Lot AOC 2 and 251 East Main Street
4-13 Summary of Detailed Analysis for Beacon Point AOC 1
4-13A Comparative Analysis of Alternatives for Beacon Point AOC 1
4-13B Cost Estimate Summary for Beacon Point AOC 1
4-13C Preliminary ARAR Summary – Beacon Point AOC 1
4-14 Summary of Detailed Analysis for Beacon Point AOC 2
4-14A Comparative Analysis of Alternatives for Beacon Point AOC 2
4-14B Cost Estimate Summary for Beacon Point AOC 2
4-14C Preliminary ARAR Summary – Beacon Point AOC 2
4-15 Summary of Detailed Analysis for Beacon Point AOC 3
4-15A Comparative Analysis of Alternatives for Beacon Point AOC 3
4-15B Cost Estimate Summary for Beacon Point AOC 3
4-15C Preliminary ARAR Summary – Beacon Point AOC 3
4-16 Summary of Detailed Analysis for Airport Property North of Marine Basin

TABLE OF CONTENTS (cont.)
FEASIBILITY STUDY
RAYMARK INDUSTRIES, OPERABLE UNIT 6 – ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

TABLES (cont.)

NUMBER

4-16A Comparative Analysis of Alternatives for Airport Property North of Marine Basin
4-16B Cost Estimate Summary for Airport Property North of Marine Basin
4-16C Preliminary ARAR Summary – Airport Property North of Marine Basin
4-17 Summary of Detailed Analysis for Wooster Park
4-17A Comparative Analysis of Alternatives for Wooster Park
4-17B Cost Estimate Summary for Wooster Park
4-17C Preliminary ARAR Summary – Wooster Park
4-18 Summary of Detailed Analysis for Third Avenue Property
4-18A Comparative Analysis of Alternatives for Third Avenue Property
4-18B Cost Estimate Summary for Third Avenue Property
4-18C Preliminary ARAR Summary – Third Avenue Property

FIGURES

NUMBER

1-1 Site Locus
1-2 Location of Properties
4-1 Lockwood Avenue
4-2 200 Ferry Boulevard
4-3 230/250/280/300 Ferry Boulevard
4-4 Lot Behind 326 Ferry Boulevard/Vacant Housatonic Lot
4-5 326 Ferry Boulevard
4-6 576/600 East Broadway
4-7 Vacant Lot Abutting I-95
4-8 Connecticut Right-of-Way
4-9 250, 304, and 340 East Main Street
4-10 380 East Main Street
4-11 DPW Lot Area of Concern (AOC) 1
4-12 DPW Lot Area of Concern (AOC) 2 and 251 East Main Street
4-13 Beacon Point Area of Concern (AOC) 1
4-14 Beacon Point Area of Concern (AOC) 2
4-15 Beacon Point Area of Concern (AOC) 3
4-16 Airport Property North of Marine Basin
4-17 Wooster Park
4-18 Third Avenue Property

REFERENCES

TABLE OF CONTENTS (cont.)
FEASIBILITY STUDY
RAYMARK INDUSTRIES, OPERABLE UNIT 6 – ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

APPENDICES

A Focused Feasibility Studies for Partial OU3 Ferry Creek Elbow, OU4 Raybestos Memorial Ballfield, and OU9 Stratford Landfill and Short Beach Park
- A-1 Focused Feasibility Study for Partial Operable Unit 3
- A-2 Focused Feasibility Study for Operable Unit 4
- A-3 Focused Feasibility Study for Operable Unit 9

B General Description of the Potential Remedial Alternatives
C Summary of Potential ARARs and TBCs
D Development of Volume Estimates
E Groundwater Levels
F In-Town Consolidation/CAMU Areas
- F-1 Preliminary Screening for Consolidation and CAMU Areas
- F-2 Detailed Analysis of Alternatives for Consolidation and CAMU Areas
- F-3 Comparative Analysis of Alternatives for Consolidation and CAMU Areas

G Cost Estimates
- G-1 Lockwood Avenue Property – Cost Estimate Backup Sheets
- G-2 200 Ferry Boulevard – Cost Estimate Backup Sheets
- G-3 Ferry Boulevard Properties – Cost Estimate Backup Sheets
- G-4 Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue – Cost Estimate Backup Sheets
- G-5 326 Ferry Boulevard – Cost Estimate Backup Sheets
- G-6 576 and 600 East Broadway Properties – Cost Estimate Backup Sheets
- G-7 Vacant DOT Lot Abutting I-95 – Cost Estimate Backup Sheets
- G-8 CT Right-of-Way – Cost Estimate Backup Sheets
- G-9 250, 304, and 340 East Main Street – Cost Estimate Backup Sheets
- G-10 380 East Main Street – Cost Estimate Backup Sheets
- G-11 Department of Public Works Lot – Area of Concern 1 – Cost Estimate Backup Sheets
- G-12 Department of Public Works Lot – Area of Concern 2 and 251 East Main Street – Cost Estimate Backup Sheets
- G-13 Beacon Point Area of Concern 1 – Cost Estimate Backup Sheets
- G-14 Beacon Point Area of Concern 2 – Cost Estimate Backup Sheets
- G-15 Beacon Point Area of Concern 3 – Cost Estimate Backup Sheets
- G-16 Airport Property North of Marine Basin – Cost Estimate Backup Sheets
- G-17 Wooster Park – Cost Estimate Backup Sheets
- G-18 Third Avenue Property – Cost Estimate Backup Sheets
- G-19 Overall Cost Assumptions

H Cost Evaluations for Complete Removal of Raymark Waste
- H-1 Estimated Volume of Raymark Waste
- H-2 Comparison of Costs for Excavation of Raymark Waste to Groundwater Versus Complete Excavation of All Raymark Waste

ACRONYMS

ARARs	Applicable or Relevant and Appropriate Requirements
ATSDR	Agency for Toxic Substances and Disease Registry
AVS/SEM	acid volatile sulphide/simultaneously extractable metals
bgs	below ground surface
CAMU	Corrective Action Management Unit
CDD	chlorinated dibenzo-p-dioxins
CDF	chlorinated dibenzofurans
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLP	contract laboratory program
cm	centimeter
COC	Chemicals of Concern
COPC	chemicals of potential concern
CSI	comprehensive site investigation
CSF	cancer slope factor
CT DEP	Connecticut Department of Environmental Protection
CT DPHAS	Connecticut Department of Public Health and Addiction Services
DABS	Dermal Absorption Factors
DEC	Direct Exposure Criteria
DHHS	Department of Health and Human Services
dL	Deciliter
DNAPL	dense non-aqueous phase liquid
DOT	Department of Transportation
DPW	Department of Public Works
ECG	electrocardiograph
ELI	Environmental Laboratories, Inc.
ELUR	Environmental Land Use Restriction
EPA	United States Environmental Protection Agency
EPC	exposure point concentrations
ERA	ecological risk assessment
ESI	expanded site inspection
FEMA	Federal Emergency Management Agency
FID	flame ionization detector

ACRONYMS (cont.)

FRW	fraction of property estimated to contain Raymark waste
FS	Feasibility Study
GA/GAA	State of Connecticut Classification for Drinking Water source
GB	State of Connecticut Classification for Non-drinking Water source
GC/ECD	gas chromatograph with electron capture detection
GCL	Geosynthetic Clay Liner
GPR	ground penetrating radar
GPS	Global Positioning System
HDPE	High density polyethylene
HEAST	Health Effects Assessment Summary Tables
HHEM	Human Health Evaluation Manual
HHRA	human health risk assessment
HI	hazard index
HQ	hazard quotient
IEUBK	Integrated Exposure Uptake Biokinetic model
ILCR	incremental lifetime cancer risk
IRIS	Integrated Risk Information System
kg	kilogram
LDR	Land Disposal Regulation
LLDPE	linear low density polyethylene
LOAEL	lowest observed adverse effect level
μg	microgram
MCL	Massachusetts Cleanup Limits
MEP	multiple extraction procedure
mg	milligram
mph	miles per hour
NAPL	non-aqueous phase liquid
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NERL	New England Regional Laboratory
NESHAP	National Emission Standard for Hazardous Air Pollutants
NGVD	National Geodetic Vertical Datum
NOAA	National Oceanic and Atmospheric Administration

ACRONYMS (cont.)

NOAEL	no observed adverse effect level
NPDES	National Pollutant Discharge Elimination System
NTCRA	Non-Time Critical Response Action
O&M	Operation and Maintenance
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PHC	Principal Hazard Constituents
PID	photoionization detector
PMC	Pollutant Mobility Criteria
ppb	parts per billion
ppm	parts per million
PRG	preliminary remediation goal
RAF	relative adsorption factor
RAGS	Risk Assessment Guidance for Superfund
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RfC	reference concentration
RfD	reference dose
RI	Remedial Investigation
RME	reasonable maximum exposure
ROD	Record of Decision
RSR	Connecticut Remediation Standard Regulation
SARA	Superfund Amendments and Reauthorization Act
SAS	special analytical services
SDWA	Safe Drinking Water Act
SPLP	synthetic precipitation leaching procedure
SRI	Strategic Redevelopment Initiative
SSL	soil screening level
SVOC	semi-volatile organic compound
TAL	target analyte list

ACRONYMS (cont.)

TBC	To be Considered, CERCLA Guidance and Standards
TCDD	2,3,7,8-tetrachloro-dibenzo-p-dioxin
TCL	target compound list
TCLP	toxicity characteristic leaching procedure
TEF	toxicity equivalence factor
TERC	Total Environmental Restoration Contract
TEQ	toxicity equivalent
TOC	total organic carbon
TSCA	Toxic Substances Control Act
TtNUS	Tetra Tech NUS
UCL	upper confidence limit
USGS	United States Geological Society
UTS	Universal Treatment Standards
VOC	volatile organic compound
VSP	vertical sampling program
XRF	x-ray fluorescence
yr	year

1.0 INTRODUCTION

This report presents the Feasibility Study (FS) for operable unit (OU) 6 at the Raymark Industries Superfund Site (the Site) located in Stratford, Connecticut. This FS Report was prepared by Nobis Engineering, Inc. (Nobis) for the United States Environmental Protection Agency (EPA) under Task Order No. 0006-RI-CO-01H3, Contract No. EP-S1-06-03. This report presents a range of remedial options that addresses risks to human health that were identified during the Remedial Investigation (RI) for OU6 (Additional Properties) (TtNUS, 2005).

This FS was prepared consistent with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986; the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) 40 CFR 300; and the Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA (EPA, 1988) (RI/FS Guidance Document).

The remedial options developed in this document will be used by EPA to formulate a preferred remedy that will address Raymark waste at OU6 on a property-specific basis (Raymark waste defined in the RI for OU6; TtNUS, 2005). Part of this document also includes an evaluation of potential in-town locations for Raymark Waste consolidation. These consolidation locations or Corrective Action Management Units (CAMUs) are part of other Raymark OUs: OU3 (partial), OU4, and OU9 (partial). An evaluation of a range of the alternatives considered for each of these OUs has been included in this FS and is presented in Appendix A. After the public comment period has concluded on EPA's preferred remedy(ies), the selected remedy(ies) will be documented in an EPA Record of Decision (ROD).

1.1 Organization of Report

The OU6 FS is organized in the following manner:

- Section 1.0 presents the purpose of this FS Report; a summary of the Site; a summary of previous investigations at OU6; a general discussion of the nature and extent of contamination on the OU6 properties; and a summary of the baseline risk assessment prepared for OU6 properties in the RI.

- Section 2.0 presents the discussion of applicable or relevant and appropriate requirements (ARARs); the remedial action objective (RAO) and preliminary remediation goals (PRGs); general response actions; estimates of Raymark waste volumes on each OU6 property; and the identification and screening of technologies/alternatives to address Raymark waste at the OU6 properties.

- Section 3.0 presents the development of remedial alternatives for the OU6 properties; provides detailed descriptions of the remedial alternatives that are considered for each property group; and presents a discussion of potential CAMUs for in-town consolidation/capping of Raymark waste.

- Section 4.0 presents the rationale for combining OU6 properties into property groups; presents the property-specific detailed and comparative analyses of remedial action alternatives.

1.2 Purpose of the Report

The overall objective of this FS is to develop and evaluate remedial alternatives that address contaminated soil (Raymark waste) at each of the OU6 properties. The general FS process is described below:

- Develop remedial action objectives that incorporate target cleanup goals that are protective of human health and the environment. The remedial action objectives specify the contaminants, media of interest, exposure pathways, and preliminary remediation goals. The preliminary remediation goals (numeric criteria) are developed based on chemical-specific applicable or relevant and appropriate requirements (ARARs), when available, and site-specific risk-related factors.

- Develop general response actions to address each medium of interest. Each response action may be implemented singly or in combination with other actions to satisfy the remedial action objectives.

- Identify and screen technologies applicable to each general response action. Technologies and process options that are not technically implementable are eliminated.

Representative process options for the remaining, viable technologies are then evaluated for their effectiveness, implementability, and cost.

- Assemble a range of remedial alternatives from the retained technologies.

- Prepare a detailed analysis of individual alternatives following the criteria specified in the NCP and the RI/FS guidance document; and compare and evaluate the alternatives.

The RAO presented in Section 2.2 of this FS Report establishes the site-specific criteria that must be met to achieve a reduction in risk, that is protective of human health, and to comply with federal and state regulations, where applicable or relevant and appropriate.

The Raymark waste volume estimates presented in Section 2.4 of this FS Report establish the physical parameters, volumes, and physical settings for the contaminated media to be remediated, consistent with the RAO developed in Section 2.2.

Section 2.5 of this FS Report and Tables 2-1 and 2-3 present the identification and screening of technologies that were considered in this FS. Technologies that were retained in the initial screening underwent a more detailed evaluation to identify processes best suited to achieve the RAO. The criteria used in evaluating technologies are: effectiveness of the technology to address site-related contaminants, implementability of the technologies, and relative cost.

The rationale for developing remedial alternatives is presented in Section 3.0. Viable technologies were assembled into alternatives representing a range of removal/treatment and containment options that can be applied to each of the OU6 properties.

In Section 4.0, consistent with the NCP and the RI/FS guidance document, detailed evaluations of each alternative for each OU6 property were performed. The detailed analysis of alternatives evaluates each of the alternatives developed in Section 3.0 for each property by considering property-specific characteristics such as volumes or areas of contamination, sizing and configuration of low-permeability caps, flood mitigation requirements, wetland mitigation requirements, etc.

Property-specific alternatives were evaluated based on the following criteria: overall protection of human health and the environment; compliance with ARARs; long-term effectiveness and permanence; reduction of mobility, toxicity, or volume through treatment; short-term effectiveness; implementability; and cost. Overall protection of human health and the environment and compliance with ARARs are the two threshold criteria, while the remaining five are balancing criteria. Community and state acceptance are the two modifying criteria that EPA will assess after public comment prior to final selection of the remedial strategy in the Record of Decision. Comparative analyses of the alternatives are also presented in Section 4.0. See Section 4.1 for a detailed description of these criteria.

1.3 History of the Raymark Superfund Site

This section summarizes the history of the former Raymark Facility, describes the Raymark Superfund Site, and identifies other activities associated with the former Raymark Facility. Refer to the OU1 Final Remedial Investigation Report (HNUS, 1995) for further details on the Raymark Facility operating history, environmental activities, permits, and compliance history.

1.3.1 History of Raymark Facility and Environs

The Raymark Facility, formerly named Raybestos - Manhattan Company, was located at 75 East Main Street in Stratford, Fairfield County, Connecticut, at latitude 41^{o}_12$^{'}$_02.5$^{"}$_N and longitude 73 ^{o} _07$^{'}$_14.0$^{"}$_W (see Figure 1-1). The Raymark Facility operated from 1919 until 1989, when the manufacturing plant was shut down and permanently closed. During operation, Raymark waste was disposed of in Stratford as “fill” material at the Raymark facility, at various commercial, residential, municipal and recreational locations, and wetlands adjacent to the Housatonic River. The Raymark Industries Superfund site includes the [former] Raymark Industries, Inc. facility and other locations where Raymark Industries, Inc., facility waste has come to be located (60 FR 20330). Remediation of the former Raymark facility was completed in 1997.

An RI/FS for the Raymark Facility was completed in 1995 (HNUSa and HNUSb, 1995). Subsequent to the completion of the RI/FS, EPA designated the facility as Operable Unit No. 1 (OU1). In 1996 and 1997, as part of the remedial activities, the Facility buildings were demolished and a permanent cap was placed over the contaminated areas on the property. Based on Stratford tax map information, the Facility occupied 33.4 acres. Raymark

manufactured friction materials containing asbestos and non-asbestos components, metals, phenol-formaldehyde resins, and various adhesives. Primary products were gasket material, sheet packing, and friction materials including clutch facings, transmission plates, and brake linings. As a result of these activities, soils at the Facility were contaminated with, among other things, asbestos, lead, copper, and polychlorinated biphenyl compounds (PCBs).

During the facility's 70 years of operation, it was common practice to dispose of the Raymark Facility manufacturing waste as "fill" material both at the Raymark Facility itself, as well as at various locations throughout Stratford. The manufacturing wastes from various plant operations were used to fill low-lying areas on-site to create additional space for facility expansion. Based on aerial photographs and reported knowledge of site activities, on-site disposal occurred between 1919 and 1984, and progressed essentially from north to south, across the Raymark Facility. As a result of disposal of these manufacturing wastes on the property, soils at the Raymark Facility became contaminated with asbestos, lead, copper, and PCBs, among other things. New buildings and parking areas were constructed over these filled areas as the manufacturing facility expanded. Raymark also offered manufacturing wastes as "free fill" to employees, residents, and the town for disposal at locations throughout the Town of Stratford. Several of the locations that received waste are included within the OU6 area (TtNUS, 2005).

A number of "off-the-facility" locations, where Raymark waste was disposed, were contaminated with asbestos, lead, PCBs, and/or other contaminants at levels that posed a potential threat to public health. To abate the potential health threat, residential properties were remediated by EPA under CERCLA time-critical removal action authority during 1993 to 1996. After the former Raymark Facility was demolished, the excavated material from these residential locations was consolidated under a permanent cap at the former facility from 1995 to 1997. In addition, Raymark waste identified at one municipal property, Wooster Middle School, was also excavated, stored, and ultimately placed under the permanent cap. Since this time, the former Raymark Facility has been redeveloped as a retail center.

An additional 24 properties have been identified in Stratford as locations where Raymark waste was historically disposed, which are the subject of the OU6 RI (TtNUS, 2005). The objective of this FS is to develop and evaluate remedial alternatives to address Raymark wastes on these 24 properties.

1.3.2 Raymark Superfund Site Description and Setting

The Raymark Industries site was listed as a superfund site in the National Priority List (NPL) in 1995. Contaminated areas associated with the Raymark Superfund Site have been divided into nine operable units. EPA created these nine operable units (OUs) to help manage the cleanup process. The nine operable units are as follows:

- OU1 Raymark Facility
- OU2 Groundwater
- OU3 Upper Ferry Creek and Surrounding Wetlands
- OU4 Raybestos Memorial Field
- OU5 Shore Road Area
- OU6 Additional Properties Study Area (subject of this FS)
- OU7 Lower Ferry Creek, Selby Pond, and Housatonic River wetlands
- OU8 Beacon Point Area and Elm Street Wetlands
- OU9 Short Beach Park and Stratford Landfill

The area identified as OU6 (subject of this FS) includes 24 properties impacted by waste from the former Raymark Facility. These properties are not all contiguous to each other and are scattered, mainly along the southeastern edge of Stratford. The "OU6 Study Area" encompasses a total of 157.1 acres and is described under Section 1.4. Fourteen of the 24 properties identified in the OU6 RI report were previously evaluated within the areas described in the Raymark – Ferry Creek (OU3) investigations. However, the OU3 evaluations did not evaluate properties individually, rather the 14 properties were included as part of larger areas identified as A-1, A-2, and A-3 in the Final Area I Remedial Investigation, Raymark – Ferry Creek (OU3) (TtNUS, 1999b); Area B in the Ferry Creek OU3 Draft Final RI, Area II (TtNUS, 2000a); and Area D in the Ferry Creek OU3 Draft Final RI, Area III (TtNUS, 2000b). EPA subsequently decided to divide its efforts into soil-only properties and sediment-only areas. This meant that the 14 properties originally included as part of OU3 were re-evaluated individually as part of the OU6 RI report. The remaining 10 properties are outside of the Ferry Creek OU3 investigation area but are located throughout parts of the Town of Stratford (TtNUS, 2005).

1.4 Physical Characteristics of the OU6 Study Area

This section describes the physical characteristics of the OU6 Study Area and the region in which the OU6 Study Area is situated. The OU6 Study Area topography is described in Section 1.4.1, and surface geology and fill materials are described in Section 1.4.2. Throughout this report, all elevations are stated in feet with respect to the National Geodetic Vertical Datum (NGVD), 1929.

1.4.1 Topography and 100-Year Floodplain

Most of the 24 properties are part of the Housatonic River Basin, a tidally influenced system. The OU6 Study Area includes residential, recreational, and commercial properties. The OU6 Study Area, including the 24 properties, is shown on Figure 1-2.

The topography of the majority of the OU6 Study Area is relatively flat, with gentle slopes trending towards Ferry Creek and the Housatonic River. Based on a review of USGS topographic maps, the majority of the OU6 Study Area lies at topographic elevations of approximately 10 feet.

Only 3 of the 24 properties are located outside the 100-year floodplain (326 Ferry Boulevard, DPW Lot – Area of Concern (AOC 1 and 2) and 251 East Main Street. The remaining properties within the OU6 Study Area are located entirely or partially within the 100-year floodplain, as observed from Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps for Stratford, Connecticut (FEMA, 1992). Throughout most of the OU6 Study Area, the 100-year frequency base flood elevation ranges from 10 to 12 feet (FEMA, 1992); and the 10-year frequency flood elevation is 8.5 feet (USACE, 1998).

1.4.2 Surficial Geology and Fill

The surficial deposits of the OU6 Study Area are mapped as Stratford outwash sediments, fill deposits, and swamp/marsh deposits (Flint, 1968). Based on borings advanced in or near the OU6 Study Area, the surficial deposits are characterized primarily as a variety of locally-derived glacial outwash deposits and ice contact deposits, alluvial deposits, swamp and marsh deposits, and fill materials. Glacial till may be present locally. Overburden consists of a complex sequence of alluvial and outwash deposits (sand and gravel) ranging from silty sands to coarse

gravels. Peat/organic silt deposits are common in the OU6 Study Area, frequently underlying fill materials.

Fill consists of a mixture of natural and man-made materials. Fill materials frequently include manufacturing, household, and construction debris usually mixed with natural materials such as silty sand and gravel. Natural materials include various amounts of clay, silt, sand, and gravel. Man-made materials consist of charcoal, asphalt, metal, brick, tile, glass, and other miscellaneous materials, including manufacturing debris. Other fill materials that do not contain visual evidence of man-made debris are present throughout the OU6 Study Area, generally consisting of sands with varying amounts of silt and gravel. This fill is frequently more difficult to distinguish from natural/native deposits. Specific information on the presence or absence of artificial fill materials and contaminated soil intervals was reviewed from the boring logs. Fill was identified based on visual descriptions of soil and sediment samples collected during the field investigations.

Historically, fill originating from the former Raymark Facility has been described as a generally black fine-grained material often containing visible asbestos-containing materials. For the purposes of the FS, Raymark waste is defined by its chemical composition as described in Section 2.2.

1.5 Nature and Extent of Contamination

This section presents a general summary of the nature and extent of contamination encountered at the OU6 Study Area. Property-specific descriptions of nature and extent are presented in Section 3.0 of the OU6 RI (TtNUS, 2005).

1.5.1 Potential Sources of Contamination

The contamination sources in the OU6 Study Area are locations where Raymark waste materials were disposed of (dumped) at residential, commercial, state and municipal properties within or adjacent to the OU6 Study Area. The random nature of the Raymark waste disposal practices at the OU6 properties is illustrated on the property-specific figures in Section 4.0 of this FS, which show the delineated Raymark waste areas.

1.5.2 Overview of Chemical Compounds Detected

Brief descriptions of the major classes of chemical contaminants detected in the soils of the former Raymark Facility and the common industrial uses of these chemicals are presented in Sections 1.5.2.1 to 1.5.2.7. Section 1.5.2.8 provides a reference for the specific chemicals known to have been stored, handled, and/or used at the former Raymark Facility during its operation that may have contributed to contamination of the properties within the OU6 Study Area. This information provides a reference framework for the chemicals identified in the soils at the 24 properties presented in the OU6 RI.

1.5.2.1 Volatile Organic Compounds (VOCs)

The VOCs detected in soil samples collected from the former Raymark Facility can be separated into three major groups: chlorinated hydrocarbons, aromatic hydrocarbons, and ketones. Many of these VOCs are organic solvents commonly used in industrial processes for degreasing parts; to prepare metal surfaces prior to painting, coating, or bonding; as constituents of paint thinners and resins; and to extract organic compounds from materials. Additionally, some of the detected VOCs are common components of gasoline and petroleum fuels.

1.5.2.2 Semi-Volatile Organic Compounds (SVOCs)

The SVOCs detected in soil samples collected from the former Raymark Facility can be separated into three major groups: phenolic compounds, polynuclear aromatic hydrocarbons (PAHs), and phthalates. SVOCs are common constituents of various industrial products. Phenolic compounds are typically associated with fuels, coal, and petroleum products, and are used in manufacturing friction materials. PAHs are common components of coal tar (bitumen and asphaltic tars), petroleum products (motor and fuel oil), and combustion by-products. Phthalates are typically used as plasticizers in the manufacture of synthetic materials. Phenolic resins were used by Raymark Industries, Inc. in manufacturing friction materials.

1.5.2.3 Pesticides

Pesticides are typically used to control unwanted insects in residential and commercial areas, as well as to prevent crop destruction in agricultural settings. Pesticide formulations may include chlorinated and organophosphorous varieties.

During the operation of the former Raymark Facility, a large portion of the property consisted of vegetated areas. Pesticides may have been used at the former Raymark Facility to control unwanted insect populations. Various types of formulations could have been used, including chlorinated and organophosphorous pesticides. While these chemicals may have been applied at the former Raymark Facility, no documentation of their use has been identified. However, pesticides were identified in the soils on the former Raymark Facility and in the Raymark waste materials on residential properties excavated during EPA removal actions in the mid-1990's.

1.5.2.4 Polychlorinated Biphenyls (PCBs)

The PCBs detected in the soil samples collected from the former Raymark Facility consisted solely of Aroclor 1262 and Aroclor 1268. PCBs are extremely stable chemicals with a wide range of physical properties. They have been historically used in plasticizers, adhesives, lubricants, heat transfer fluids, and as dielectric fluids in transformers and capacitors. Aroclor 1262 and Aroclor 1268, specifically, are used as plasticizers in synthetic resins. Aroclor 1268 is also commonly used as a wax extender and plasticizer in rubbers.

No information on PCB usage was provided by Raymark Industries, Inc. documenting the specific use of PCBs as part of their manufacturing process. However, the use of PCBs in the manufacturing of brake linings is documented in the literature. The Raymark Facility was also known as having used and/or manufactured both rubber (gasket materials) and resins (phenolic resins in brake linings). It is assumed that Aroclor 1262 and Aroclor 1268 were used as plasticizers in these materials. Samples containing Aroclors 1262 and 1268 were obtained at the former Raymark Facility.

1.5.2.5 Dioxins and Furans

Some soil samples from the former Raymark Facility contained detectable concentrations of dioxins and furans. Dioxins and furans are not manufactured commercially. It is believed that

chlorinated dioxins and furans were formed as a by-product during various manufacturing processes at the former Raymark facility. The term “dioxins” is commonly used to refer to a specific group of polychlorinated dibenzo-p-dioxin chemical compounds. The toxicity of one specific compound, 2,3,7,8-tetrachloro-dibenzo-p-dioxin (2,3,7,8-TCDD), has been studied more than other known dioxins and furans. The toxicities of all other dioxins and furans are expressed in relation to 2,3,7,8-TCDD. Concentrations of each individual dioxin and furan in a sample are multiplied by Toxicity Equivalent Factors (TEFs) to yield 2,3,7,8-TCDD equivalent concentrations. These values are then totaled to yield total dioxin Toxicity Equivalent (TEQ) concentrations.

1.5.2.6 Metals

Numerous metals were detected in the soil samples collected from the former Raymark Facility. Some metals are naturally occurring components of soil and/or localized mineral deposits, or are the result of decomposition of weathered bedrock. Metals may also be introduced into the environment through various industrial activities including disposal of waste materials or process sludges, and fugitive emissions from various thermal or combustion processes.

Barium, copper, lead, and zinc were the primary metals reportedly used at the Raymark Facility to fabricate various brake and friction materials. Each of these metals was detected at elevated concentrations on the former Raymark Facility.

1.5.2.7 Asbestos

Asbestos was detected in numerous soil samples collected from the former Raymark Facility. Asbestos is a group of magnesium silicate minerals that contain varying quantities of iron and calcium silicates. Because of its non-combustible and heat-resistant properties, asbestos was commonly used to manufacture brake linings, gaskets, fireproof fabrics, roofing materials, and electrical and heat insulation, and as a reinforcing agent in rubber and plastics.

Asbestos-containing materials were the primary components in the products manufactured at the former Raymark Facility. Asbestos fibers were mixed with phenolic resins to manufacture brake pads and linings. Asbestos was also used to manufacture friction materials (clutches and transmission plates) and gaskets. Chrysotile was the form of asbestos used at the Raymark Facility.

1.5.2.8 Chemical Compounds Used or Handled at the Raymark Facility

A number of chemical compounds and materials were handled, stored, and/or used in manufacturing processes at the former Raymark Facility during its operation. A list of these chemicals was developed from information provided in the RCRA Facility Investigation Report (ELI, 1995) and the Facility's RCRA Part A application (August 15, 1980). No Part B application was ever formally filed for the Facility, so specific information on the operation of the former Raymark Facility is unavailable.

1.6 Contaminant Fate and Transport

This section presents a general description of the fate and transport of contaminants in the OU6 Study Area. A discussion of the fate and transport of contaminants on each of the 24 properties is presented in Section 3.0 of the OU6 RI (TtNUS, 2005).

1.6.1 Sources of Soil Contaminants

The Raymark waste used as fill at "off-the-facility" locations contains VOCs, SVOCs, PCBs, pesticides, dioxins and furans, metals (primarily lead and copper), and asbestos. The fill is a mixture of natural and man-made materials. Raymark waste (comprised of sludges excavated or dredged from the lagoons, "off-specification" materials that were discarded, and other waste products) was disposed of as fill material throughout the OU6 Study Area, and much of the contamination on the 24 properties occurred as a result of that filling.

There is also a potential for contaminants to have been released onto a property from other commercial and industrial operations or from groundwater contamination identified in the OU2 Groundwater RI (TtNUS, 2000). Past releases of petroleum hydrocarbons, VOCs, SVOCs, and other contaminants from other sources are also likely, based on the long history of industrial and commercial activities in the area. Process water and runoff from the Raymark Facility, which contained these same contaminants, were directly discharged to Ferry Creek, which runs through the OU6 Study Area. The origins of some of the chemical contamination affecting the properties are indistinguishable. Identifying these potential other sources was not within the scope of the OU6 RI. However, these other contaminants will be considered during the evaluation of potential remedies in this FS.

Based upon available information, the three primary sources of contaminants at the 24 properties discussed in the RI report are:

- Disposal of contaminated Raymark wastes, including sludges from the former Raymark Facility lagoons, which were used to fill in low topographic areas;
- Spills, leaks, and other releases that may have occurred at the property as a result of past storage, usage, or disposal of chemicals and other substances; and
- Disposal of waste from other sources.

There are three primary mechanisms by which contamination from the estimated area of Raymark waste could potentially enter into other environmental media:

- Contaminants in the fill may leach to subsurface soils;
- Erosion and surface runoff can carry contaminated soils into Ferry Creek, Bruce Brook, and the Housatonic River; and
- Contaminants may leach into the groundwater, migrate through advection, and discharge into Ferry Creek, Bruce Brook, or the Housatonic River as baseflow.

The evaluations of contaminant fate and transport in the RI were based on existing property conditions, identification of chemicals present in the environmental media, the physical state of soil and groundwater contaminants, general fate and transport mechanisms, and the interpretation of geologic and hydrogeologic conditions within the OU6 study area.

1.6.2 Fate and Transport of Contaminants in Soils

On a property, the fate and transport processes of concern are those that govern the migration of soil contaminants (once released or deposited) to the surrounding environment. Once these contaminants have entered another medium, other fate and transport mechanisms occur that may cause further chemical migration or transformations.

Once organic and inorganic contaminants are released to soils, a variety of processes occur that may cause them to become immobilized, degraded, or to be mobilized to another

environmental medium. The general movement of contaminants in soils on each of the 24 properties is described in the OU6 (Sections 2.6 and 3.0, TtNUS, 2005).

1.7 Summary of OU6 Baseline Risk Assessments

The risk assessment contained in the OU6 RI focused on current and potential future human health risks. A qualitative ecological evaluation was also conducted.

1.7.1 Human Health Risk Assessment

Baseline human health risk assessments were performed only for those portions of each of the OU6 properties where Raymark waste was identified in soil. More specifically, soil exposures and the resulting cancer risk estimates, non-cancer hazard index estimates, and lead evaluations for each property were evaluated using only samples collected from within Raymark waste areas. In order to account for the fact that receptors would be likely to spend only a portion of their time at the property within the Raymark waste areas, exposures were prorated based on the percentage of the property estimated to contain Raymark waste. Therefore, risk estimates for exposures to the estimated areas of Raymark waste are based on the extent of sample collection and analysis from within the estimated areas of Raymark waste[1].

The human health risk assessment (HHRA) focused on commercial use for 20 of the individual properties. Recreational use was evaluated at three properties: the Lockwood Avenue Property, Beacon Point Area, and Wooster Park (note that the Lockwood Avenue Property was evaluated both as a commercial property and as a future recreational property). Residential use was evaluated at three properties: the Third Avenue Property, a portion of the CT Right-of-Way, and the Vacant Lot at Housatonic Avenue. Commercial exposure assessments included commercial workers, customers, shoppers, and trespassers. Recreational exposure assessments included recreational visitors and trespassers. Residential exposure assessments included all current and possible future residential uses.

Three different types of quantitative evaluations were performed. Non-carcinogenic contaminants were evaluated through estimates of hazard indices. The resulting hazard indices

[1] To address uncertainty resulting from prorating of exposures based on the percentage of the property estimated to contain Raymark waste, the OU6 RI also included a summary of risks from exposure to Raymark Waste without the prorating factor throughout each property (see Appendix B-12, Table 1 of the OU6 RI, TtNUS, 2005).

were compared to unity. Hazard indices greater than one indicate a potential for non-carcinogenic health effects. Carcinogenic contaminants were evaluated through estimates of cancer risk. Cancer risk estimates were compared to EPA's cancer risk range of 1×10^{-4} to 1×10^{-6}. Risks below 1×10^{-6} (or a risk less than 1 in 1,000,000) are generally considered to be acceptable by EPA, and risks greater than 1×10^{-4} (1 in 10,000) are generally considered to be unacceptable. Lead was evaluated through adult and child lead models, which predict blood-lead levels. The resulting blood-lead levels and the estimated probability that those blood-lead levels would exceed 10 μg/dL were compared to EPA's stated goal for lead, that individuals exposed would have no more than a 5 percent probability of exceeding the level of concern of 10 μg/dL.

Quantitative inhalation risk evaluations for asbestos were not performed in the HHRA, because available air data are inadequate at each of the OU6 properties. Instead, qualitative comparisons of soil data to the definition of asbestos-containing materials (i.e. greater than 1 percent (EPA, 1990)) were used to evaluate potential exposures to asbestos. Pavement and vegetative cover at most of the OU6 Study Area properties reduce the potential for inhalation exposures. However, disturbances of asbestos-containing soil through digging would increase the potential for airborne asbestos exposure and associated inhalation risks. This underscores the importance of avoiding disturbing soils prior to remediation and using health protective measures during remediation.

The results of the human health risk assessments for dioxins are presented for two different cancer risk evaluations to provide more complete information about potential risk. The toxicity of dioxin is under review by EPA and a more protective cancer slope factor (CSF) has been proposed. Risk estimates based on both the current CSF and the proposed CSF were developed for the RI and are shown on Table 4-1 of the OU6 RI (TtNUS, 2005).

The HHRA estimated potential cancer, non-cancer, and/or lead risks from the estimated areas of Raymark waste in excess of EPA acceptable limits for commercial workers at 10 properties, to recreational visitors for one property, and to residents for three properties. In addition to these 14 properties, estimated potential cancer risks from the estimated areas of Raymark waste at six properties,, with lead evaluations and non-cancer hazard indices that did not meet EPA's levels of concern, fall within EPA's cancer risk range of 1×10^{-4} to 1×10^{-6}. The six properties are five commercial properties and one residential property. For many of these

properties, carcinogenic PAHs, arsenic, total Aroclors (PCBs), dioxin/furans, dieldrin, and lead were the predominant risk drivers (TtNUS, 2005, Table 4-1 of the OU6 RI). The remaining four properties are considered potential health risks based on asbestos only. While Raymark waste was identified on these four properties, there was insufficient data to evaluate potential health risks.

There are uncertainties associated with the risk assessments due to limited sampling at individual properties, uncertainty related to the extent of Raymark waste, and the types of analyses performed at many of the properties. As a result, at some properties there are insufficient data to provide a quantitative estimate of hazard indices, cancer risk, or lead levels, and at other properties estimates of hazard indices and cancer risks from some contaminants were based on maximum detected concentrations. At each property, the presence of contamination outside the areas of Raymark waste suggests that exposures and risks from the entire property may be greater than those estimated for the Raymark waste areas alone.

1.7.2 Ecological Risk Evaluation

None of the 24 study area properties were individually evaluated for ecological impacts under OU6. Many of the properties are located within areas that were included in the ecological risk evaluations included in the three OU3 RIs (TtNUS, 1999b, 2000a, 2000b), and the Wetlands Evaluation, Raymark-Ferry Creek-OU3 Technical Memorandum (B&RE, 1998).

Some information from these reports was included in the property-specific evaluations in the RI (TtNUS, 2005).

In general, there are few, if any, known ecological impacts from the OU6 Study Area properties from the contaminants evaluated in the OU6 RI, provided that contact with waste materials, erosion, and contaminant migration is controlled. The exceptions are properties where the abutting wetlands have been compromised by the placement of fill. There are, however, ecological resources surrounding a number of these properties. These resources, which include Ferry Creek, the Housatonic River, Wooster Park, and other wetlands, were considered in the evaluation of remedial alternatives for the individual properties.

2.0 IDENTIFICATION AND SCREENING OF TECHNOLOGIES

Remedial alternatives in an FS are developed by assembling combinations of technologies, and the media to which they would be applied, into an appropriate range of alternatives that address site-specific contamination. This section presents the preliminary phase of the FS remedial alternatives development process. The FS process consists of the following steps:

- Development of remedial action objectives (RAOs) that are protective of human health and the environment and which specify the contaminants and media of concern, exposure pathways, and preliminary remediation goals (PRGs) that permit a range of treatment and containment alternatives;
- Development of general response actions for each medium of interest that define measures that may be taken singly or in combination to satisfy the RAOs for the Site;
- Identification of the volumes and/or areas of media to which the general response actions might be applied; and
- Identification and screening of the technologies applicable to each general response action.

Section 2.1 presents a preliminary listing of ARARs and other guidance to be considered in the development of RAOs for the OU6 Study Area within the Raymark Superfund Site. Section 2.2 presents the RAO for soil at OU6. Section 2.3 presents the general response actions that may be implemented to achieve the RAO(s). Section 2.4 identifies the volumes and areas of media to which the general response actions may be applied. Section 2.5 presents the screening of technologies and process options. Appendix F presents the screening for six areas that were evaluated for potential in-town consolidation.

2.1 ARARs and TBCs

ARARs are promulgated, enforceable federal and state, substantive environmental protection requirements that are determined to be legally applicable or relevant and appropriate to the hazardous substances, remedial actions, or other circumstances at a CERCLA site. The NCP Section 300.430 states that on-site remedial actions at CERCLA sites must meet ARARs unless there are grounds for invoking a waiver. The two classes of ARARs: "applicable" and "relevant and appropriate" requirements are defined below.

Applicable Requirements – Section 300.5 of the NCP defines applicable requirements as "those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site". For example, National Pollutant Discharge Elimination System (NPDES) regulations, which specify requirements for point source discharges to surface water, may be "applicable" to CERCLA remedial actions that include discharge of treated groundwater to a surface water body.

Relevant and Appropriate Requirements – Section 300.5 of the NCP defines relevant and appropriate requirements as "those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at a CERCLA site that their use is well suited to the particular site". For example, Safe Drinking Water Act (SDWA) MCLs, criteria that regulate the concentration of contaminants in public water supply systems, are often "relevant and appropriate" requirements at CERCLA sites. MCLs are "applicable" only to water in a public drinking water supply system; however, they may be "relevant and appropriate" requirements for groundwater at a CERCLA site if the aquifer could be used as drinking water supply, or if MCLs are used to derive soil clean-up action levels.

TBCs (standards and guidance To Be Considered) are non-promulgated advisories or guidance issued by the federal or state government that are not legally binding, but may be considered during development of remedial alternatives. For example, EPA Health Advisories and Reference Doses are non-promulgated criteria that are used in assessing health risks from contaminants present on CERCLA sites.

ARARs and TBCs are divided into three categories: chemical-specific, location-specific, and action-specific. In Sections 2.1.1 through 2.1.3, these categories are briefly described and general types of potential ARARs and TBCs are identified that may be applied to the Site. More detailed discussions of the potential ARARs and TBCs for property-specific remedial alternatives are provided in Section 4.0 and in Appendix C, Tables B to E.

2.1.1 Chemical-Specific ARARs and TBCs

Chemical-specific ARARs and TBCs are usually health- or risk-based numerical values that are used to establish the acceptable amount or concentration of a chemical that may remain in, or be discharged to, the environment. In general, chemical-specific requirements are set for a single chemical or a closely-related group of chemicals. These requirements do not consider the mixture of chemicals.

There are no federal chemical-specific ARARs for soil. Chemical-specific ARARs for soil within the State of Connecticut include Remediation Standard Regulation (RSR) Direct Exposure Criteria (DEC) and Pollutant Mobility Criteria (PMC). The Connecticut Department of Environmental Protection (CTDEP) DEC were used as a guideline during development of PRGs for the FS.

A summary of the potential chemical-specific ARARs and TBCs, and their consideration in the FS, is provided in Appendix C, Table A

2.1.2 Location-Specific ARARs

Location-specific ARARs are restrictions placed on the concentrations of hazardous substances, or the conduct of activities, solely because they are in specific areas. The general types of location-specific ARARs that may be applied to the Raymark Superfund Site are briefly described below.

Several federal and state regulations govern activities in wetlands and floodplains. Such regulations include, but are not limited to, two federal executive orders. They are potential location-specific ARARs because many of the Raymark property groups (defined in Section 4.1) that are addressed in this FS include wetlands and/or are located totally or partially within the 100-year floodplain.

The location-specific ARARs mandate that floodplain and wetland impacts or losses resulting from development (i.e. remedial actions) be avoided unless there is no practicable alternative, and appropriate mitigation and/or compensation generally should be provided for any impacts or losses from development. As discussed in Section 4.3 and CAMU write-ups, in Appendix F, the ability to comply with these requirements is a significant uncertainty on certain properties where

consolidation and/or capping is proposed, especially where activities are proposed in floodplain areas.

A summary of potential location-specific ARARs and TBCs, and their consideration in the FS, is provided in Appendix C, Tables B to E.

2.1.3 Action-Specific ARARs

Action-specific ARARs are usually technology- or activity-based requirements or limitations on actions taken with respect to hazardous wastes. These requirements are generally focused on actions taken to remediate, handle, treat, transport, or dispose of hazardous wastes. These action-specific requirements do not in themselves determine the remedial alternative; rather, they indicate how a selected alternative must be achieved (EPA/540/G-89/006). The general types of action-specific ARARs that may be applied to the Raymark Superfund Site are briefly described below.

Most action-specific ARARs fall into three primary categories: federal and state regulations pertaining to the Clean Water Act (CWA), Clean Air Act (CAA), and Resource Conservation and Recovery Act (RCRA). CWA ARARs generally regulate the discharge of treated groundwater, which will not be applicable or relevant and appropriate for this FS since no groundwater treatment will be undertaken. CAA requirements typically pertain to air emissions from hazardous waste treatment operations, which will not be applicable or relevant and appropriate for this FS because all soil treatment alternatives evaluated will be conducted at an off-site facility. RCRA ARARs typically establish design, operating, and monitoring requirements for hazardous waste treatment, storage, and disposal facilities. Most of the action-specific ARARs that will be considered for this FS will be RCRA-related requirements of the type described above.

A summary of the potential action-specific ARARs and TBCs and their consideration in the FS are provided in Appendix C, Table A.

2.2 Development of Remedial Action Objectives (RAOs)

RAOs consist of media-specific goals for protecting human health and the environment. The RAOs specify the media and contaminants of concern, exposure routes and receptors, and

preliminary remediation goals for each exposure route. By specifying both exposure pathways and preliminary remediation goals, the RAOs permit the development of a range of alternatives that may achieve protection by reducing exposure to contaminated media (e.g., capping an area) or reducing contaminant concentrations through treatment or removal.

The medium of concern for this FS is soil on all OU6 properties. As such, a single RAO for soil was developed based on the results of the RI, the site-specific baseline human health risk assessment, historical information on the constituents present in waste at the former Raymark Facility, and ARARs. This section presents the three major components of the RAO development process: identifying contaminants of concern, determining preliminary remediation goals, and formulating the RAO statement.

2.2.1 Soil Contaminants of Concern

The soil contaminants of concern (COCs) for this FS are asbestos, lead, PCBs, and copper. The concentrations of these constituents have been used during previous removal actions as a "fingerprint" to determine whether a Raymark-related release had occurred and to delineate the extent of the Raymark waste release. EPA made these determinations and developed a definition of "Raymark waste" (See 2.2.2.1) after analyzing approximately 300 soil and groundwater samples collected from the former Raymark Facility (OU1) and through study of the historical operations at the former Raymark Facility.

The following sections provide the rationale for the selection of asbestos, lead, PCBs, and copper as Raymark waste indicators and the exclusion of other constituents from the Raymark waste definition. Further discussion of the Raymark waste definition is provided in Section 2.2.2.1of this FS under the discussion of PRGs.

2.2.1.1 Asbestos

Asbestos was selected as an identifying contaminant of Raymark waste because of its dominance in the waste materials sampled throughout the former Raymark Facility. Chrysotile asbestos was selected as the specific asbestos of concern due to its dominance in the samples collected. From the hundreds of samples collected at the former Raymark Facility, chrysotile asbestos was the only form of asbestos identified.

2.2.1.2 Lead

Lead was selected as an identifying contaminant of Raymark waste as it was used in the fabrication of various brake and friction materials in the Raymark manufacturing process. Raymark acknowledged in its RCRA "Part A application" that up to 2.5 billion gallons of lead-contaminated waste liquid flowed through its on-site lagoons on an annual basis. The on-site lagoons were routinely dredged and the spoils were disposed of on the facility property and at other locations throughout the town. Samples of soil and sediment collected from the former Raymark Facility, in particular the on-site lagoons, contained high levels of lead.

2.2.1.3 PCBs

PCBs were selected as an identifying contaminant of Raymark waste because of their predominance in samples collected at the former Raymark Facility and given that PCBs do not occur naturally in the environment. Samples collected at the former Raymark Facility indicated that PCBs were contained in the waste materials. Using this information, PCBs (Aroclor 1268) was selected as an identifying contaminant of Raymark waste.

2.2.1.4 Copper

Copper was selected as a further identifying contaminant because of its predominance in the waste materials sampled throughout the former Raymark Facility.

2.2.1.5 Other Contaminants Co-Mingled with Raymark Waste

In addition to the asbestos, lead, PCBs, and copper, Raymark waste materials include numerous other contaminants, such as dioxins, other metals, semi-volatile and volatile organic compounds. When analyzed, these contaminants were consistently shown to be co-located with the asbestos, lead, PCBs, and copper used to identify locations of Raymark waste. When addressing the asbestos, lead, PCBs, and copper, these other contaminants of concern will be addressed.

2.2.2 Soil Preliminary Remediation Goals

The Preliminary Remediation Goals (PRGs) for this FS were derived from human health-based screening levels, ARARs, background concentrations, and other published guidance

documents, or directives. The PRGs used for this FS have been used historically to guide investigations and perform removal/remedial actions at other properties impacted by Raymark waste throughout Stratford.

2.2.2.1 Definition of Raymark Waste

The PRGs for this FS were not applied to the sampling data on a strict constituent-by-constituent basis. Instead, all determinations of the presence or absence of Raymark waste were based on the following definition of Raymark waste:

> *Raymark waste in soil is defined as a single soil sample at the same depth interval containing lead above 400 mg/kg and asbestos (chrysotile only) greater than 1 percent and either PCBs (Aroclor 1268 only) above 1 mg/kg, or copper above 288 mg/kg.*

This definition was developed by EPA, in consultation with the CTDEP and the Raymark Advisory Committee (a citizens group that EPA has worked with for over 10 years), prior to an evaluation of sampling data from all OU6 properties.

The rationale behind the criteria that Raymark waste is identified as asbestos and lead, and either PCBs or copper, represents an effort to focus remedial actions on Raymark waste only. This approach was developed because finding any one of these contaminants in the environment was not necessarily an indicator of the presence of Raymark waste because the area was used for disposal by other sources. It was the combination of elevated levels of these compounds that indicated the strong likelihood that their presence was due to the past disposal of Raymark waste. Data collected from the Raymark facility supports this hypothesis, indicating the presence of 2 out of 3 of the indicator contaminants in 81% of the samples of process waste on the Raymark Facility.

2.2.2.2 Asbestos

The PRG for asbestos is one percent chrysotile asbestos, which is based on the National Emission Standards for Hazardous Air Pollutants (NESHAP) definition for an asbestos-containing material (EPA, 1990). All previous removal actions and investigations at Raymark

were based on the one percent criterion, which was standard practice at the time of these activities.

Since the development of the Raymark waste definition, EPA has issued guidance stating that soil containing less than one percent asbestos may not be protective in all instances, and that a quantified risk assessment is recommended to be performed to evaluate the risk presented by asbestos (EPA, 2004). However, because the OU6 RI and the numerous previous investigations at Raymark were based upon the one percent criterion, EPA is proceeding with using the one percent threshold at the Raymark Superfund Site without performing quantitative risk assessments for asbestos. EPA believes that the one percent PRG is protective because the risk from asbestos will be addressed by the alternatives developed (containment (capping) or excavation). In addition, engineering control measures will be taken to prevent asbestos from becoming airborne during the performance of any response actions. Finally, institutional controls will prevent disturbance of the remediated areas by controlling land use.

EPA will address areas where Raymark waste was found which, by definition, contain greater than one percent chrysotile asbestos. In areas where Raymark waste was not found but asbestos was determined to be present, the information was referred to the Connecticut Department of Public Health (CT DPH) and to the Town (Health Department). Copies of this information were provided to the Health Departments in September 2004.

2.2.2.3 Lead

The PRG for lead is 400 milligrams per kilogram (mg/kg) for residential properties and 1,000 mg/kg for commercial properties. Based on the samples collected from the former Raymark Facility, 400 mg/kg lead was selected by EPA and approved by the Agency for Toxic Substances and Disease Registry (ATSDR) as a conservative, permanently protective cleanup level for residential areas. This value was consistent with EPA's 1992 draft Soil Screening Level Guidance and Revised Interim Soil Lead Guidance document (EPA, 1992). This document was later published in July 1994 as Revised Interim Guidance on Establishing Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities (EPA, 1994). The CTDEP Direct Exposure Criteria (DEC) is 500 mg/kg lead for residential properties and 1,000 mg/kg for commercial properties.

In an effort to differentiate concentrations of lead in soil from Raymark waste from that of lead paint from a home or business, the presence of lead and asbestos together with either PCBs (Aroclor 1268) or copper in the same sample at the same depth interval, further identifies the soil contamination at a particular property as Raymark waste (see Section 2.2.2.1).

2.2.2.4 PCBs

The PRG for PCBs is 1 mg/kg total PCB for residential properties and 10 mg/kg for commercial properties. The 1 mg/kg total PCB standard was selected based on the OSWER directive from August 1990, Remedial Actions for Superfund Sites with PCB Contamination (EPA, 1990b). Further, based on sampling results and known historical use, EPA selected Aroclor 1268 (see Section 2.2.1.3) as the identifying benchmark for Raymark waste. The CTDEP DEC which does not speciate aroclors also defines total PCBs at 1.0 mg/kg as protective for residential properties and 10 mg/kg for commercial properties.

2.2.2.5 Copper

The 288 mg/kg standard was selected by EPA as the identifying benchmark as it is ten times greater than average background concentrations. The CTDEP Residential DEC for copper is 2,500 mg/kg, and 76,000 mg/kg for commercial.

2.2.3 Soil Remedial Action Objective

The RAO for this FS was formulated based on the COC (Section 2.2.1) and PRG (Section 2.2.2) development presented in the preceding sections. The soil RAO for protection of human health is to prevent direct exposure (inhalation, dermal contact, or ingestion) to soil meeting the definition of Raymark waste (Section 2.2.2.1).

Achieving this RAO will also prevent direct exposure to other contaminants co-located with the Raymark waste.

This FS does not include an RAO for the protection of the environment. Based on ecological risk assessments performed for the other Raymark OUs, there are few, if any, known ecological impacts on the OU6 properties from the COCs included in this FS. Nevertheless, many of the OU6 properties are located within wetland and floodplain resources, and consideration is given

to the preservation, compensation, or mitigation of these resources during the evaluation of remedial alternatives.

In the fate and transport evaluation performed for the OU6 RI, the leaching of Raymark waste constituents (primarily lead) into groundwater underlying Raymark waste areas is evaluated as a potential transport mechanism. Soil sampling results from Raymark waste using the synthetic precipitation leaching procedure (SPLP) has provided conflicting evidence that leaching of lead into groundwater above regulatory standards may or may not be occurring. However, based on an evaluation of lead concentrations in groundwater, sediment, and surface water observed in water bodies adjacent to Ferry Creek, the contribution to risk that would result from leaching of lead from Raymark waste into groundwater (and ultimately discharging to sediment/surface water) if occurring, is not believed to be significant enough to warrant an RAO for the protection of groundwater.

2.3 Development of General Response Actions

General response actions are media-specific measures that may be taken to satisfy the RAOs established for a Site. General response actions may include treatment, containment, removal, disposal, and institutional actions, or a combination of these measures.

Several general response actions were identified to provide a wide range of possible options for satisfying the RAO stated above in Section 2.2.3. The potential general response actions identified are: no action, institutional actions, containment, excavation, treatment, and disposal. Table 2-1 presents a summary of the RAO and general response actions identified for soil in this FS, along with an initial identification of the general remedial technology types and process options that correspond to each general response action.

2.4 Volume of Contaminated Soil (Raymark Waste)

Based on the Raymark waste definition identified in Section 2.2.2.1, EPA, in consultation with the CTDEP, calculated the area of Raymark waste at each of the 24 OU6 properties. These areas are shown on the Figures 4-1 through 4-18 contained in Section 4.0 of this FS as the “Estimated Area of Raymark Waste” and are presented in square feet for each property on Table 1-1 of the OU6 RI (TtNUS, 2005). A detailed description of the assumptions that were

used to develop these Raymark waste areas from the analytical data set for each property is presented in Section 2.3 of the OU6 RI (TtNUS, 2005).

The total potential volume of Raymark waste present at each property was estimated by multiplying the area of the Raymark waste footprint on that property by the maximum depth at which Raymark waste was observed at that property. Analytical results from soil samples collected from each property were used to estimate the maximum depth of Raymark waste on a particular property. In addition, a distinction was made between Raymark waste located above and below the seasonal high water table. Estimates of the seasonal high groundwater table depth for each property were developed based on historical groundwater level measurements from monitoring wells, and moisture observations that were recorded during the advancement of soil borings at each property. The area of the Raymark waste footprint on each property was multiplied by the depth to the seasonal high water table to determine the volume of Raymark waste located above the seasonal high water table.

A more detailed description of the Raymark waste volume estimation process is provided in Appendix D of this FS. For purposes of this FS, the 24 separate OU6 properties have been grouped into 18 property groups as described in section 4.1. Table 2-2 presents the estimated volume (in cubic yards) of Raymark waste present at each of the 18 property groups, itemized to show the volume above and below the seasonal high water table. These volume estimates are used in subsequent sections as the basis for the development and evaluation of remedial alternatives for the OU6 property groups. Cost estimates by property groups are considered a summary of property-specific volume estimates. These are presented in Appendix G.

2.5 Identification and Screening of Technologies and Process Options

This section presents a description of the preliminary screening and the detailed evaluations of technologies and process options for remediation of soil (Raymark waste) at OU6. The screening and evaluation of technologies and process options are documented on Tables 2-3 and 2-4, respectively.

2.5.1 Preliminary Screening of Technologies and Process Options

Potential remedial technologies and process options were identified and screened according to their overall applicability (technical implementability) to Raymark waste, the contaminants of

concern (lead, asbestos, PCBs, and copper), and the site-specific conditions present at OU6 (complex mixture of contaminants, large volume of contaminated material, remediation required on several discontinuous properties). The purpose of this screening effort is to investigate all of the available technologies and process options and to eliminate those (obviously) not applicable to the OU6 properties, based on the established RAO and general response actions provided in Sections 2.2 and 2.3, respectively. Technology identification considered the demonstrated performance of each technology given the site conditions and contaminants-of-concern.

The preliminary screening of technologies is presented on Table 2-3. This table presents the technologies available to address soil contamination, grouped by general response action. A brief description of the technology is provided and a determination is made to either retain or eliminate the technology based on the evaluation of its technical implementability. A brief description of the rationale that was used to eliminate technologies is also provided. The remedial technologies that are retained from this screening are further evaluated as described in Section 2.5.2.

2.5.2 Evaluation and Selection of Technologies and Process Options

A detailed evaluation of technologies and process options that were retained in the preliminary screening step is conducted to further focus the alternatives development process. In this step, process options are evaluated with respect to other processes in the same technology category. One representative process option is selected, if possible, for each technology type, to simplify the subsequent development and evaluation of alternatives without limiting flexibility during remedy selection or remedial design.

The evaluation of technologies and process options utilizes three criteria: effectiveness, implementability, and relative cost. The Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (EPA, 1988) suggests that this evaluation focus on the effectiveness criterion, with less emphasis directed at the implementability and relative cost criteria.

Brief definitions of effectiveness, implementability, and relative cost, as they apply to the evaluation process, follow.

Effectiveness – This criterion focuses on the potential effectiveness of process options in handling the estimated volume of media and meeting the remediation goals; the potential impacts to human health and the environment during construction and implementation; and how proven and reliable the process is with respect to the contaminants and conditions at the Site.

Implementability – The implementability evaluation encompasses both the technical and institutional feasibility of implementing a process. Technical implementability was used as an initial screen of technology types and process options, to eliminate those that are clearly ineffective or unworkable at a site. Therefore, this subsequent, more detailed evaluation of process options places greater emphasis on the institutional aspects of implementability, such as the ability to obtain permits for off-site actions, availability of treatment, storage, and disposal services, and availability of necessary equipment and resources.

Cost – Cost plays a limited role in this screening. The cost analysis is based on engineering judgment, and each process is evaluated as to whether costs are high, low, or medium relative to the other options in the same technology type. If there is only one process option, costs are compared to other candidate technologies.

The evaluation of technologies and process options is presented on Table 2-4. The technologies that were retained from this evaluation are presented in Section 2.5.3.

2.5.3 Selection of Technologies and Process Options for Soils

The technologies and process options for soil (Raymark waste) that were retained for further consideration in this FS include the following:

- No-Action
- Institutional Actions
  - Institutional Controls (Deed Restrictions/Local Ordinances)
  - Access Restrictions (Fencing/Signage)
  - Monitoring (Environmental Sampling)
- Containment
  - Horizontal Barriers (Low Impermeable Cap)
  - Horizontal Barriers (Environmental Sampling)

- Excavation
  - Bulk Mechanical Excavation
- Disposal
  - Out-of-Town Disposal
  - In-Town Consolidation

These technologies and process options will be used in Section 3.0 to assemble potential remedial alternatives. Institutional actions will be a part of virtually every potential alternative, either as a measure that complements another technology to help maintain the effectiveness of the alternative (i.e. institutional controls, access restrictions) or as a measure to ensure that the alternative continues to protect human health in the long term (i.e. environmental sampling). The primary components of potential remedial alternatives for the OU6 properties will include some combination of the containment, removal, disposal technologies that are shown above. Note that disposal options will allow for treatment of Raymark waste as part of disposal requirements, as appropriate.

Treatment was screened out from further evaluation for the following reasons:

- Raymark Waste contains a complex mixture of contaminants, and treatment of this material to levels suitable for on-site reuse would require a multiple stage treatment process involving a great deal of manipulation and handling of waste materials. The complexity of the treatment process would be very time consuming and costly.

- According to the bench-scale treatability study performed in 1994, in order to achieve treatment goals for lead using solidification, approximately 20 percent (by weight) portland cement would need to be added to Raymark waste. The excess material generated by this process would need to be placed or disposed of somewhere other than the Raymark waste excavation from which it originated. This would add both costs and additional disposal volume requirements.

- The residual product resulting from the solidification process is a concrete-like-material that ultimately hardens into a monolith. Using this material to backfill Raymark waste excavations may not be practical. If the treated material is not suitable for backfill, then it

would need to be disposed of at a landfill at additional cost, and clean soil would need to be used to backfill Raymark waste excavations.

- Alternatives with off-site disposal include treatment to address the principal threats posted by Raymark waste contaminants. Raymark waste containing contaminants in excess of UTS values (if out-of-town disposal is the selected method) or PHCs (if in-town consolidation is the selected method) would be treated prior to disposal in order to reduce the toxicity, mobility, and volume of contaminants. UTS and PHCs are further discussed in Section 3.1.3.

3.0 DEVELOPMENT AND SCREENING OF ALTERNATIVES

In Section 2.0, on Table 2-4, the preliminary screening evaluation of technologies and process options retained the following process options based on an evaluation of their effectiveness, implementability, and cost given the volume of Raymark waste that will be addressed and the contaminant types and concentrations that are anticipated:

General Response Action	Technology	Process Option
No Action	No Action	No Action
Institutional Actions	Institutional Controls	Institutional Controls - Local Ordinances
	Access Restrictions	Fencing and Signage
	Monitoring	Environmental Sampling
Containment	Horizontal Barriers	Low Permeable Cap
		Permeable Cover
Excavation	Excavation	Bulk Mechanical Excavation
Disposal	Disposal	Out-of-town Disposal
		In-town Consolidation

In this section, these process options are combined to assemble remedial alternatives that address the RAO for OU6. Remedial alternatives were developed in accordance with the National Oil and Hazardous Substances Contingency Plan (NCP; 40 CFR 300.430) and the Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (EPA, 1988). The NCP encourages developing alternatives that favor treatment technologies to address principal threats and alternatives that employ engineering controls to address relatively low long-term threats. The NCP suggests developing a range of treatment alternatives, one or more engineering control alternatives (such as containment), one or more innovative treatment alternatives, and the baseline no action alternative. Note that although treatment is not presented as a stand-alone technology, or process option, the disposal technology and process option does allow for treatment of some Raymark waste as part of the disposal requirements, as appropriate.

In Section 3.1 of this FS, the rationale for the development of remedial alternatives is provided. A detailed description of the potential remedial alternatives is presented without property-specific considerations (see Appendix B). In Section 3.2, each remedial alternative (and

variations of the alternative) developed for the 18 OU6 property groups (defined in Section 4.1) are described and the preliminary screening of these alternatives is discussed in detail.

3.1 Development of Alternatives

This section presents the rationale for the development of remedial alternatives to address Raymark waste on each of the 18 OU6 property groups that are included in this FS.

In addition, as part of this preliminary screening phase, an evaluation of alternatives for three focused feasibility studies was performed and is presented in Appendix A. Six in-town consolidation areas/Corrective Action Management Units (CAMUs), were also evaluated and this evaluation can be found in Appendix F. A CAMU is defined under the Resource Conservation and Recovery Act (RCRA), 40 CFR 264.552.

3.1.1 Property groups Included in this Feasibility Study

The property groups that are the primary focus of this FS are the 18 property groups that comprise OU6 (see Section 4.1). Each of the alternatives developed in this section and retained for the detailed analysis shall apply to these 18 property groups.

3.1.2 Corrective Action Management Unit (CAMU) Rule

As discussed in Section 2.0 of this FS, in-town consolidation of excavated Raymark waste was retained as a process option for further consideration in the development of remedial alternatives. Property groups to be used as in-town consolidation areas would be considered CAMUs.

CAMUs are special units created under RCRA to facilitate treatment, storage, and disposal of hazardous wastes. The CAMU regulations also establish standards for CAMU-eligible wastes and minimum design requirements for CAMUs to ensure that the consolidation of wastes is implemented in a manner that is protective of human health and the environment.

The use of the CAMU regulations to manage any potential in-town consolidation of Raymark waste was considered a viable option for this FS because it presents a cost-effective mechanism that will expedite the timing of remedial action implementation at the OU6 property

groups while providing a permanent, protective solution for the management of hazardous waste generated by remediation activities. See Appendix F for screening and evaluation of potential in-town consolidation locations.

The in-town consolidation of waste should be distinguished from the capping of waste on a property group. For waste entirely located within a property group, such capping may involve the movement of Raymark waste from within one part of a property group to another to facilitate the capping. Since such a movement would take place in a continuous "Area of Contamination" or "AOC", the RCRA Land Disposal Restrictions ("LDRs") and other RCRA design requirements would not apply to the movement and capping of such waste.

3.1.3 Treatment/Disposal of Raymark Waste During Remedial Actions

The National Contingency Plan at 40 CFR Section 300.430 (a)(1)(iii) states that EPA expects to use "treatment to address the principal threats posed by a site, wherever practicable" and "engineering controls, such as containment, for waste that poses a relatively low long-term threat" to achieve protection of human health and the environment. For OU6 property groups at the Raymark Site, the vast majority of the Raymark waste source material is not considered to be "principal threat waste", but rather "low-level threat waste".

However, some of the Raymark waste being addressed as part of the OU6 response action does meet the definition of "principal hazardous constituents (PHC)" within Part 264, Subpart S, of the CAMU rule of RCRA. In general, PHCs are those "carcinogens that pose a potential direct risk from ingestion or inhalation at the Site at or above 10^{-3}, and non-carcinogens that pose a potential direct risk from ingestion or inhalation at the site an order of magnitude or greater over their reference dose." Therefore, based on existing sampling data from the OU6 properties (TtNUS, 2005), the EPA believes that approximately 10% of the Raymark waste being addressed at OU6 can be considered "principal threat waste." EPA Region I, also believes that the same 10% of the Raymark waste that meets the definition of PHCs, is also above the "universal treatment standards (UTS)" under the RCRA land disposal restrictions which would require treatment (40 CFR 264). EPA Region 1, therefore, has proposed to handle 10% of any excavated Raymark waste at an off-site treatment/disposal facility throughout this Feasibility Study.

Excavation of Raymark waste for the purpose of out-of-town disposal would be implemented along with a sampling program to fulfill the requirements of the out-of-town disposal facility and/or RCRA Land Disposal Regulations (LDRs) (40 CFR 268). If the results of soil sampling during excavation indicate that all or a portion of the Raymark waste being excavated is hazardous as defined by RCRA, then LDRs would apply to the RCRA hazardous portions of the excavated waste. To comply with LDRs, any hazardous waste containing concentrations of one or more hazardous constituents in excess of their RCRA disposal requirements, that is, the Alternative LDR Treatment Standards for Contaminated Soil (40 CFR 268.49), would need to be treated prior to ultimate disposal. The Alternative LDR Treatment Standards are typically capped at 10 times the Universal Treatment Standards listed in 40 CFR 268.48.

Raymark waste that is excavated for the purpose of in-town consolidation at a CAMU would also be evaluated in a soil sampling program to characterize the nature of materials that are being consolidated and to determine the requirements for treatment of Raymark waste prior to consolidation. Unless waived, the CAMU rule requires treatment of PHC prior to placement of soil into a CAMU. For the OU6 property groups, PHC's are generally considered to be any carcinogen that poses a direct risk from ingestion or inhalation that is greater than 10^{-3} or any non-carcinogen that poses a potential direct risk from ingestion or inhalation that is greater than a hazard index of 10. Soil samples collected during excavation and consolidation of Raymark waste would be used to establish treatment requirements for soil being transported to a CAMU.

3.1.4 Wetlands Considerations

Remedial actions that are conducted on the following parcels may require activities within wetlands or wetland buffer zones: Lockwood Avenue Property, 200 Ferry Boulevard, 230 Ferry Boulevard, 250 Ferry Boulevard, 280 Ferry Boulevard, 300 Ferry Boulevard, Vacant Lot at Housatonic Avenue, 576 and 600 East Broadway, Vacant DOT Lot Abutting I-95, Beacon Point Area, and 1 Beacon Point Road. However, a formal evaluation on wetlands was not performed (TtNUS, 2005). Remedial actions (such as excavation, capping, or consolidation) performed on these parcels would need to be conducted in a manner that complies with location-specific ARARs, including Executive Order 11990 – Protection of Wetlands. This order states that new construction in wetlands must be avoided unless there is no practicable alternative and, if undertaken, the proposed actions include all practicable measures to minimize harm to wetlands.

The evaluation and selection of remedial alternatives for the Raymark OU6 property groups will consider, and will provide for, public comment regarding 1) practical alternatives; 2) potential impacts to wetlands; and 3) the wetlands mitigation measures that would be required to implement the alternatives in accordance with the applicable or relevant and appropriate federal regulations and guidelines.

3.1.4.1 Delineation of the Wetlands

In 1994, EPA and the U.S. Fish and Wildlife delineated the wetlands around Ferry Creek. These wetland areas are depicted in figures in the OU3 RI Reports (1999a, 2000a, and 2000b). In 1998, the function and value of these wetland areas were evaluated and it was determined that, based on the deposition of Raymark waste, these wetland areas were seriously degraded (B&RE, 1998). These wetland areas are shown on each figure in Section 4.0 for property groups located around Ferry Creek. However, a formal evaluation on wetlands was not performed for all property groups.

3.1.4.2 Evaluation of Practicable Alternatives

Executive Order 11990 states that there should be no new construction in the wetlands unless there is no practicable alternative. During the remedy selection process, the detailed analysis of alternatives for property groups containing wetlands will be utilized to support the determination that practicable alternatives are or are not available for that property, and whether capping in the wetlands is a viable remedy.

3.1.4.3 Wetland Mitigation

Based on the depth and lateral extent of Raymark waste on some of the property groups, remediation would likely result in unavoidable impacts to wetlands. As described in the revised Memorandum of Agreement between the EPA and the Department of the Army Concerning the Determination of Mitigation Under the Clean Water Act Section 404(b)(1) Guidelines (MOA), dated March 12, 1990, three general types of wetlands mitigation are compatible with the requirements of the guidelines where work is to be conducted within or adjacent to wetland areas: avoidance, minimization, and compensatory mitigation. Since avoidance would not be possible for these property groups because of the location of contamination; minimization and

compensatory mitigation, if necessary, would be the appropriate actions. Remedial actions on these property groups would be designed in a manner which minimizes adverse impacts to wetlands. If severe impacts or destruction of wetlands is unavoidable, wetlands may need to be restored in-place, depending upon their function and value, to the extent practicable. If wetlands are unable to be restored at their current location (i.e. the wetland area is to be capped), compensatory mitigation may need to be performed.

Consideration of mitigation requirements was included for every remedial alternative that might be implemented within wetlands. Further, wetlands related requirements will be taken into consideration in the selection of the final cleanup remedy for each property, as well as the In-town Consolidation/CAMU areas. For wetlands mitigation, this will generally require a 1 to 1 compensation for all wetlands lost to the remedial action. This compensatory action should ideally be located within the vicinity of the lost wetland. The area around Ferry Creek, however, has very little available land for this compensatory measure. Therefore, the compensatory action may need to be implemented elsewhere or land taking may be required.

3.1.5 Floodplain Considerations

Remedial actions that are conducted on the following parcels may require activities within the 100-year floodplain (Note there is some overlap between wetland and floodplain properties): Lockwood Avenue Property, 230 Ferry Boulevard, 250 Ferry Boulevard, 280 Ferry Boulevard, 300 Ferry Boulevard, Lot Behind 326 Ferry Boulevard, Vacant Lot at Housatonic Avenue, 576 and 600 East Broadway, Vacant DOT Lot Abutting I-95, Connecticut Right-of-Way, Beacon Point Area, 1 Beacon Point Road, Airport Property North of Marine Basin, Wooster Park, and Third Avenue Property. However, a formal evaluation on floodplains was not performed.

Executive Order 11988 (Floodplain Management) requires that federal agencies seek alternatives to actions that involve modifications to floodplains, and that if no other alternative exists, efforts must be made to “reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains.” As such, the development and evaluation of remedial alternatives for these parcels considered the potential impacts to flood storage capacity and the measures that will be necessary to mitigate for the loss of flood storage.

As discussed above, there is little vacant land available in the vicinity of Ferry Creek; therefore, to fulfill the flood storage requirement, land may need to be acquired through purchase or land-taking.

3.1.5.1 Delineation of the 100-Year Floodplain

Figure 1-2 of the OU6 RI (TtNUS, 2005) provided a depiction of the horizontal limits of the 100-year floodplain within the entire OU6 Study Area. This footprint was based on Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps for this area. One of the notes provided on the FEMA Flood Insurance Rate Maps reads, "This map…does not necessarily identify all areas subject to flooding. The community map repository should be consulted for possible updated flood hazard information prior to use of this map for property purchase or construction purposes."

As such, the EPA refined the limits of the 100-year floodplain depicted on the property group maps that were utilized for the evaluation of remedial alternatives (see Figures 4-1 through 4-18) by consulting Town of Stratford topographic contour maps for the individual parcels. The revised floodplain footprint corresponds to the appropriate contour line (i.e. 10 feet or 12 feet MSL) based on the base flood elevations provided on the FEMA map below the "Zone A" designations for a particular area.

3.1.5.2 Evaluation of Practicable Alternatives

Executive Order 11988 states that federal agencies must consider alternatives to avoid adverse impacts and incompatible development in the floodplain. This FS does not eliminate the capping alternative from consideration for any property solely on the basis of being located in the floodplain. Capping alternatives for property groups located wholly or partially within the 100-year floodplain are evaluated in full under the assumption that the practicability of alternative actions will be evaluated prior to selection of the capping alternative (see Section 4.0). During the remedy selection process, the detailed analysis of alternatives for property groups located within the floodplain will be utilized to support the determination that practicable alternatives are or are not available for that property, and whether capping in the floodplain is a viable remedy.

3.1.5.3 Flood Storage Mitigation

The Executive Order states that if a federal agency decides to conduct an action within the 100-year floodplain, it must be designed to minimize potential harm to or within the floodplain. State ARARs also require floodplain compensation. Consideration of this requirement was included for every remedial alternative that might be implemented within a floodplain. Further, this will be taken into consideration in the selection of the final cleanup remedy for each of the OU6 property groups.

In general, for alternatives that do not include capping of Raymark waste, the current flood storage volume is maintained by backfilling Raymark waste excavations so that the current surface topography is retained.

Flood storage mitigation becomes more complicated when a low-permeability cap is part of the remedy. By altering the ground surface elevation and/or the infiltration capacity of the affected floodplain area, the capacity of this area to act as a temporary storage area for floodwaters is impaired. To mitigate this impact, actions must be taken to retain the existing capacity or function (if retaining capacity is not feasible) of the floodplain area that is being capped.

On property groups where low-permeability caps within the 100-year floodplain were evaluated, a range of potential options for flood storage mitigation was considered. In most cases, the evaluation of alternatives assumes that low-permeability caps in floodplains will be installed in such a manner that the post-cap ground surface elevation mirrors the existing ground surface elevation. This will be accomplished by excavating Raymark waste (and, if necessary, non-Raymark waste soil, see Section 3.5.3.1) to a depth equivalent to the thickness of the cap prior to placing the cap. By taking this action, the property's above-ground flood storage capacity will be retained. Some below-ground flood storage (pore space within the vadose zone) may be lost due to the placement of a low-permeability barrier. A low-permeability barrier may limit infiltration of floodwaters. The impact of the cap on below-ground flood storage was assumed, for the purpose of the FS, to be negligible and readily able to be compensated for materials selected during remedial design. However additional study will be necessary during the remedial design phase to ensure that no net loss of flood storage or impediment to infiltration of flood water into the aquifer is realized from capping in the floodplain.

In certain floodplain areas that are located in undeveloped areas or less densely developed areas, pre-excavation of Raymark waste was assumed not to be necessary. On these property groups, the assumed flood storage mitigation action will include a change in ground surface elevation (i.e. lowering) in other, uncapped, areas of the property to replace the flood storage volume that was lost due to capping. The objective of this action will be to achieve no net loss of flood storage capacity for the property such that new flood hazards are not created on the subject property or any adjacent properties.

In the case where sufficient land area is not available on the subject property to achieve flood storage mitigation, acquisition of adjacent properties may be necessary. This is most likely to be a requirement in densely-developed areas that are located within the floodplain where the cap area occupies all or most of the property area.

More detail on property-specific assumptions for flood storage mitigation is provided in the detailed analysis of alternatives for specific property groups (Section 4.0). For this FS evaluation, general assumptions on the type and scope of flood mitigation requirements are utilized. A pre-design floodplain hydrology study will be necessary in order to properly design flood mitigation measures.

3.2 Remedial Alternative Components

Description of the potential remedial action options that were retained during the screening phase and applied to the selected remedial alternatives described in Section 3.3 are detailed below. These descriptions are provided for the basis of the property-specific discussions in Section 4.0.

3.2.1 Excavation Volumes/Final Cover

Most alternatives require some excavation of Raymark waste and replacement of this excavated material with either a low permeable RCRA cap or a permeable soil cover. The sections below describe the overall capping and cover process.

3.2.1.1 Site Preparation

Site preparation of varying degrees would be necessary to implement Raymark waste excavations at the OU6 property groups. Clearing and grubbing from light brush to trees several inches in diameter may be necessary to facilitate access to excavation areas. Ground stabilization may also be required on certain property groups where existing ground surface conditions will inhibit or prohibit the movement of heavy equipment across the property. Ground stabilization is usually accomplished through the placement and compaction of gravel roadways in areas where heavy equipment use is required.

Erosion and sedimentation control measures will be taken at each area where excavation or any other earth-moving activity occurs. Typically, these measures will include the installation of silt fence and/or straw bales at the perimeter of all work areas and adjacent to any wetland or surface water features that could potentially be impacted by runoff from the work sites. The scale of these measures will vary depending upon the size of the excavation areas and their proximity to sensitive environmental areas.

In most cases, excavated Raymark waste will be stockpiled, covered, and monitored on the property group being excavated. Soil stockpiling areas will be necessary to stage excavated soil while it is being characterized for disposal. Soil stockpiling areas will consist of bermed areas surrounded by erosion controls to prevent the migration of contaminants in the event that rainwater falls onto soil piles. Underliners will be installed at each stockpiling area to prevent intermingling between contaminated soil and the underlying ground surface. On property groups that do not have adequate space to support a stockpiling area, or where the current use of the property group (or surrounding properties) makes stockpiling on the property group impractical, alternate in-town soil stockpiling locations will need to be selected and utilized.

Decontamination facilities will be required to prevent the transport of contamination from excavation locations. Decontamination of all equipment and personnel leaving each excavation location will be a priority during implementation of the excavations to minimize short-term impacts to the community from the remedial action. For this purpose, decontamination pads will need to be constructed at each property group access point to prevent the transport of contaminated soil into public or private roadways. Decontamination pads typically consist of a gravel or concrete pad designed to drain decontamination fluids into a sump. Decontamination

is accomplished using pressure washers to wash the tires and frames of trucks as they leave the property.

3.2.1.2 Raymark Waste Excavation

After site preparation activities have been completed, and prior to the commencement of excavation, a site survey will be conducted at each property to identify and mark Raymark waste areas. Excavation areas will be marked in the field using wooden stakes or pin flags. Excavation areas will be as depicted on Figures 4-1 through 4-18 in Section 4.0 as Raymark waste areas.

Excavation of Raymark waste will be accomplished using a hydraulic excavator. Excavated soil will be transferred from the excavator bucket directly into dump trucks or dump trailers at the point of excavation. Dump trucks will transport excavated soil from the excavation location to the stockpiling/staging area where it will be temporarily stored until the proper disposal (and potential treatment) requirements are determined. Trucks will be decontaminated before leaving the properties. Adequate measures will be taken to contain dust and other materials from becoming airborne during excavation activities.

The seasonal high water table for each property group has been estimated using the existing groundwater level data and observations during the advancement of soil borings on each individual property. Backup information on the development of groundwater level estimates is presented in Appendix E. Note that excavation to the water table increases the volume of Raymark waste and is presented in the detailed cost estimates as “additional excavating volume”.

After an initial removal of approximately 12 inches of contaminated soil to the horizontal limits of Raymark waste, a series of cleanup confirmation soil samples will be collected from each excavation. Confirmation samples will be collected from the sidewalls of each excavation at regular intervals to verify that the horizontal extent of Raymark waste has been determined. These soil samples will be analyzed for the presence of Raymark waste. Excavations will be expanded horizontally in the vicinity of any soil sample meeting the definition of Raymark waste. Additional cleanup confirmation samples will be collected after the additional excavation is

complete. This iterative process will continue until confirmation sampling confirms that the horizontal extent of Raymark waste has been determined.

Once the horizontal extent of Raymark waste is defined, the vertical extent must also be determined. It is assumed that the extent of Raymark waste present on the property group will continue vertically to the proposed excavation depth (see Section 3.5). If, however, during the initial removal of the contaminated soil, and prior to reaching the anticipated excavation depth, evidence (visual or otherwise) suggests that Raymark waste is no longer present, then confirmation samples will be collected from the floor of the excavation. These soil samples will be analyzed for PRGs and established regulatory levels for direct contact and Pollutant Mobility Criteria (PMCs). Excavations will continue vertically in the vicinity of any soil sample not found to meet PRGs and established regulatory levels for direct contact and Pollutant Mobility Criteria (PMCs). Additional cleanup confirmation samples can be collected after the additional excavation is complete. This iterative process will continue until confirmation sampling confirms that the remaining soil meets PRGs and established regulatory levels for direct contact and Pollutant Mobility Criteria (PMCs), or until the planned depth of the excavation is reached. If the analysis determines that the soil meets all regulatory requirements before the planned depth of the excavation is reached, then the excavation will be complete.

3.2.1.3 Backfill and Site Restoration

Where excavations are required for cap construction, excavations will be backfilled using clean soil. Backfill material will be obtained from a local source, and delivered to the property group using dump trucks or dump trailers. Backfill material will be dumped directly into the excavations and spread using a bulldozer. Compaction will be accomplished using a vibratory roller or equivalent equipment. Backfill will be spread and compacted in lifts, and density tests will be conducted after each lift to ensure that backfill is being placed according to specifications.

Backfill material will, to the extent practicable, have permeability less than the existing on-site material.

Excavations in the 100-year floodplain will be backfilled to the original grade. Surface restoration at each property will involve re-establishing the pre-excavation surface features, as

practicable. Vegetated areas will be replanted with the equivalent vegetation that was present prior to excavation. At certain property groups, site restoration activities might include the re-creation of wetlands that are destroyed as a result of Raymark waste excavation. All currently paved areas would likely be resurfaced with asphaltic pavement.

3.2.1.4 Low-Permeability Cap

The proposed cap areas represent a reasonable approximation of the area of a cap that would be required to achieve the RAO (i.e. prevent direct contact with Raymark waste). The basis for the cap area estimates for the OU6 property groups is depicted on Figures 4-1 through 4-18 in Section 4.0.

Although Raymark waste used as fill is not considered disposal in landfills, the RCRA final closure rules for a hazardous waste facility (40 CFR 264.310) can be considered relevant and appropriate requirements for the design of the caps under Alternatives 3 and 4. In summary, the 40 CFR 264.310 requirements include:

- Provide long-term minimization of migration of liquids;
- Function with minimum maintenance;
- Promote drainage and minimize erosion or abrasion of the cover;
- Accommodate settling and subsidence so that the cover's integrity is maintained; and
- Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present.

The low-permeability caps will be designed and constructed under these alternatives and will be consistent with these requirements. A low-permeability cap design proposed by EPA Region I in the *Revised Alternative Cap Design Guidance Proposed for Unlined, Hazardous Waste Landfills in the EPA Region I* (Gagne and Choi, 2001) will be utilized. Caps will be finished at the ground surface with materials that match the existing surface characteristics. Currently, vegetated surfaces will be finished at the ground surface with 6 inches of topsoil and a vegetated cover; in general, Raymark waste areas currently covered with asphalt pavement, or areas where future land use might require an asphalt surface covering, will be finished at ground surface with asphalt.

As a general rule, low-permeability caps were not assumed to cover the entire property area unless Raymark waste areas were so widespread as to warrant a cap over the entire property. In many cases, caps were assumed over non-Raymark waste areas that are bounded on either side by a Raymark waste area. The assumed cap areas that were used to evaluate capping options for each of the individual property groups are depicted in Figures 4-1 to 4-18.

The following sections provide more detail on the design of low-permeability caps assumed for this FS.

3.2.1.4.1 Low-Permeability Cap in Vegetated Areas

The descriptions of the cap components presented in this section comprise a cap design that is compliant with RCRA Subtitle C, with modifications to the design based on the recommendations contained in the February 5, 2001 memorandum *Revised Alternative Cap Design Guidance Proposed for Unlined, Hazardous Waste Landfills in the EPA Region I* (Gagne and Choi, 2001). If the ground surface where the cap will be placed, within the Raymark waste area, on a property group is covered with grass, a vegetated RCRA-compliant low-permeability cap is assumed for this FS evaluation. It should be noted, however, that flexibility does exist in the cap design to allow for potential site redevelopment options. The specific cap design and site reuse will be determined during the remedial design phase. It is assumed and has been presented in the cost section for each property-specific group, that the cap design will include the layers shown below, described from top to bottom.

a. Vegetative Cover. The vegetative cover will primarily consist of grass, but could be any vegetation type that has a shallow root zone that is not at risk of penetrating the lower layers of the cap. The function of the surface vegetation is to reduce runoff and increase evapotranspiration. But most importantly, a well-designed vegetative layer will prevent excessive erosion of the cover, which will improve its performance and reduce long-term maintenance costs.

b. Topsoil Layer. The vegetative cover will be planted in a layer of topsoil that is approximately 6 inches thick. Topsoil will consist of a sand-silt-loam mixture that enables the storage of water for use by the overlying vegetation, and provides a nutrient-rich substrate that promotes vegetative growth.

c. Upper Protective Soil Layer. The upper protective soil layer will be placed between the topsoil layer and the warning layer to provide material that is capable of sustaining the vegetative cover during dry periods and to protect the underlying geosynthetic layers from frost damage. The protective soil layer will consist of approximately 12 inches of compacted, fine-grained soil material.

d. Warning/Delineation Fabric Layer. A warning layer, consisting of a “snow fence” or bright geotextile material, will be placed to serve as a “warning layer” for future intrusive activities should they occur at the Site. This fabric layer will be permeable to permit groundwater flow.

e. Lower Protective Soil Layer. The lower protective soil layer will be placed between the warning layer and the drainage layer to provide material that is capable of sustaining the vegetative cover during dry periods and to protect the underlying geosynthetic layers from frost damage. The protective soil layer will consist of approximately 12 inches of compacted, fine-grained soil material.

f. Drainage Layer. The drainage layer of the cap is designed to provide a high-permeability (greater than 0.1 cm/sec) region through which liquids that penetrate the upper soil layers will be diverted before they reach the geomembrane. The drainage layer may be constructed using 12 inches of granular materials (gravel or sandy gravel), but geosynthetic materials have been used effectively to achieve adequate permeability and flow capacity while reducing the thickness of the cap. For the purposes of estimating costs for the FS, it was assumed that a geosynthetic drainage layer, consisting of two non-woven geotextiles that are heat bonded to both sides of a drainage geonet, would be used as the drainage layer. This geocomposite would be installed over the geomembrane (see next paragraph), and will have the additional benefit of providing additional puncture protection for the underlying geomembrane.

g. Top Low-Permeability Layer (Geomembrane). The first line of defense against the infiltration of liquids that penetrate the upper soil layers and pass through the drainage layer will be a low permeability geomembrane. Geomembranes are thin sheets of flexible, very low permeability material that function extremely well as a liquid and gas

barrier. Geomembranes are used extensively in landfill caps as the primary low permeability element, and can be constructed from various types of materials to be resistant to the stresses that they might encounter without failing or losing function. Geomembranes with less than a 10^{-7} cm/s permeability will be used. Geomembranes can be manufactured smooth or textured, with textured geomembranes the design of choice where slope stability is an issue.

Geomembranes are fabricated using several different types of polymers including polyvinyl chloride (PVC) and polypropylene, but polyethylene (PE) is exclusively mentioned in the EPA Region I Technical Memorandum (Gagne and Choi, 2001). PE geomembranes are manufactured at various densities, and have demonstrated excellent performance in resisting chemical and biological degradation, burrowing animals, and maintaining performance at extreme temperatures. Linear low density polyethylene (LLDPE) and high density polyethylene (HDPE) will both be considered as potential geomembrane materials. In general, HDPE liners provide greater chemical resistance while LLDPE liners are more flexible and able to withstand stresses from elongation. EPA Region I recommends a geomembrane thickness of at least 60 mil for polyethylene geomembranes.

h. Bottom Low-Permeability Layer (Geosynthetic Clay Layer). The second line of defense against the infiltration of liquids that penetrate the soil layers and pass through the drainage layer will be a low permeability Geosynthetic Clay Liner (GCL). GCLs with less than a 10^{-7} cm/s permeability will be used (GCLs typically have a permeability of 10^{-9} cm/sec). Geosynthetic Clay Liners are recommended in the Revised Alternative Cap Design Guidance as a good alternative to the 12 inch Bottom Low-Permeability Soil Layer.

i. Base Layer. Approximately 6 inches of smooth clean fill material (sand) will be used to establish the rough grading for the cap base. This material will be used to smooth out existing ground surface imperfections so that the cap can be constructed on top of a smooth and compacted soil surface.

3.2.1.4.2 Low-Permeability Cap in Paved Areas

The components of asphalt caps will be similar to those discussed for the vegetated cap (previous subsection), except that 3 inches of topsoil and the vegetated surface will be replaced by a 3-inch layer of asphalt pavement. The protective soil layer below the asphalt surface will consist of a pavement subgrade layer adequate to support the asphalt surface and the anticipated vehicle loading for the property. A drainage geocomposite, a 60 mil geomembrane, GCL, and base layer will be included in the lower portions of the asphalt cap. For the purpose of estimating costs for this FS, a 2 foot thick granular subgrade was assumed for the placement of asphalt-based low-permeability caps.

Prior to the placement of capping materials, the ground surface will be prepared in a manner that will optimize the performance of the cap. Existing pavement surfaces will be excavated and may be reused as part of the subgrade. Up to 2 feet of surface soil will be removed (where necessary) from the cap footprint to enable the placement of cap materials without affecting the current ground surface elevations. Soil that is removed from the ground to accommodate the subgrade preparation will be transported to an in-town stockpiling area for characterization, and ultimately delivered to an out-of-town landfill facility, or in-town consolidation area; some soils will be used in the construction of the on-site cap. The asphalt surface covering will be placed on top of the compacted subgrade, and will have a thickness of at least 3 inches to comply with RSR requirements.

3.2.1.5 Soil Cover

The components of a multiple layer soil cover results in a minimum of four feet of clean fill or two feet of clean fill with asphalt located above Raymark waste left in-place following excavation.

3.2.1.5.1 Permeable Soil Cover

Areas on property groups outside of wetlands or floodplains that have Raymark waste remaining after excavations are completed, will have a permeable soil cover placed over the area where Raymark waste remains. Based on existing property group conditions, the permeable soil cover will be four feet of clean fill or two feet of clean fill with an asphalt top layer. The soil cover design will include the following layers, described from top to bottom:

a. Vegetated Surface Layer. A native seed mix would be applied to the restored surface to reestablish vegetated cover compatible with the adjacent terrain and to mimic pre-existing conditions to the extent practical. The purpose of this layer of the permeable soil cover will be to promote stability of the restored surface.

b. Topsoil Layer. A 6-inch layer of topsoil will be applied over all backfilled portions to achieve final grade elevations and provide a suitable base for root establishment from the vegetated surface. A nutrient-rich topsoil blend would be selected to promote plant growth and provide adequate water retention for subsequent plant uptake or infiltration to the permeable soil layers below.

c. Top Permeable Fill Layer. A 30-inch layer of clean backfill material will be placed above the warning layer to provide additional separation between the Raymark waste left in-place and surficial soil available for contact by potential receptors.

d. Warning/Delineation Fabric Layer. A warning layer, consisting of a “snow fence” or bright geotextile material, will be placed to serve as a “warning layer” for future intrusive activities should they occur at the Site. This fabric layer will be permeable to permit groundwater flow.

e. Bottom Permeable Fill Layer. A 12-inch layer of clean backfill material will be placed above the geotextile fabric.

f. Geotextile Fabric Layer. The permeable cover will include an initial geotextile fabric overlain above RW left in-place to permit groundwater flow but segregate fine-grained material between the soil cover and in situ Raymark waste.

3.2.1.5.2 Cover within a Wetland or Floodplain Area

A soil cover will be constructed within a wetland area or floodplain area to eliminate the potential for future risk to human health and the environment by direct contact. The cover will be constructed to additionally promote infiltration and hydrologic connection between surface water and groundwater to ensure that impacts to the floodplain area are temporary during remedial

action implementation, and restoration of the floodplain area to the extent practical is achieved. Preservation of the functionality of the floodplains is critical to prevent future adverse effects to the adjacent community from increased flow volume in Ferry Creek and to maintain ecosystem vitality. The permeable soil cover will be constructed with either an asphalt or vegetated surface to mimic pre-existing conditions prior to excavation, as practical. Based upon available GIS and aerial maps for the OU6 properties, it is assumed that less than 10% of the floodplain area is surfaced with asphalt. The following subsections provide a description of the permeable soil cover that will be constructed over Raymark waste post-excavation surfaces within floodplain or wetland areas. The soil cover design will include the following layers:

a. Vegetated Surface Layer. A native seed mix will be applied to the restored surface to reestablish vegetated cover compatible with the adjacent terrain and to mimic pre-existing conditions to the extent practical. The primary purpose of this layer of the permeable soil cover will be to reduce runoff and promote stability of the restored surface during flooding events. Secondary benefits will be to facilitate ecosystem recovery and enhance evapotranspiration.

b. Topsoil Layer. A 6-inch layer of topsoil will be applied over all backfilled portions of the floodplain to achieve final grade elevations and provide a suitable base for root establishment from the vegetated surface. A nutrient-rich topsoil blend would be selected to promote plant growth and provide adequate water retention for subsequent plant uptake or infiltration to the permeable soil layers below.

c. Top Permeable Fill Layer. A 30-inch layer of clean backfill material will be placed above the warning layer to provide additional separation between Raymark waste left in-place and surficial soil available for contact by potential receptors. Backfill material will be selected to ensure that the following soil properties of the pre-existing floodplain are restored following removal of Raymark waste; grain size, porosity, permeability and organic content. Additionally, the top permeable fill layer will include ballast/armoring (i.e.; rip rap) material to promote stability and mitigate future erosion. Cost estimating assumed that a fill material closer to loam with an armored surface would provide a more comparable substrate to pre-existing conditions within the floodplain areas as opposed to common borrow.

d. Warning/Delineation Fabric Layer. A delineation fabric (nonwoven, orange) will be placed below the 30-inch top permeable fill layer to serve as a "warning layer" for future intrusive activities should they occur at the Site. This fabric layer will be permeable to permit groundwater flow.

e. Bottom Permeable Fill Layer. A 12-inch layer of clean backfill material will be placed above the geotextile fabric. Similar to the top permeable fill layer, backfill material will be selected to ensure that the following soil properties of the pre-existing floodplain are restored following removal of Raymark waste; grain size, porosity, permeability and organic content. Cost estimates assumed that a fill material comparable to loam rather than common borrow would provide soil characteristics that more closely resemble existing conditions within the floodplain areas.

f. Geotextile Fabric Layer. The permeable cover will include an initial geotextile fabric overlain above Raymark waste left in-place to permit groundwater flow but segregate fine-grained material between the soil cover and in situ Raymark waste. A Class 2, 7 oz., nonwoven geotextile fabric is assumed to meet the required performance specifications given the current understanding of hydrogeology of the floodplain area and was used as the basis for estimating costs.

3.2.1.6 Raymark Waste Disposal

Excavated Raymark waste that cannot remain on the property group will be consolidated at an in-town consolidation location (Alternatives 3, 5, 7, and 9) or will be transported to an out-of-town disposal facility (Alternatives 4, 6, 8, and 10).

a. In-town Consolidation

Raymark waste excavated that does not exceed PHC standards established for a CAMU will be consolidated at one or more locations within the Town of Stratford. Raymark waste will be placed, spread, and compacted at the to-be-selected CAMU location(s), then covered using a low-permeability cap similar in design to that which was described for Alternatives 3 and 4 (Section 3.5.3). Potential In-town consolidation areas are discussed in Appendix F.

Excavated Raymark waste will be transported to in-town consolidation locations using dump trailers with 20 cubic yard capacities. All trailers used to transport soil for in-town consolidation will be decontaminated prior to leaving the property groups and will be securely covered during transit to prevent the spread of contamination.

Raymark waste that exceeds PHC standards will be shipped out-of-town for potential treatment and disposal.

b. Out-Of-Town Disposal

Raymark waste that exceeds standards will be shipped out-of-town for potential treatment and disposal. Excavated Raymark waste will be stockpiled and sampled prior to transport. The range of potential disposal options will include Subtitle D solid waste landfills (for waste that is not a characteristic hazardous waste and does not contain greater than 50 ppm PCBs), Subtitle C hazardous waste landfills (for waste that is a characteristic hazardous waste), and/or TSCA landfills (for waste containing greater than 50 ppm PCBs). In order to determine the appropriate disposal requirements for excavated soil, waste characterization samples would be collected from all stockpiled soil.

Each disposal facility will have its own requirements for the characterization of waste that it might accept, but a typical sampling program consists of a full TCLP analysis (VOCs, SVOCs, pesticides/PCBs, metals), total PCBs, dioxins, and total metals. Soil that does not exceed the TCLP threshold concentrations for the toxicity characteristic, and does not contain greater than 50 ppm PCBs, would be suitable for disposal at a Subtitle D landfill.

Soil that is RCRA hazardous (for example, soil that exceeds the TCLP threshold concentration for the toxicity characteristic) will be subject to land disposal restrictions (LDRs). Hazardous wastes that exhibit concentrations of contaminants that exceed the Alternative LDR Treatment Standards for contaminated soil (that is 10 times the UTS (40 CFR 268.48)) would require treatment prior to disposal. All soil treatment would occur at an out-of-town treatment facility, as needed for disposal.

Soil would be transported to out-of-town treatment/disposal facilities using dump trailers with 20 cubic yard capacity. All trailers that transport soil to the out-of-town treatment/disposal facility would be decontaminated prior to leaving the soil stockpiling/loading area and securely covered during transit to prevent the spread of contamination onto public or private roadways.

3.2.2 Wetlands and Floodplains

See Section 3.1.4 and 3.1.5 for detailed discussion of issues to be considered for use on any OU6 property groups with wetlands and floodplains.

3.2.3 Future Use Restrictions

Institutional controls will be components of all alternatives where Raymark waste remains on a parcel either above or below the seasonal high water table. Institutional controls will restrict activities such as certain excavations without prior written approval from EPA or DEP, or the use of groundwater, and can be an effective strategy for the mitigation of human health risks posed by Raymark waste. Fencing and warning signs can also be effective deterrents to trespassers that may otherwise come in contact with Raymark waste. The placement of restrictions on the property groups will require a property survey and assistance of attorneys to complete the legal filings and requirements.

Institutional controls will be placed on all parcels where Raymark waste remains to ensure the integrity of the remedy is not compromised by future on-site activities. Long-term operations and maintenance programs will be instituted to ensure that the remedy function as intended for the foreseeable future. As required by CTDEP regulations, groundwater monitoring programs will be implemented to verify the effectiveness of the remedy in preventing the migration of Raymark waste contaminants into groundwater.

The RSRs contain provisions for the establishment of an agreement between property owners and the CTDEP in the event that certain uses or activities on that property might present a potential exposure risk. The legal mechanism that has been created to enforce this agreement is the Environmental Land Use Restriction (ELUR). ELURs can be placed on a property to limit future uses and/or to restrict activities such as the disturbance of soil, demolition of buildings, or

disturbance of the cap/cover. ELURs are binding agreements that are recorded on the property deed; therefore they will impact current and future owners of the property.

3.2.4 Operation and Maintenance

The components of long-term operation and maintenance includes groundwater monitoring, maintenance of the parcel cap and/or cover and five-year reviews.

3.2.4.1 Groundwater Monitoring

A monitoring program will be developed to evaluate the performance of the remedy as it pertains to the potential prevention/reduction of contaminant migration into groundwater. Groundwater monitoring will be conducted periodically from at least one location upgradient and one location downgradient from the remedy. The assumed groundwater monitoring frequency will be quarterly for the first 2 years after which time annual monitoring may or may not be required depending on the remedy selected and monitoring results. Groundwater will be collected and analyzed for VOCs, PCBs, and metals.

3.2.4.2 Cap/Final Cover

Operations and maintenance will be conducted at each property with Raymark waste remaining on the parcel. An operations and maintenance (O&M) plan will be developed to ensure that the cap/cover remains as an effective barrier that prevents direct contact with contamination remaining on the parcel.

The O&M plans for property groups with either vegetated or asphalt covers will be similar. Both will require periodic inspections to identify potential vulnerabilities and make performance assessments. The primary differences will involve the types of maintenance and repair activities that might be required of each subgrade layer of the cap. Vegetated caps will require periodic mowing, pest control, and occasional earth repair where excessive erosion has impacted the final cover. Asphalt surfaces are likely to require less maintenance since there is no soil or vegetation associated with their function, however, surface maintenance such as sealing, crack repair, and asphalt replacement are assumed. Asphalt must be maintained to minimize infiltration of rainwater, specifically asphalt surfaces must be inspected for cracks, etc.

3.2.4.3 Five-Year Review

A five-year review will be conducted to verify that no change in potential exposures to or impacts from the Raymark waste at the property group has occurred. Five year reviews are to verify that the remedy is still functioning as designed and such remedy is still protective. The NCP (40 CFR 300) states that for any remedial action that results in “hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure”, a review of site conditions and risks will be performed at least every 5 years. Five-Year Reviews will be required for Alternatives 1 through 10. Five-year reviews will include groundwater monitoring for Alternatives 2 through 10. Five-year reviews will not include groundwater monitoring for Alternative 1. However, if all Raymark waste is removed during the remedial action from the property group, five-year reviews will not be required.

3.2.4.4 Maintenance of Existing Surfaces

Site conditions will be formally evaluated by EPA during the five-year review and restoration of pavement and/or vegetated surfaces will be required, as necessary.

3.3 Remedial Alternative Descriptions

The technologies and process options that were retained from the preliminary screening presented in Section 2.0 were assembled into ten remedial alternatives to address Raymark waste at the OU6 property groups. This section presents a detailed description of each alternative. The components of the alternatives are presented in Section 3.2. The following is a summary of the remedial alternatives that are included in this section:

- Alternative 1: No Action
- Alternative 2: Restrictions with Long-Term Monitoring
- Alternative 3: Low-Permeability Cap with In-town Consolidation
- Alternative 4: Low-Permeability Cap with Out-of-town Disposal
- Alternative 5: Excavation to the Water Table with In-town Consolidation
- Alternative 6: Excavation to the Water Table with Out-of-town Disposal
- Alternative 7: Excavation to Either 2 Feet or 4 Feet with In-town Consolidation
- Alternative 8: Excavation to Either 2 Feet or 4 Feet with Out-of-town Disposal
- Alternative 9: Excavation to 4 Feet depth with In-town Consolidation

- Alternative 10: Excavation to 4 Feet depth with Out-of-town Disposal

3.4 Screening of Remedial Alternatives for the OU6 Property Groups

The NCP states that screening of remedial alternatives at this stage of the FS should be performed if deemed necessary. In an effort to streamline this FS and to assemble a concise array of plausible alternatives, effectiveness, implementability, and cost were considered, in accordance with Section 4.0 of the *Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (October, 1988). These criteria are expanded on below:

Effectiveness – the effectiveness evaluation considers the following:

- Ability to protect human health and the environment in the short term (i.e. during the construction and implementation period);
- Ability to protect human health and the environment in the long term (i.e. the period after remediation is complete); and
- Reduces the toxicity, mobility, or volume of contaminants through treatment.

Implementability – the implementability evaluation considers the following:

- Technical feasibility – ability to construct, reliably operate, and meet technology-specific regulations for process options until the remedial action is complete. Operation, maintenance, and monitoring of alternatives is also included; and

- Administrative feasibility – ability to obtain the necessary permits for off-site actions and the availability of treatment, storage, and disposal services (including capacity).

Cost – the cost evaluation that is performed at this stage of the FS process includes a relative (i.e. low, medium, high) assessment of capital and O&M costs that would be incurred.

None of the 10 alternatives identified in Section 3.3 were eliminated as a result of the above screening criteria. Because of this, all 10 alternatives have been carried forward and are presented in Section 4.0, Detailed Analysis of Alternatives for all 18 property groups.

3.5 Description of Remedial Alternatives

The ten alternatives that were evaluated for each of the 18 property groups are shown below. Pairs of alternatives (3 and 4, 5 and 6, 7 and 8, and 9 and 10) have the same component except for the disposal of Raymark waste which is either in-town or out-of-town.

3.5.1 Alternative 1: No Action

The no action alternative was developed as a baseline case, as required by the NCP, to which all other alternatives may be compared. Under this alternative, it is assumed that no treatment, removal, or containment of Raymark waste would occur. Any reduction in the toxicity or volume of contaminants would occur only as a result of natural attenuation or degradation processes. Current and future human health risks would remain as they were quantified in the baseline human health risk assessment. Present values analyses are performed based on a 30-year monitoring period.

3.5.2 Alternative 2: Restrictions with Long-Term Monitoring

This institutional control alternative was developed to provide a scenario under which no active treatment, removal, or containment of Raymark waste would occur. Protection is provided through the placement of use or administrative restrictions on the property group to prevent excavation or any activity that might result in potential exposure to Raymark waste. Institutional actions such as institutional controls or town ordinances comprise use and administrative restrictions.

3.5.2.1 Future Use Restrictions

Institutional controls would be a component of Alternative 2. This remedy only consists of fencing, signage, and institutional controls prohibiting excavation without written consent from the EPA or DEP and groundwater use of any kind. An institutional control as presented would not in itself prohibit changes in land use. Descriptions of the institutional controls are presented in Section 3.2.3.

3.5.2.2 Operation and Maintenance

The operation and maintenance of the property group includes groundwater monitoring, maintenance of the current ground surfaces including vegetative or and/or paved surfaces, and five-year reviews.

3.5.2.2.1 Groundwater Monitoring

Limited groundwater monitoring will be conducted to assess potential changes in groundwater quality in areas where Raymark waste is left above the seasonal high groundwater table. Monitoring of selected wells will be performed on a quarterly basis for 2 years, and annually thereafter. Additional descriptions of groundwater monitoring are presented in Section 3.2.4.1.

3.5.2.2.2 Existing Surfaces

Monthly site inspections and annual reporting of existing site conditions to CTDEP will be required. Restoration of pavement and/or vegetated surfaces will be required, as necessary (Section 3.2.4.4).

3.5.3 Alternatives 3 and 4: Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4)

These alternatives use low-permeability caps to prevent potential direct contact exposures to Raymark waste and to minimize precipitation infiltration that can mobilize subsurface soil contaminants into groundwater. RCRA Subtitle C compliant caps will be used to cover Raymark waste areas located within the property group. Raymark waste will be excavated 3 feet in unpaved areas and 2.5 feet in paved areas. Excavated waste will be placed at an in-town consolidation area (Alternative 3) or an out-of-town disposal location (Alternative 4).

3.5.3.1 General Assumptions

Several important assumptions were made for the implementation of these Alternatives 3 and 4 on the OU6 property groups. These assumptions provide the rationale for decisions that were made during the detailed analysis and development of cost estimates for each alternative:

- **<u>The assumed area of the cap is greater than the area of the Raymark waste "footprint" on a particular property</u>.**

  - The Raymark waste footprint estimates were developed based on the spatial distribution of soil borings containing material that meets the definition of Raymark waste (Section 2.2.2.1). As a result, most of the footprints are irregularly shaped or non-contiguous areas that would not provide a practical basis for placement of a low-permeability cap. Construction of caps that only cover the delineated Raymark waste footprints would be inefficient and unnecessarily complex, and the effectiveness of caps constructed in this manner would be less than adequate.

  - Depending on the specific cap design, if any Raymark waste is removed from these property groups the material will either be transported to an in-town consolidation location (Alternative 3) or to an out-of-town disposal facility (Alternative 4). However, if the specific cap design allows for additional capacity, some limited amount of consolidation could occur.

  - Raymark waste is excavated 3 feet in unpaved areas and 2.5 feet in paved areas below the ground surface. This excavation depth will occur in areas outside and within the 100-year floodplain unless otherwise noted.

- **<u>In general, current grades and topography will be maintained</u>.**

  - To ensure that the current uses of the property groups will be continued after the completion of the remedial action, the grades and surface topography for each property will be maintained to the extent practicable. The removal of Raymark waste (and removal of non-Raymark waste soil), equal to the thickness of the cap, would be required on certain property groups to construct caps that do not interfere with the current use of the properties. Certain property groups (230/250/280/300 Ferry Boulevard, 576/600 East Broadway, 326 Ferry Boulevard, 250 East Main Street, 304/340 East Main Street, 251 East Main Street, DPW Lot, and Third Avenue Property) contain Raymark waste adjacent to, or in close proximity to, an existing building/structure. These buildings are currently used for industrial, commercial, or residential purposes and constructing a low-permeability cap with a thickness of up

to 2.5 feet may not be practical. Therefore, the evaluation of capping options on these property groups assumed that Raymark waste and soil will need to be excavated to a depth that would accommodate the construction of the cap without altering the existing ground surface elevations.

3.5.3.2 Excavation Volumes/Final Cover

Under Alternatives 3 and 4, Raymark waste areas that are currently covered with asphalt, or areas where future use will require an asphalt surface covering, will be covered using an asphalt surface, as practicable. All of the Raymark waste areas that are not covered with asphalt will be covered with a vegetated low-permeability cap.

3.5.3.2.1 Site Preparation

Site preparation activities for Alternatives 3 and 4 are presented in Section 3.2.1.1.

3.5.3.2.2 Raymark Waste Excavation

On currently developed properties, excavation to 2.5 feet or 3 feet may be required in order to construct a cap while maintaining current grades, as necessary. Raymark waste within the 100-year floodplain areas will be mitigated so the flood storage capacity will not be diminished. Detailed descriptions of the identification and marking of excavation areas, excavation methods, and confirmation analysis are presented in Section 3.2.1.2.

3.5.3.2.3 Backfill and Site Restoration

When excavation is required in order to construct a cap, all excavations will be backfilled, as described in Section 3.2.1.3. Surface restoration at each property group will involve re-establishing the pre-excavation surface features as much as possible and ensuring that floodplain storage capacity is maintained.

3.5.3.2.4 Raymark Waste Disposal

All excavated Raymark waste will be sent to an in-town consolidation location (Alternative 3) or for out-of-town disposal (Alternative 4). The in-town and out-of-town disposition under Alternatives 3 and 4 are presented in detail in Section 3.2.1.6.

3.5.3.3 Floodplain and Wetlands

If wetlands or floodplains are present on the property, they will need to be addressed as described in Sections 3.1.4 and 3.1.5, respectively.

3.5.3.4 Future Use Restrictions

Institutional controls would be a component of Alternatives 3 and 4 as Raymark waste will be left in place. These institutional controls can include various restrictions such as ELURs or local ordinances to prevent certain excavations or any other future activity that could result in compromising the effectiveness of the remedy. Descriptions of the institutional controls are presented in Section 3.2.3.

3.5.3.5 Operation and Maintenance

The operation and maintenance of the property group includes groundwater monitoring, maintenance of the caps including any vegetated soil and paved surfaces, monthly inspections, annual reports, and five-year reviews.

3.5.3.5.1 Groundwater Monitoring

Groundwater monitoring will be a component of Alternatives 3 and 4 as Raymark waste will be capped in place above the seasonal high water table. Pursuant to Connecticut RSR requirements, monitoring of selected wells will be performed on a quarterly basis for 2 years, and annually thereafter. Additional descriptions of groundwater monitoring are presented in Section 3.2.4.1.

3.5.3.5.2 Cap/Final Cover

Because Raymark waste is capped in place, the O&M for Alternatives 3 and 4 will involve monthly cap/final cover inspections with annual reporting to summarize inspection findings and verify the effectiveness of institutional controls. Additional descriptions of the cap/final cover are presented in Section 3.2.4.2.

3.5.4 Alternatives 5 and 6: Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6)

Alternatives 5 and 6 feature the excavation of the entire volume of Raymark waste that is located above the seasonal high water table and disposal of this waste at an in-town consolidation location (Alternative 5) or at out-of-town disposal facility (Alternative 6). The seasonal high water table elevation was selected as the vertical limit of excavation to achieve compliance with the Connecticut RSRs Pollutant Mobility Criteria.

3.5.4.1 General Assumptions

Several important assumptions were made for the implementation of Alternatives 5 and 6 on the OU6 property groups. These assumptions provide the rationale for decisions that were made during the detailed analysis and development of cost estimates for each alternative:

- **Footprint of excavations -** The excavation of Raymark waste areas will be conducted within the footprint of the waste areas. If the depth of excavations is deeper than 4 feet, benching or over excavating to prevent sidewall collapse would be done.

- **Property topography after excavation -** To ensure that the current use of the property will be continued after the completion of the remedial action, the grades and surface topography for each property group will be maintained to the extent practicable.

- **Depth of excavation -** The depth of excavation will be dependent upon the depth of contamination. Should confirmation sampling performed during the excavation indicate that all regulatory levels for direct contact (based upon either a commercial or residential settling) and Pollutant Mobility Criteria (PMCs) are met, the excavation will be complete. This could result in more shallow excavation than initially planned.

3.5.4.2 Excavation Volumes/Final Cover

Under Alternatives 5 and 6, Raymark waste areas that are currently covered with asphalt, or areas where future use will require an asphalt surface covering, will be capped using an asphalt surface, as practicable. All of the Raymark waste areas that are not covered with asphalt would be covered with a vegetated soil cover.

3.5.4.2.1 Site Preparation

Site preparation activities for Alternatives 5 and 6 are presented in Section 3.2.1.1.

3.5.4.2.2 Raymark Waste Excavation

Alternatives 5 and 6 involve the excavation of all identified Raymark waste to the depth of the seasonal high water table. Detailed descriptions of the identification and marking of excavation areas, excavation methods, and confirmation analysis are presented in Section 3.2.1.2.

3.5.4.2.3 Backfill and Site Restoration

Following verification that Raymark waste has been removed above water table, all excavations, will be backfilled, as described in Section 3.2.1.3. Surface restoration at each property group will involve re-establishing the pre-excavation surface features as much as possible and ensuring that floodplain storage capacity is maintained.

3.5.4.2.4 Raymark Waste Disposal

All excavated Raymark waste will be sent to an in-town consolidation location (Alternative 5) or for out-of-town disposal (Alternative 6). The in-town and out-of-town disposition under Alternatives 5 and 6 are presented in detail in Section 3.2.1.6.

3.5.4.2.5 Complete Excavation

Excavation to the seasonal high water table (Alternatives 5 and 6) will result in complete removal of all Raymark waste at 8 of the 18 property groups. This is because all Raymark waste on these 8 property groups is located above the seasonal high water table. At one other property group, Raymark waste was found only below the seasonal high water table (8 to10-foot depth with seasonal high water table depth of approximately 5 feet). Because of its location only below the seasonal high water table, long term monitoring requirements are limited.

For the remaining nine property groups, all of which have Raymark waste located within the seasonal high water table, an additional evaluation has been performed in Appendix H. The objective of the evaluation was to determine if the additional costs associated with complete

excavation of Raymark waste would be offset by the savings realized from the elimination of long term monitoring requirements. This evaluation found that for two property groups, Third Avenue and 326 Ferry Blvd., it will be more cost effective to excavate all Raymark waste from the property, even below the seasonal high water table. This was found to be case when in-town consolidation was the selected alternative. Saving were not realized with out-of-town disposal as the higher costs associated with out-of-town disposal were not offset by the savings realized by eliminating long term monitoring requirements.

3.5.4.3 Floodplain and Wetlands

If wetlands or floodplains are present on the property, they will need to be addressed as described in Sections 3.1.4 and 3.1.5, respectively.

3.5.4.4 Future Use Restrictions

Institutional controls would be a component of Alternatives 5 and 6 if Raymark waste is left in place below the seasonal high water table. These institutional controls can include various restrictions such as ELURs or local ordinances to prevent certain excavations or any other future activity that could result in compromising the effectiveness of the remedy. Descriptions of the institutional controls are presented in Section 3.2.3.

For properties where all Raymark waste is removed, institutional controls will not be required.

3.5.4.5 Operation and Maintenance

The operation and maintenance of the property group includes groundwater monitoring, and five-year reviews.

3.5.4.5.1 Groundwater Monitoring

Although Raymark waste located above the seasonal high water table will be excavated, groundwater monitoring will be required to confirm the effectiveness of the remedy. Connecticut's RSRs state that groundwater monitoring in a GB area may be discontinued two years after the cessation of all remediation if the applicable surface-water protection and volatilization criteria have been met and all groundwater is suitable for all existing uses.

Because Alternatives 5 and 6 will remove all Raymark waste to the seasonal high water table, it is anticipated that these requirements will be met, therefore, only 2 years of quarterly groundwater monitoring is assumed.

Additional descriptions of groundwater monitoring are presented in Section 3.2.4.1.

3.5.4.5.2 Cap/Final Cover

The O&M for Alternatives 5 and 6 will involve annual cover inspections with annual reporting to summarize inspection findings and verify the effectiveness of institutional controls. Additional descriptions of the final cover are presented in Section 3.2.4.2.

3.5.5 Alternatives 7 and 8: Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8)

These alternatives will result in rendering Raymark waste inaccessible, in accordance with the Connecticut RSRs direct contact criteria. Raymark waste in currently paved areas will be excavated to a 2-foot depth and replaced by clean fill and a 3-inch thick layer of asphalt pavement. Raymark waste in currently unpaved areas will be excavated to 4 feet below grade and will be replaced with clean fill and a vegetative cover. Excavated Raymark waste will be sent for in-town consolidation (Alternative 7) or out-of-town disposal (Alternative 8).

3.5.5.1 General Assumptions

Several important assumptions were made for the implementation of Alternatives 7 and 8 on the OU6 property groups. These assumptions provide the rationale for decisions that were made during the detailed analysis and development of cost estimates for each alternative:

- **Footprint of excavations -** The excavation of Raymark waste areas will be conducted within the footprint of the waste areas. Because the depth of excavations will not be deeper than 4 feet, benching or over excavating to prevent sidewall collapse is not anticipated.

- **Property topography after excavation -** To ensure that the current use of the property will be continued after the completion of the remedial action, the grades and surface topography for each property will be maintained to the extent practicable.

- **Depth of Excavation -** The depth of excavation will be dependent upon the depth of contamination. Should confirmation sampling performed during the excavation indicate that all regulatory levels for direct contact (based upon either a commercial or residential setting) and Pollutant Mobility Criteria (PMCs) are met, the excavation will be complete. This could result in a more shallow excavation than initially planned.

3.5.5.2 Excavation Volumes/Final Cover

Under Alternatives 7 and 8, Raymark waste areas that are currently covered with asphalt, or areas where future use will require an asphalt surface covering, will be capped using an asphalt surface, as practicable. All of the Raymark waste areas that are presently covered with grass, or any other permeable surface covering, would be covered with a vegetated soil cover surface. Floodplains, however, will be capped as detailed in Section 3.2.1.5.2.

3.5.5.2.1 Site Preparation

Site preparation activities for Alternatives 7 and 8 are presented in Section 3.2.1.1.

3.5.5.2.2 Raymark Waste Excavation

Raymark waste excavation activities for Alternative 7 and 8 are presented in Section 3.2.1.2 for additional details.

3.5.5.2.3 Backfill and Site Restoration

Following verification that Raymark waste has been removed to required depths, all excavations will be backfilled, as described in Section 3.2.1.3. Surface restoration at each property group will involve re-establishing the pre-excavation surface features as much as possible and ensuring that floodplain storage capacity is maintained.

3.5.5.2.4 Raymark Waste Disposal

All excavated Raymark waste will be sent to an in-town consolidation location (Alternative 7) or for out-of-town disposal (Alternative 8). The in-town and out-of-town disposition under Alternatives 7 and 8 are presented in detail in Section 3.2.1.6.

3.5.5.3 Floodplain and Wetlands

If wetlands or floodplains are present in the property group, they will need to be addressed as described in Sections 3.1.4 and 3.1.5, respectively.

3.5.5.4 Future Use Restrictions

Institutional controls would be a component of Alternatives 7 and 8 if Raymark waste is left in place. These institutional controls can include various restrictions such as ELIRs or local ordinances to prevent certain excavations or any other future activity that could result in compromising the effectiveness of the remedy. Descriptions of the institutional controls are presented in Section 3.2.3.

For properties where all Raymark waste is removed, institutional controls will not be required.

3.5.5.5 Operation and Maintenance

The operation and maintenance of the property group includes groundwater monitoring, maintenance of the cover including the vegetated soil and paved surfaces, monthly inspections, annual reports, and five-year reviews.

3.5.5.5.1 Groundwater Monitoring

Groundwater monitoring will be a component of Alternatives 7 and 8 for any property at which Raymark waste is left in place above the seasonal high water table. Connecticut's RSRs state that groundwater monitoring in a GB area may be discontinued two years after the cessation of all remediation if the applicable surface-water protection and volatilization criteria have been met and all groundwater is suitable for all existing uses. Because Alternatives 7 and 8 will remove Raymark waste to a depth of only 2 feet in paved areas (4 feet in unpaved areas), these

requirements may not be met. Because of this, 2 years of quarterly groundwater monitoring then ongoing annual groundwater monitoring is assumed.

Additional descriptions of groundwater monitoring are presented in Section 3.2.4.1.

3.5.3.5.2 Cap/Final Cover

If any Raymark waste is left in place, the O&M for Alternatives 7 and 8 will involve monthly cover inspections with annual reporting to summarize inspection findings and verify the effectiveness of institutional controls. Additional descriptions of the final cover are presented in Section 3.2.4.2.

3.5.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10)

Alternatives 9 and 10 would involve excavation of Raymark waste in both paved and unpaved areas to a depth of 4 feet and backfilling with clean materials, thereby rendering all waste materials inaccessible in accordance with the Connecticut RSRs direct contact criteria. Excavated Raymark waste will be sent for in-town consolidation (Alternative 9) or out-of-town disposal (Alternative 10).

3.5.6.1 General Assumptions

Several important assumptions were made for the implementation of Alternatives 9 and 10 on the OU6 property groups. These assumptions provide the rationale for decisions that were made during the detailed analysis and development of cost estimates for each alternative:

- **Footprint of excavations -** The excavation of Raymark waste areas will be conducted within the footprint of the waste areas. Because the depth of excavations will not be deeper than 4 feet, benching or over excavating to prevent sidewall collapse is not anticipated.

- **Property topography after excavation -** To ensure that the current use of the property will be continued after the completion of the remedial action, the grades and surface topography for each property will be maintained to the extent practicable.

- **<u>Depth of Excavation</u> -** The depth of excavation will be dependant upon the depth of contamination. Should confirmation sampling performed during the excavation indicate that all regulatory levels for direct contact (based upon either a commercial or residential setting) and Pollutant Mobility Criteria (PMCs) are met, the excavation will be complete. This could result in a more shallow excavation than initially planned.

3.5.6.2 Excavation Volumes/Final Covers

Under Alternatives 9 and 10, Raymark waste areas that are currently covered with asphalt, or areas where future use will require an asphalt surface covering, will be capped using an asphalt surface, as practicable. All of the Raymark waste areas that are not paved would be covered with a vegetated soil cover. Floodplains, however, will be capped as detailed in Section 3.2.1.5.2.

3.5.6.2.1 Site Preparation

Site preparation activities for Alternatives 9 and 10 are presented in Section 3.2.1.1 for additional details.

3.5.6.2.2 Raymark Waste Excavation

Raymark waste excavation for Alternatives 9 and 10 are presented in Section 3.2.1.2 for additional details.

3.5.6.2.3 Backfill and Site Restoration

Following verification that Raymark waste has been removed to required depths, all excavations will be backfilled, as described in Section 3.2.1.3. Surface restoration at each property group will involve re-establishing the pre-excavation surface features as much as possible and ensuring that floodplain storage capacity is maintained.

3.5.6.2.4 Raymark Waste Disposal

All excavated Raymark waste will be sent to an in-town consolidation location (Alternative 9) or for out-of-town disposal (Alternative 10). The in-town and out-of-town disposition under Alternatives 9 and 10 are presented in detail in Section 3.2.1.6.

3.5.6.3 Floodplain and Wetlands

If wetlands or floodplains are present in the property group, they will need to be addressed as described in Sections 3.1.4 and 3.1.5, respectively.

3.5.6.4 Future Use Restrictions

Institutional controls would be a component of Alternatives 9 and 10 if Raymark waste is left in place. These institutional controls can include various restrictions such as ELURs or local ordinances to prevent certain excavations or any other future activity that could result in compromising the effectiveness of the remedy. Descriptions of the institutional controls are presented in Section 3.2.3.

For properties where all Raymark waste is removed, institutional controls will not be required.

3.5.6.5 Operation and Maintenance

The operation and maintenance of the property group includes groundwater monitoring, maintenance of the cover including the vegetated soil and paved surfaces monthly inspections, annual reports, and five-year reviews.

3.5.6.5.1 Groundwater Monitoring

Groundwater monitoring will be a component of Alternatives 9 and 10 for any property at which Raymark waste is left in place above the seasonal high water table. Connecticut's RSRs state that groundwater monitoring in a GB area may be discontinued two years after the cessation of all remediation if the applicable surface-water protection and volatilization criteria have been met and all groundwater is suitable for all existing uses. Because Alternatives 9 and 10 will not remove all Raymark waste located above the seasonal high water table, it is anticipated that

these requirements will not be met. Because of this, 2 years of quarterly groundwater monitoring then ongoing annual groundwater monitoring is assumed.

Additional descriptions of groundwater monitoring are presented in Section 3.2.4.1.

3.5.6.5.2 Cap/Final Cover

If any Raymark waste is left in place, the O&M for Alternatives 9 and 10 will involve monthly cover inspections with annual reporting to summarize inspection findings and verify the effectiveness of institutional controls. Additional descriptions of the final cover are presented in Section 3.2.4.2.

3.6 Evaluation of Potential In-town Consolidation Areas/CAMUs

A component of many of the alternatives evaluated included an in-town consolidation option. EPA and CTDEP worked closely with the Raymark Advisory Committee and its technical consultant to determine potential locations within Stratford that would be suitable for the consolidation of Raymark waste. A requirement in the evaluation process was that any potential consolidation locations already contain Raymark waste. Due to regulatory constraints among other considerations, placing contaminated material (Raymark waste) onto a parcel that was either 1) contaminated with something other than Raymark waste; or 2) that was not contaminated, was not considered.

Six potential consolidation locations were identified which included:

- Lockwood Avenue Property
- 250/280/300 Ferry Boulevard
- 576/600 East Broadway
- OU3 Ferry Creek Elbow
- OU4 former Raybestos Memorial Ballfield
- OU9 Stratford Landfill and Short Beach Park

576/600 East Broadway was eliminated as an area that could accept significant volumes of additional Raymark waste. This was due to principally to a constraint for maintaining grades to

abutting residential parcels. While there may be some opportunities for limited consolidation at this location, it cannot provide the necessary capacity to be a significant consolidation area.

250/280/300 Ferry Boulevard was also eliminated as an area that could accept significant volumes of additional Raymark waste. On-site buildings are accessed at current ground level grades which would, therefore, require excavation for cap construction. Opportunities for consolidation do exist from behind current buildings to the edge of Ferry Creek, however, that entire area is within the 100 year floodplain. Any consolidation would require floodplain compensation which will require significant additional costs. Because of these limitations, 250/280/300 Ferry Boulevard was eliminated as a potential consolidation location.

All four remaining locations were evaluated for varying consolidation volumes based on site specific conditions. These evaluations are presented in Appendix F. In addition, the three locations: OU3 Ferry Creek Elbow (OU3 Study Area), OU4 former Raybestos Memorial Ballfield (OU4 Ballfield), and OU9 Stratford Landfill and Short Beach Park were further evaluated in Focused Feasibility Studies (FFS) to determine other clean-up options available (beyond consolidation) as each of these areas are separate operable units (not part of OU6) within the Raymark Site. See Appendix A.

4.0 DETAILED ANALYSIS OF ALTERNATIVES

The remedial alternatives that were developed and brought through the screening in Section 3.0 are described and analyzed in detail for each of the OU6 property groups, in this section. The detailed analysis of the alternatives is intended to provide sufficient information to facilitate selection of a specific remedy or combination of remedies for these Raymark waste properties. The detailed analysis of alternatives was developed in accordance with the NCP (40 CFR 200.430(e)) and the *Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (EPA, 1988). Details on CAMU screening and evaluation are provided in Appendix F.

4.1 Format of the Detailed Analysis

As noted previously, OU6 of the Raymark Industries Superfund Site consists of 24 separate parcels of land that have been grouped into 18 property groups as described below and in Section 4.3. In an effort to streamline the detailed analysis of alternatives and evaluate scenarios that could potentially result in a savings through economies-of-scale, EPA decided to combine adjacent properties where Raymark waste was found into various property groups. Properties were grouped after making a preliminary determination that the volume and orientation of Raymark waste that is present was conducive to implementing the same remedy on adjacent properties. This enabled EPA to conduct a more streamlined evaluation of alternatives for these property groups, resulting in potential more timely responses, cost savings, and a more realistic approach for cleanup.

However, the following 9 properties were evaluated individually in the detailed analysis of alternatives. These properties do not share a Raymark waste area with an adjacent property or are adjacent to an OU6 property that could potentially be addressed with a separate remedy. These 9 properties are evaluated later in this FS in the section shown in parentheses:

- Lockwood Avenue Property (4.3.1)
- 200 Ferry Boulevard (4.3.2)
- 326 Ferry Boulevard (4.3.5)
- Vacant Lot Abutting I-95 (4.3.7)
- Connecticut Right-of-Way (4.3.8)

- 380 East Main Street (4.3.10)
- Airport Property North of Marine Basin (4.3.16)
- Wooster Park (4.3.17)
- Third Avenue Property (4.3.18)

The remaining 15 OU6 properties were combined into property groups and/or separated into areas of concern (AOCs) to streamline the detailed analysis and tailor the evaluation to the unique distribution and orientation of Raymark waste on each property. These 15 properties were grouped into 9 property groups as described in the following paragraphs. A short summary of the rationale for grouping properties or breaking properties into AOCs is provided below.

230, 250, 280, and 300 Ferry Boulevard were merged into a single property group (Ferry Boulevard Properties – Section 4.3.3) for the purpose of the detailed analysis. This approach was considered to be both practical and cost-effective since these properties are co-located, adjacent, and each contain a large volume of contiguous Raymark waste (see Figure 4-3). Therefore, it was assumed that the same remedial action would be selected for all four properties, with the probability of cost savings from design and implementation of the remedy.

The **Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue** (Section 4.3.4) were combined into a single property group. This approach was considered to be practical since the two properties are co-located and adjacent with contiguous Raymark waste areas. Evaluating and implementing the same action on both properties concurrently will result in a probable cost savings since issues such as access, floodplain, wetlands, technical implementability, and ARARs are similar for both parcels.

576 and 600 East Broadway (Section 4.3.6) are co-located, adjacent properties, each with a relatively large volume of Raymark waste. Therefore, it was assumed that the most practical remedy in this area would include the same remedial action on both parcels, which would result in a cost savings from combining the design and implementation of the remedies.

The **DPW Lot and 251 East Main Street** (Section 4.3.12) parcels are co-located and adjacent properties that share a contiguous Raymark waste area (southern portion of DPW Lot – labeled DPW Lot AOC 2 – and southwestern portion of 251 East Main Street). The shared Raymark

waste area has a relatively small volume of Raymark waste (no Raymark waste below the water table) and the potential for a “clean closure,” therefore they were evaluated together to achieve a cost saving. A separate area of Raymark waste in the northern portion of the DPW Lot was evaluated separately as DPW Lot AOC 1 (Section 4.3.11).

250, 304, and 340 East Main Street (Section 4.3.9) are three co-located and adjacent properties with contiguous Raymark waste areas. Therefore, it was assumed that the most practical remedy in this area would include the same action on each parcel, which would result in a cost savings from combining the design and implementation of the remedy.

Beacon Point Area and One Beacon Point Road are co-located and adjacent properties with three separate and distinct Raymark waste areas, one of which spans the property boundary between the two parcels. Each of the three Raymark waste areas has a unique volume and distribution of Raymark waste such that the evaluation of the three areas separately was considered the most practical way to evaluate remedial alternatives. Therefore, these two properties were divided into three AOCs for the purpose of evaluating potential remedial options (Sections 4.3.13, 4.3.14, and 4.3.15).

The detailed analysis that follows will evaluate the feasibility of each alternative brought through the screening in Section 3.0 for each of the 9 property groups and 9 individual properties, which together total the 18 property groups shown in Section 4.3. A detailed analysis of each of the CAMUs that were retained through the screening of alternatives is described in Appendix in Appendix F.

4.2 Detailed Analysis Criteria

In conformance with the NCP, seven of the following nine criteria were used to evaluate each of the retained alternatives during the detailed analysis. The last two criteria, state and community acceptance, will be addressed following receipt of state and public comments on the FS and proposed cleanup plan put forth by EPA.

- Overall Protection of Human Health and the Environment
- Compliance with ARARs
- Long-Term Effectiveness and Permanence

- Reduction of Toxicity, Mobility, or Volume Through Treatment
- Short-Term Effectiveness
- Implementability
- Cost
- State Acceptance
- Community Acceptance

Under the NCP, the selection of a remedy is based on the nine evaluation criteria, which are categorized into three groups:

- Threshold Criteria – The overall protection of human health and the environment, and compliance with Applicable or Relevant and Appropriate Requirements (ARARs) are threshold criteria that each alternative must meet in order to be eligible for selection.

- Primary Balancing Criteria – The five primary balancing criteria are long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost.

- Modifying Criteria – The state and community acceptance are modifying criteria that will be considered in remedy selection.

Brief, general discussions of these evaluation criteria are presented in the following text.

4.2.1 Overall Protection of Human Health and the Environment

This evaluation criterion provides a check to assess whether each alternative provides adequate protection of human health and the environment. The overall assessment of protection draws on the assessments conducted under other evaluation criteria, especially long-term effectiveness and permanence, short-term effectiveness, and compliance with ARARs. The evaluation focuses on whether a specific alternative achieves adequate protection; how risks are eliminated, reduced, or controlled; and whether the Remedial Action Objective (RAO) would be achieved.

4.2.2 Compliance with ARARs

ARARs are considered during the detailed evaluation of alternatives. Alternatives are assessed on whether they attain ARARs. When an ARAR cannot be met, the basis for justification of a waiver under CERCLA if any is presented. The actual determination of which ARARs are requirements is made by the EPA in consultation with the CTDEP.

4.2.3 Long-Term Effectiveness and Permanence

Under this criterion, the alternatives are evaluated for long-term effectiveness and permanence, and the degree of risk remaining after the RAO has been met. The following components are evaluated:

- Magnitude of residual risks - assesses the residual risk remaining from untreated wastes or treatment residuals at the conclusion of remedial actions, the remaining sources of risk, and the need for 5-year reviews.

- Adequacy and reliability of controls - assesses controls that are used to manage treatment residuals or remaining untreated wastes. This assessment includes addressing: likelihood of technologies to meet required efficiencies or specifications, type and degree of long-term management, long-term monitoring requirements, operation and maintenance (O&M) functions to be performed, uncertainties associated with long-term O&M, potential need for replacement of technical components and associated magnitude of risks or threats, degree of confidence in controls to handle potential problems, and uncertainties associated with land disposal of untreated wastes and residuals.

4.2.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

This criterion addresses the statutory preference for remedies that employ treatment as a principal element by assessing the relative performance of different treatment technologies for reducing the toxicity, mobility, or volume of the contaminated media. Specifically, the analysis should examine the magnitude, significance, and irreversibility of the estimated reductions.

The degree to which remedial alternatives employ treatment that reduces toxicity, mobility, or volume is assessed by considering the following factors:

- The treatment processes that the remedies employ, the media they would treat, and threats addressed;
- The approximate amount of hazardous materials that would be destroyed or treated;
- The degree of expected reduction in toxicity, mobility, or volume as a result of treatment;
- The degree to which the treatment is irreversible;
- The type and quantity of residuals that would remain following treatment, considering the persistence, toxicity, mobility, and bioaccumulation capacity of the contaminants of concern and impacted media; and
- The ability of alternatives to satisfy the statutory preference for treatment as a principal element.

4.2.5 Short-Term Effectiveness

The assessment of short-term effectiveness during construction or implementation until the RAO is met includes consideration of the following factors:

- Potential short-term impacts to the community during remedial actions and whether risks may be addressed or mitigated;
- Potential impacts to, and protection of, the workers during remedial actions;
- Potential adverse environmental impacts that result from construction and implementation of the alternative, and the reliability of mitigation measures; and
- Time until the RAO is achieved.

4.2.6 Implementability

The ease or difficulty of implementing a remedial alternative is assessed by considering the following factors during the detailed analysis:

- Technical Feasibility;
  - Degree of difficulty or uncertainties associated with constructing and operating the alternative;
  - Technical difficulties associated with the technologies' reliability that could result in schedule delays;
  - Likelihood of additional remedial actions and anticipated ease or difficulty in implementation; and
  - Ability to monitor and perform risk assessments to verify the effectiveness of the remedy.

- Administrative Feasibility:
  - The need to coordinate with other offices and agencies, and obtain necessary approvals and permits for off-site actions.

- Availability of Services and Materials:
  - Availability of adequate capacity and location of treatment, storage, and disposal services, if required;
  - Availability of necessary equipment and specialists;
  - Availability of treatment technologies comprising the alternative, sufficient demonstration of the technologies, and availability of vendors; and
  - Availability of services and materials, and the potential for obtaining competitive bids.

4.2.7 Cost

A detailed cost analysis is performed for each alternative to assess the net present worth cost to implement the remedial actions. The cost analysis consists of the following:

- Estimate of capital (direct and indirect) and annual O&M costs;
- Development of costs with an accuracy in the range of +50 percent to -30 percent; and

- Calculation of the net present worth (capital and O&M costs) of the alternative by discounting to a base year or current year using a discount rate of 7 percent.

4.2.8 State Acceptance

The CTDEP is providing input to the feasibility study process on an ongoing basis and will continue to do so throughout the public comment period. Assessment of the state concerns may not be completed until comments on the FS are received. As a result, this FS does not include any additional discussion about this criterion for any of the alternatives analyzed. State concerns may be discussed in the proposed plan to be issued for public comment.

4.2.9 Community Acceptance

This criterion refers to the community's comments on the remedial alternatives under consideration. The community is broadly defined to include all interested parties. Community concerns would be addressed after the public comment period, which follows the release of the proposed plan. As a result, this FS does not include any additional discussion about this criterion for any of the alternatives analyzed.

4.3 Property-Specific Detailed Analysis of Alternatives

The following sections present the detailed analysis of alternatives for each of the 9 property groups and 9 individual OU6 properties that were introduced in Section 4.1. Each analysis is presented as a stand-alone section so that decisions on the most appropriate remedy for each property group/property may be made independently during preparation of the Proposed Plan. Alternatives were evaluated against the first seven of the nine criteria that were presented in Section 4.2. Please refer to Appendix B in Volume 2 of this FS for a general description of potential remedial alternatives.

4.3.1 Lockwood Avenue Property

The Lockwood Avenue property consists of approximately 5.3 acres of commercially-zoned (partly waterfront business and partly retail) land, located east of Lockwood Avenue and Ferry Boulevard. It is one of the property groups that was evaluated in the OU6 RI (TtNUS, 2005). The property is presently unoccupied and undeveloped, and contains no structures. The property is vegetated with common reed in the wetland areas and trees and shrubs in the upland areas. A soil berm is present along Lockwood Avenue and along a portion of Ferry Creek. Broad Street is located to the north, with Ferry Creek and the Housatonic River to the east, residential properties on Stratford Avenue to the south, and commercial and residential properties on Lockwood Avenue to the west.

Sixty percent of the Lockwood Avenue property is occupied by tidal wetlands that, in their current state, are periodically inundated with tidal or flood waters. This property is located at the extreme southern end of Ferry Creek, where the creek flows into the Housatonic River (Figure 4-1). As such, this parcel plays a role in mitigating the rise of floodwaters and tidal waters in the lower Ferry Creek Area. The selection of a remedial action to address Raymark waste on this parcel, therefore, will be highly dependent upon the feasibility of either constructing a remedy that does not reduce the storage capacity on (or in the vicinity of) the Lockwood Avenue property or by successfully acquiring a nearby property(ies) sufficient in size to mitigate floodplain losses. The entire property group lies within the 100-year floodplain.

The functional value of the wetland on the property was assessed in the “Technical Memorandum on Wetlands Evaluation dated June 1998.” As stated in this document, the Lockwood Avenue wetlands is part of a larger wetlands evaluation (approximately 9 acres that includes the 5.3 acres of the Lockwood Avenue Property Group; shown in the wetlands evaluation document as Ferry Creek OU3 Area B wetlands). This area has an overall functional value index ranging from 0.1 to 0.78 (out of 1.0 for 10 functions) using the Coastal Method of evaluation. Based on this assessment, the functional value of this wetland is considered moderately to severely degraded partially due to the presence of Raymark waste.

Key factors associated with the areas and volumes to be addressed at this property group include:

- Raymark waste area: ..... 80,000 SF (Figure 4-1)
- Total volume of Raymark waste:..... 23,704 (CY)
- Maximum depth of Raymark waste: ..... 8 feet bgs
- Average depth to the seasonal high groundwater table:.....2.5 feet
- Raymark waste area outside of 100-year floodplain: ..... 0 SF
- Raymark waste area in 100-year floodplain:..... 80,000 SF
- Raymark waste in 100-year floodplain to 2.5 FT:..... 7,407 CY (80,000 SF x 2.5 FT)
- Raymark waste area under pavement: ..... 0 SF
- Raymark waste in unpaved area:..... 80,000 SF
- Raymark waste located below the water table:.....16,297 CY (80,000 SF x 5.5 FT)
- Alternatives 3/4:
  - Raymark waste under pavement to 2.5 FT: .....0 CY
  - Raymark waste in unpaved area to 3 FT: .....8889 CY (80,000 SF x 3 FT)
- Alternatives 5/6:
  - Raymark waste located above the water table: .....7,407 CY (80,000 SF x 2.5 FT)
- Alternatives 7/8:
  - Raymark waste under pavement to 2 FT: .....0 CY (0 SF x 2 FT)
  - Raymark waste in unpaved area to 4 FT: .....11,852 CY (80,000 SF x 4 FT)
- Alternatives 9/10:
  - Raymark waste to 4 FT: .....11,852 CY (80,000 SF x 4 FT)

The calculation of the average depth to the seasonal high water table of 2.5 feet below ground surface (bgs) is based on observations of water levels from soil borings advanced in the area. The calculation of the maximum depth of Raymark waste is based on data collected during the RI (TtNUS, 2005).

The detailed analysis of alternatives for this property group is presented below and consists of the following components:

- A list of key assumptions (Section 4.3.1.1) is used as the basis for the detailed analysis of alternatives and for the development of costs for the FS;

- Figure 4-1, which shows a map of Lockwood Avenue, the delineated Raymark waste area, the 100-year floodplain, and the proposed cap footprint;
- Table 4-1, which presents the individual detailed analysis of alternatives for Lockwood Avenue in tabular form;
- The comparative analysis of alternatives for Lockwood Avenue, presented in text form;
- Table 4-1A, which presents a tabular summary of the comparative analysis;
- Table 4-1B, which presents a summary of cost estimates for each of the alternatives;
- Table 4-1C, which provides a summary of ARARs for each of the Lockwood Avenue alternatives; and
- Cost Estimate Backup Sheets for the FS cost estimates, which are presented Appendix G.

4.3.1.1 Lockwood Avenue Property Assumptions

Key assumptions associated with each alternative are presented in this section. Pairs of alternatives (3 and 4, 5 and 6, 7 and 8, and 9 and 10) have the same components except for the disposal of Raymark waste which is either in-town or out–of-town. See Section 3.3 for details on the Remedial Alternatives discussed below. See Table 4-1 for a summary of the details on the analysis for the Lockwood Avenue property group.

4.3.1.1.1 Alternative 1 – No Action

Detailed descriptions of the no action alternative are presented in Section 3.5.1.

4.3.1.1.2 Alternative 2 – Restrictions with Long-Term Monitoring

Detailed descriptions of Alternative 2 are presented in Section 3.5.2. The property group-specific details include the following:

Future Use Restriction:

- Due to the Raymark waste that will remain at this property group, Alternative 2 will include placement of institutional controls on the Lockwood Avenue property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

Operation and Maintenance

- Groundwater Monitoring: Two monitoring wells will be installed to support long-term groundwater monitoring, which will be complemented by an existing monitoring well (MW-312). The existing monitoring well is assumed to be functional and can be utilized for long-term groundwater monitoring. Because Raymark waste will remain above the seasonal high water table, all three wells will be monitored quarterly for two years, and annually thereafter.

- Existing Surfaces: Monthly surface inspections of vegetative covers will be required along with annual reporting to summarize inspection findings and to verify the effectiveness of institutional controls.

4.3.1.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4)

The purpose of a low-permeability cap is to prevent contaminants located above the cap from leaching into the groundwater. In order to construct a low-permeable cap at this property group, however, excavation of 3 feet of material (unpaved areas) is required. Since the average depth to groundwater is only 2.5 feet, all contaminated material will have to be removed for cap installation. Once removed, there would be no contaminated material left above the water table and a low-permeable cap will serve no purpose. Because of this, low-permeable cap alternatives (Alternatives 3 and 4) are not evaluated for this property group.

4.3.1.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6)

Alternatives 5 and 6 do not comply with ARARs and, therefore, were not evaluated. Excavation to the water table (2.5 feet) would not be in compliance with ARARs. CTDEP's Direct Exposure Criteria (DECs) require that 4 feet of clean fill be placed above waste left in place in unpaved areas. Because the depth to the seasonal high groundwater table is less than 4 feet, and because the current grade must be maintained (floodplain), Alternatives 5 and 6 were not evaluated.

4.3.1.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8)

Detailed descriptions of Alternatives 7 and 8 are presented in Section 3.5.5. For this property group, it is assumed that Raymark waste is excavated to either a depth of 2 feet (current paved areas) or 4 feet (current unpaved areas). Since the entire parcel is not paved, excavation to 2 feet is not applicable. This results in only 4 feet excavations, which is the same as Alternatives 9 and 10. Because of this, Alternative 7 and 8 are not evaluated.

4.3.1.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8)

Detailed descriptions of Alternatives 9 and 10 are presented in Section 3.5.6. Raymark waste areas will be excavated to a 4-foot depth, which will result in excavation into the seasonal high water table. Excavated material will be placed in an in-town consolidation area (Alternative 9) or an out-of-town disposal location (Alternative 10). The property group-specific details include the following:

Excavation Volumes/Final Cover

- Approximately 11,852 CY of Raymark waste will be excavated 4 feet and replaced with a vegetated, permeable soil cover.
- Final property contours will be designed to meet Lockwood Avenue and surrounding parcels at current elevations.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated 4 feet. Once excavated, this area will be backfilled with clean fill and revegetated to reflect existing conditions, as practicable, with current elevations and drainage patterns retained so that the current flood storage capacity will not be diminished after completion of the remedial actions.

- Temporary impacts to wetlands are anticipated as Raymark waste within the wetlands will be excavated 4 feet. Once excavated, this area will be backfilled with clean fill and

revegetated with current elevations and drainage patterns retained so that the current value of the wetland will not be diminished after completion of the remedial actions.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 9 and 10 will include placement of institutional controls on the Lockwood Avenue property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Two monitoring wells will be installed to support long-term groundwater monitoring, which will be complemented by an existing monitoring well (MW-312). The existing monitoring well is assumed to be functional and can be utilized for long-term groundwater monitoring. Because no Raymark waste will remain above the seasonal high water table, all three wells will be monitored quarterly for 2 years, after which groundwater monitoring may no longer be required.

- Cap/Final Cover: Vegetative covers must be inspected annually and maintained in good condition.

4.3.1.1.7 Treatment of Raymark Waste (applies to Alternatives 5 through 10)

Raymark waste treatment is presented in Section 3.1.3 for all property groups.

- Based on an evaluation of historical sampling data from <u>all</u> OU6 properties, it is assumed that approximately 10% of excavated Raymark waste will require treatment prior to disposal. Treatment will be required only when excavated materials exhibit

concentrations of contaminants in excess of disposal requirements. All treatment will occur at an out-of-town facility.

- For alternatives featuring out-of-town disposal of Raymark waste (Alternatives 10), the concentration thresholds for treatment will be 10 times UTS thresholds.

- For the alternative featuring in-town consolidation (Alternatives 9), the concentration thresholds for treatment will be the PHC levels.

- Treatment volume estimates for Lockwood Avenue are based on the assumed quantity of excavation required to implement each alternative. Note that the waste volumes have been rounded up or down as appropriate.

- 1.5 conversion factor from tons to cubic yards is used.

  - <u>Alternative 3/4</u>
    - Not applicable.

  - <u>Alternative 5/6</u>
    - Not applicable.

  - <u>Alternative 7/8</u>
    - Not applicable.

  - <u>Alternatives 9/10</u>
    - 11,852 CY RW excavated * 1.2 = 14,222 CY
    - 14,222 CY * 1.5 TON/CY = 21,333 TON
    - 21,333 TON * 10% = **2,133 TONS to be treated (1,422 CY)**

4.3.1.2 Comparative Analysis of Alternatives for Lockwood Avenue Property

This section presents the comparative analysis of alternatives for Lockwood Avenue using the criteria described in Section 4.2. The comparative analysis of alternatives for this property group is summarized in comparison format on Table 4-1A.

4.3.1.2.1 Overall Protection of Human Health and the Environment

Alternative 1 (No Action) will not protect human health or the environment. Alternative 2 (Restrictions with Long-Term Monitoring) can provide limited protection of human health and the environment, if restrictions are monitored and enforced. Alternatives 9 and 10 will achieve protection of human health and the environment through excavation of Raymark waste and the use of institutional controls, rendering the contaminated waste inaccessible.

4.3.1.2.2 Compliance with ARARs

Alternative 1 (No Action) and Alternative 2 (Restrictions with Long-Term Monitoring) will not comply with ARARs because contaminants in Raymark waste will remain accessible in soils in excess of CT RSRs and federal risk criteria.

The ARARs associated with the implementation of Alternatives 9 and 10 are presented in Section 4.0 of this FS and on Table 4-1C. Through excavation of Raymark waste to 4 feet, which will be below the seasonal high water table, Alternatives 9 and 10 will render the remaining contaminated soil inaccessible and will be compliant with CTDEP's Direct Exposure Criteria. Alternatives 9 and 10 may not comply with the numeric standards of CTDEP's Pollutant Mobility Criteria, however, the RSRs allow for variances and alternate criteria. Alternatives 9 and 10 will comply with all other chemical, action, and location-specific ARARs.

4.3.1.2.3 Long-Term Effectiveness and Permanence

The magnitude of residual human health risk associated with Raymark waste will be highest for Alternative 1 (No Action), since no actions will be taken to mitigate human health risks. Residual human health risks for Alternative 2 (Restrictions with Long-Term Monitoring) will be lower than Alternative 1, but still above acceptable human health risk levels.

Alternatives 9 and 10 can provide protection in the long-term if the cover systems are maintained. Alternatives 9 and 10 will provide the greatest protection to human health and will be the most permanent.

4.3.1.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment

No treatment will be required for Alternative 1 (No Action) or Alternative 2 (Restrictions with Long-Term Monitoring). Alternatives 9 and 10 will require treatment prior to land disposal to address the assumed 10 percent fraction that exceeds the UTS or PHC levels. This treatment will result in the reduction of toxicity, mobility, and volume of Raymark waste.

4.3.1.2.5 Short-Term Effectiveness

No on-site actions will be taken under Alternative 1 (No Action) and minimal on-site actions will be taken under Alternative 2 (Restrictions with Long-Term Monitoring); therefore, there will be no short-term impacts to the community, workers, or the environment. Short-term impacts to the community, workers, and the environment from the implementation of Alternatives 9 and 10 will be similar and can be mitigated using engineering controls.

Alternatives 9 and 10 will each require approximately 8 months to complete. This timeframe does not include the amount of time necessary to complete remedial activities at an in-town consolidation location.

4.3.1.2.6 Implementability

Alternatives 9 and 10 (4-foot excavation) each require excavation, which can be implemented through standard construction and environmental remediation methods. Alternatives 9 and 10 require specific site grading, placement of cover materials based on design specifications, and O&M in the future. Alternatives 9 and 10 will involve excavation of the largest volume of Raymark waste (11,852 CY), and any expansions of the Raymark waste area due to the confirmatory sampling will lead to a larger volume of excavated Raymark waste.

Alternatives 9 and 10 are equally amendable to additional remedial actions at the property group, should they be deemed necessary.

Alternatives 9 and 10 will require quarterly monitoring for only 2 years after which groundwater monitoring may no longer be required. Alternatives 9 and 10 will also require long term operation and maintenance of the soil cover.

Alternatives 9 and 10 will be similar in terms of the ability to coordinate with other agencies.

Alternatives 9 and 10 each involve conventional construction methods for which the required equipment and technical specialists will be readily available.

4.3.1.2.7 Cost

A comparison of costs for each of the alternatives that were evaluated for Lockwood Avenue is presented on Table 4-1B.

Table 4-1
Summary of Detailed Analysis for Lockwood Avenue Property
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4[1] – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6[2] – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8[3]– Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Overall Protection of Human Health and the Environment	Would not protect human health. RI did not indentify any significant habitats for ecological receptors.	Some protection of human health, but human health risks still above acceptable limits. RI did not indentify any significant habitats for ecological receptors.	NA	NA	NA	Would protect human health through construction of an engineered barrier over Raymark waste. RI did not indentify any significant habitats for ecological receptors.
Compliance with ARARs	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs.	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-1C.	NA	NA	NA	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs with the use of alternate criteria. See Table 4-1C.
Long-Term Effectiveness and Permanence	Magnitude of residual risk high. No risk reduction. 5-year reviews required. No O&M or controls included for long term.	Residual human health risks above acceptable limits. No risk reduction. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would not be adequate to protect human health for the long-term.	NA	NA	NA	Residual risk within acceptable limits. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.
Reduction of Toxicity, Mobility, or Volume Through Treatment	None.	None.	NA	NA	NA	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons) = 2,133 Raymark Waste treated (CY) = 1,422
Short-Term Effectiveness	No actions, therefore no short-term impacts anticipated. Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures are applied. No adverse impacts to environment anticipated during implementation. Minimal on-site actions (well construction, signage, and fence installation, and groundwater sampling only). Would not achieve RAO.	NA	NA	NA	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[4] = 14,222 Approximate truckloads of Raymark waste 1185 Approximate truckloads of clean fill 1185 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 9, this time frame does not include duration of capping activities at consolidation location. 8 Would achieve RAO.

Table 4-1
Summary of Detailed Analysis for Lockwood Avenue Property
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4[1] – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6[2] – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8[3]– Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Implementability	Not applicable.	Would be implementable, assuming cooperation by property owners. Would require coordination with state/town officials to perform O&M and to document compliance with institutional controls.	NA	NA	NA	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by presence of Raymark waste left in place.
Cost	**Alternative 1** Capital: $0 O&M (Years 1-2): $0 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each $10,000/each PV of O&M: $21,578 PV of Alternative: $21,578 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 2** Capital: $56,463 O&M (Years 1-2): $61,330 O&M (Years 3-30): $34,387 Five-Year Reviews: $10,000/each Present Value of O&M: $497,003 Present Value of Alternative: $553,466 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 3** Capital: NA O&M (Years 1-2): $0 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: NA PV of Alternative: NA **Alternative 4** Capital: NA O&M (Years 1-2): $0 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: NA PV of Alternative: NA See Cost Estimate Backup Sheets in Appendix G.	**Alternative 5** Capital: NA O&M (Years 1-2): $0 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: NA PV of Alternative: NA **Alternative 6** Capital: NA O&M (Years 1-2): $0 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: NA PV of Alternative: NA See Cost Estimate Backup Sheets in Appendix G.	**Alternative 7** Capital: NA O&M (Years 1-2): $0 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: NA PV of Alternative: NA **Alternative 8** Capital: NA O&M (Years 1-2): $0 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: NA PV of Alternative: NA See Cost Estimate Backup Sheets in Appendix G.	**Alternative 9** Capital: $2,788,337 O&M (Years 1-2): $59,658 O&M (Years 3-30): $32,715 Five-Year Reviews: $10,000/each PV of O&M: $476,255 PV of Alternative: $3,264,592 **Alternative 10** Capital: $10,595,995 O&M (Years 1-2): $59,658 O&M (Years 3-30): $32,715 Five-Year Reviews: $10,000/each PV of O&M: $476,255 PV of Alternative: $11,072,250 See Cost Estimate Backup Sheets in Appendix G.

[1] Alternatives 3 and 4 were not evaluated.
[2] Alternatives 5 and 6 were not evaluated.
[3] Alternatives 7 and 8 were not evaluated.
[4] A bulking factor of 1.5 was used.

Table 4-1A
Comparative Analysis of Alternatives for Lockwood Avenue Property
Raymark OU6 - Additional Properties
Stratford, Connecticut
Page 1 of 2

	ALTERNATIVE[1]									
	1	2	3	4	5	6	7	8	9	10
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT										
Protection of Human Health	☐	☐	NA	NA	NA	NA	NA	NA	◘	◘
Protection of the Environment	☐	☐	NA	NA	NA	NA	NA	NA	NA	NA
COMPLIANCE WITH ARARs										
Chemical-Specific ARARs	☐	☐	NA	NA	NA	NA	NA	NA	◘	◘
Location-Specific ARARs	NA	■	NA	NA	NA	NA	NA	NA	◘	◘
Action-Specific ARARs	NA	■	NA	NA	NA	NA	NA	NA	◘	◘
Other Criteria, Advisories, Guidance	NA	NA	NA	NA	NA	NA	NA	NA	◘	◘
LONG-TERM EFFECTIVENESS AND PERMANENCE										
Magnitude of Residual Risk	☐	☐	NA	NA	NA	NA	NA	NA	◘	◘
Adequacy and Reliability of Controls	☐	☐	NA	NA	NA	NA	NA	NA	◘	◘
REDUCTION OF TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT										
Treatment/Recycling Processes Utilized	☐	☐	NA	NA	NA	NA	NA	NA	■	■
Amount of Hazardous Materials Destroyed or Treated	☐	☐	NA	NA	NA	NA	NA	NA	◘	◘
Degree of Expected Reductions in Tox, Mob, or Vol	☐	☐	NA	NA	NA	NA	NA	NA	◘	◘
Irreversibility	☐	☐	NA	NA	NA	NA	NA	NA	■	■
Type and Quantity of [Process] Residuals	☐	☐	NA	NA	NA	NA	NA	NA	■	■
SHORT-TERM EFFECTIVENESS										
Protection of Community During Remedial Actions	■	■	NA	NA	NA	NA	NA	NA	◘	◘
Protection of Workers During Remedial Actions	NA	■	NA	NA	NA	NA	NA	NA	◘	◘
Environmental Impacts	■	■	NA	NA	NA	NA	NA	NA	◘	◘
Time Until Remedial Action Objectives are Achieved	☐	☐	NA	NA	NA	NA	NA	NA	◘	◘

Table 4-1A
Comparative Analysis of Alternatives for Lockwood Avenue Property
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE[1]									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
IMPLEMENTABILITY										
Ability to Construct and Operate the Technology	■	■	NA	NA	NA	NA	NA	NA	■	■
Reliability of the Technology	□	□	NA	NA	NA	NA	NA	NA	◘	◘
Ease of Undertaking Additional Remedial Actions, if Necessary	■	■	NA	NA	NA	NA	NA	NA	◘	◘
Ability to Monitor Effectiveness of the Remedy	□	□	NA	NA	NA	NA	NA	NA	◘	◘
Ability to Obtain Approvals from Other Agencies	■	■	NA	NA	NA	NA	NA	NA	■	■
Coordination with Other Agencies	◘	◘	NA	NA	NA	NA	NA	NA	■	■
Availability of Off-Site Treatment, Storage, and Disposal Services and Capacity	NA	NA	NA	NA	NA	NA	NA	NA	■	■
Availability of Necessary Equipment and Specialists	NA	■	NA	NA	NA	NA	NA	NA	■	■
Availability of Prospective Technologies	NA	■	NA	NA	NA	NA	NA	NA	■	■
COST										
Capital	$0	$56,463	NA	NA	NA	NA	NA	NA	$2,788,337	$10,595,995
Present Value of O&M (First 30 Years)	$21,578	$497,003	NA	NA	NA	NA	NA	NA	$476,255	$476,255
Present Value of the Alternative	$21,578	$553,466	NA	NA	NA	NA	NA	NA	$3,264,592	$11,072,250

[1] Alternatives 3 through 8 were not evaluated.

Notes:

■ = Highest rating (most protective, most effective, most implementable)

◘ = Meets criterion, but another alternative(s) more protective/effective/implementable

□ = Does not meet criterion

Table 4-1B
Cost Estimate Summary for Lockwood Avenue Property
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Excavation Depth, ft	0	0	4	NA	2.5	2.5	2 or 4	2 or 4	4	4
Cap/Cover	NA	NA	RCRA C	NA	NA	NA	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover
Disposal Volumes (CY)										
In-Town Consolidation	NA	NA	NA	NA	NA	NA	NA	NA	12,800	0
Out-of-Town Disposal (no treatment)	NA	NA	NA	NA	NA	NA	NA	NA	0	12,800
Out-of-Town Disposal (treatment)	NA	NA	NA	NA	NA	NA	NA	NA	1,422	1,422
Total Disposal Vol.	NA	NA	NA	NA	NA	NA	NA	NA	**14,222**	**14,222**
Cost										
Capital	**$0**	**$56,463**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**$2,788,337**	**$10,595,995**
O&M (present value)	**$21,578**	**$497,003**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**$476,255**	**$476,255**
Present Value	**$21,578**	**$553,466**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**$3,264,592**	**$11,072,250**

Notes:

Alternative 1 - No Action

Alternative 2 - Restrictions With Long-Term Monitoring

Alternative 3 - Low-Permeability Cap With In-Town Consolidation (Not Applicable)

Alternative 4 - Low-Permeability Cap With Out-Of-Town Disposal (Not Applicable)

Alternative 5 - Excavation To The Water Table With In-Town Consolidation (Not Applicable)

Alternative 6 - Excavation To The Water Table With Out-Of-Town Disposal (Not Applicable)

Alternative 7 - Excavation To The Water Table With Out-Of-Town Disposal (Not Applicable)

Alternative 8 - Excavation To Either 2 Or 4 Feet With Out-Of-Town Disposal (Not Applicable)

Alternative 9 - Excavation To 4 Feet With In-Town Consolidation

Alternative 10 - Excavation To 4 Feet With Out-Of-Town Disposal

Table 4-1C
Preliminary ARAR Summary - Lockwood Avenue Property
Raymark OU6 - Additional Properties
Stratford, Connecticut

Property Group	ARAR Tables				
	A	B	C	D	E
Alternative 1	X				
Alternative 2	X	X	X		
Alternative 3[1]					
Alternative 4[1]					
Alternative 5[1]					
Alternative 6[1]					
Alternative 7[1]					
Alternative 8[1]					
Alternative 9	X	X	X		
Alternative 10	X	X	X		

[1] Alternatives 3 through 8 were not evaluated.

A = ARARs for all Alternatives

B = ARAR add-ons for an alternative for the Raymark waste located in the wetlands

C = ARAR add-ons for an alternative for the Raymark waste located in the floodplains

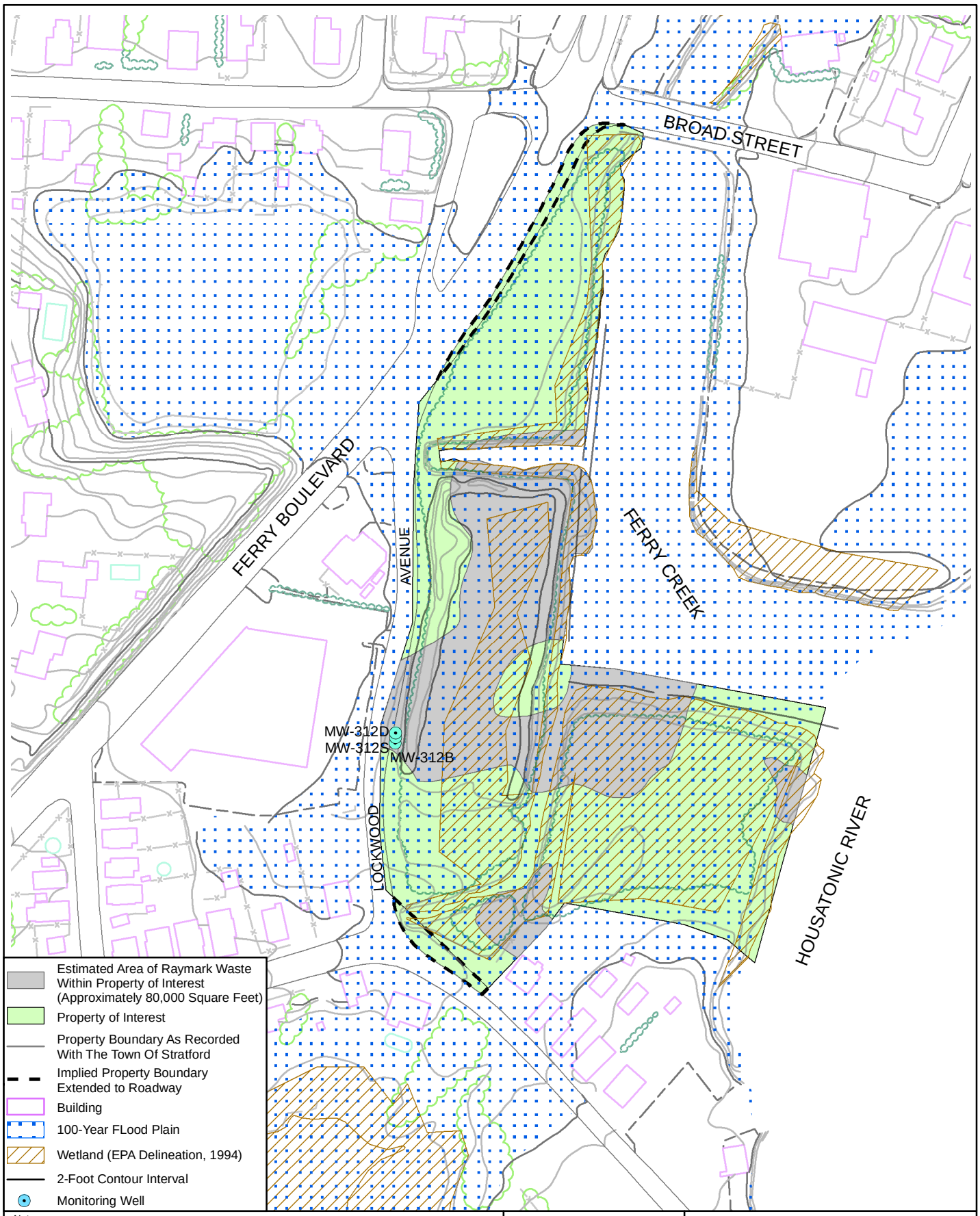
D = ARAR add-ons for alternatives that include low-permeability caps

E = ARAR add-ons for alternatives that include CAMUs

Note:

ARAR tables A-E are found in Volume II, Appendix C of this Feasibility Study.

[1] Alternatives 3/4 were not evaluated.
[2] Alternatives 5/6 were not evaluated.
[3] Alternatives 7/8 were not evaluated.
[4] A bulking factor of 1.5 was used.



Notes:
1) Plan not to be used for design.
2) All locations to be considered approximate.
3) Property boundaries are approximate based on Town of Stratford Engineering Department plans.
4) Floodplain extent based on Federal Emergency Management Agency Q3 Flood Data, Community Panel Numbers 090016 0001-0004, Revised June 16, 1992, FEMA, Washington D.C. and modified to Town of Stratford Engineering Plan 10-foot contour.
5) Adapted from TTNUS Remedial Investigation, 2005.

150 75 0 150 Feet

N

Nobis

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
(978) 683-0891
www.nobisengineering.com

FIGURE 4-1

LOCKWOOD AVENUE PROPERTY
FEASABILITY STUDY
RAYMARK SUPERFUND SITE
STRATFORD, CONNECTICUT

Drawn By: D. McGrath	Approved By: H. Ford
Project: 80006	Date: 9/3/09 Rev00

R:\80000 Task Orders\80006 Raymark\Technical Data\GIS_Data\Figures\OU6_FS_Figures\Figure_04-01_Lockwood_Avenue_Property.mxd

4.3.2 200 Ferry Boulevard Property

The 200 Ferry Boulevard property group consists of approximately 0.6 acres of commercially-zoned (retail) land located on Ferry Boulevard in Stratford, Connecticut. It is one of the properties that was evaluated in the OU6 RI (TtNUS, 2005). The property is bordered to the east by Ferry Creek, to the south and north by commercial properties (190 and 230 Ferry Boulevard, respectively), and to the west by Ferry Boulevard (Figure 4-2).

The 200 Ferry Boulevard property group is currently occupied by two businesses, each of which is housed in a two-story wooden building located at the northern end of the property. Approximately 80 percent of the property is currently covered by asphalt and used for parking. The paved area extends to the tree line along the bank of Ferry Creek, where a narrow strip of dense shrub and tree vegetation is present. The portion of the property located adjacent to Ferry Creek lies within the 100-year floodplain, but the area of Raymark waste on the property rises above the 100-year flood elevation.

Key factors associated with the areas and volumes to be addressed at this property group include:

- Raymark waste area: .....2,000 SF (Figure 4-2)
- Total volume of Raymark waste:.....407 CY
- Maximum depth of Raymark waste:.....5.5 feet bgs
- Average depth to the seasonal high groundwater table:.....5.5 feet
- Raymark waste area outside of 100-year floodplain:..... 2,000 SF
- Raymark waste area in 100-year floodplain:..... 0 SF
- Raymark waste in 100-year floodplain to 5.5 FT:.....0 CY
- Raymark waste area under pavement: ..... 1,550 SF
- Raymark waste in unpaved area:..... 450 SF
- Raymark waste located below the water table: .....0 CY
- Alternative 3/4:
  - Raymark waste under pavement to 2.5 FT: .....144 CY (1,550 SF x 2.5 FT)
  - Raymark waste in unpaved area to 3 FT: .....50 CY (450 SF x 3 FT)
- Alternative 5/6:
  - Raymark waste located above the water table: .....407 CY (2,000 SF x 5.5 FT)

- Alternative 7/8:
  - Raymark waste under pavement to 2 FT: .....114 CY (1,550 SF x 2 FT)
  - Raymark waste in unpaved area to 4 FT: .....67 CY (450 SF x 4 FT)
- Alternative 9/10:
  - Raymark waste to 4 FT: .....296 CY (2,000 SF x 4 FT)

The calculation of the average depth to the seasonal high water table of 5.5 feet below ground surface (bgs) is based on observations of water levels from soil borings advanced in the area. The calculation of the maximum depth of Raymark waste is based on data collected during the RI (TtNUS, 2005).

The detailed analysis of alternatives for this property group is presented below and consists of the following components:

- A list of key assumptions (Section 4.3.2.1) is used as the basis for the detailed analysis of alternatives and for the development of costs for the FS;
- Figure 4-2, which shows a map of 200 Ferry Boulevard, the delineated Raymark waste area, the 100-year floodplain, and the proposed cap footprint;
- Table 4-2, which presents the individual detailed analysis of alternatives for 200 Ferry Boulevard in tabular form;
- The comparative analysis of alternatives for 200 Ferry Boulevard, presented in text form;
- Table 4-2A, which presents a tabular summary of the comparative analysis;
- Table 4-2B, which presents a summary of cost estimates for each of the alternatives; Table 4-2C, which provides a summary of ARARs for each of the 200 Ferry Boulevard alternatives; and
- Cost Estimate Backup Sheets for the FS cost estimates, which are presented in Appendix G.

4.3.2.1 200 Ferry Boulevard Assumptions

Key assumptions associated with each alternative are presented in this section. Pairs of alternatives (3 and 4, 5 and 6, 7 and 8, and 9 and 10) have the same components except for the disposal of Raymark waste, which is either in-town or out-of-town. See Section 3.3 for details

on the Remedial Alternatives discussed below. See Table 4-2 for a summary of the details on the analysis for the 200 Ferry Boulevard property group.

4.3.2.1.1 Alternative 1 – No Action

Detailed descriptions of the no action alternative are presented in Section 3.5.1.

4.3.2.1.2 Alternative 2 – Restrictions with Long-Term Monitoring

Detailed descriptions of Alternative 2 are presented in Section 3.5.2. Property group-specific details include the following:

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group, Alternative 2 will include placement of institutional controls on the 200 Ferry Boulevard property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

Operation and Maintenance

- Groundwater Monitoring: Two monitoring wells will be installed to support long-term groundwater monitoring, which will be complemented by one existing monitoring well (MW-113). The existing monitoring well is assumed to be functional and can be utilized for long-term groundwater monitoring. Because Raymark waste will remain above the seasonal high water table, all three wells will be monitored quarterly for 2 years, and annually thereafter.

- Existing Surfaces: Monthly surface inspections of both pavement and vegetative covers will be required along with annual reporting to summarize inspection findings and to verify the effectiveness of institutional controls.

4.3.2.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4)

Detailed descriptions of Alternatives 3 and 4 are presented in Section 3.5.3. Raymark waste areas will be excavated 2.5 feet in paved areas and 3 feet in unpaved areas. Raymark waste within the property group will be consolidated under a RCRA cap with existing grades maintained after remedial action implementation. The clean, uncontaminated excavated soil will be staged for future use during cap construction. Excavated materials will be placed at an in-town consolidation area (Alternative 3) or an out-of-town disposal location (Alternative 4). The property group-specific details for Alternative 3 and 4 include the following:

Excavation Volumes/Final Cover

- Approximately 194 CY of Raymark waste and 222 CY of non-Raymark waste soil will be excavated 2.5 or 3 feet.
- A low permeable RCRA cap with a footprint of approximately 4,000 square feet (0.09 acres) will be constructed over Raymark waste present on the property group (Figure 4-2).
- Final property contours will be designed to meet 200 Ferry Boulevard and surrounding parcels at current elevations.
- The current ground surface within the Raymark waste area on this property group is primarily paved and will be repaved as a final surface cover following cap construction, if practicable. However, a small portion (approximately 450 SF) is currently covered with grass, therefore, a vegetated RCRA cap is assumed for that area.

Floodplain and Wetlands

- No floodplains impacts are anticipated as Raymark waste on this parcel is not within 100-year floodplain.
- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain under the cap after completion of the excavation, Alternatives 3 and 4 will include placement of institutional controls on the 200 Ferry Boulevard property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Two monitoring wells will be installed to support long-term groundwater monitoring, which will be complemented by one existing monitoring well (MW-113). The existing monitoring well is assumed to be functional and can be utilized for long-term groundwater monitoring. Because Raymark waste will remain above the seasonal high water table, all three wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in present value cost analysis.

- Cap/Final Cover: The O&M for Alternatives 3 and 4 will require monthly cap inspections with annual reporting to summarize inspection findings and verify the effectiveness of institutional controls. A 30-year monitoring period is used in the present value cost analysis.

4.3.2.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6)

Detailed descriptions of Alternatives 5 and 6 are presented in Section 3.5.4. Raymark waste areas will be excavated to the seasonal high water table. Excavated material will be placed in an in-town consolidation area (Alternative 5) or an out-of-town disposal location (Alternative 6). The property group-specific details include the following:

Excavation Volumes/Final Cover

- Approximately 407 CY of Raymark waste will be excavated to the average seasonal high water table of 5.5 feet from areas outside the 100-year floodplain. Approximately 139 CY of non-Raymark waste soil will additionally be excavated to facilitate safety requirements such as benching/sloping of sidewalls to prevent collapse.

- Raymark waste in paved areas will be excavated to the water table and replaced with clean fill. The top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat. Raymark waste in unpaved areas will be excavated to the water table and replaced with a vegetated, permeable soil cover.

- Final property contours will be designed to meet 200 Ferry Boulevard and surrounding parcels at current elevations.

- Because all Raymark waste is located above the seasonal high water table, complete excavation of all Raymark waste will occur.

Floodplain and Wetlands

- No floodplains impacts are anticipated as Raymark waste on this parcel is not within 100-year floodplain.
- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- No future use restrictions are anticipated as all Raymark waste will be removed.

Operation and Maintenance

- Groundwater Monitoring: Two monitoring wells will be installed to support long-term groundwater monitoring, which will be complemented by one existing monitoring well (MW-113). The existing monitoring well is assumed to be functional and can be utilized

for long-term groundwater monitoring. To verify that all Raymark waste is removed from the property group, all three wells will be monitored quarterly for 2 years, after which groundwater monitoring may no longer be required.

4.3.2.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8)

Detailed descriptions of Alternatives 7 and 8 are presented in Section 3.5.5. Raymark waste areas will be excavated to either a depth of 2 feet (current paved areas) or a depth of 4 feet (current unpaved areas). Excavated material will be placed in an in-town consolidation area (Alternative 7) or an out-of-town disposal location (Alternative 8). The property group-specific details include the following:

Excavation Volumes/Final Covers

- Approximately 114 CY of Raymark waste will be excavated 2 feet from currently paved areas, while an estimated 67 CY will be excavated 4 feet from currently unpaved areas.

- Raymark waste in currently paved areas will be excavated to a 2-foot depth and replaced with clean fill. The top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat. Raymark waste in unpaved areas will be excavated to a 4-foot depth and replaced with a vegetated, permeable soil cover.

- Final property contours will be designed to meet 200 Ferry Boulevard and surrounding parcels at current elevations.

Floodplain and Wetlands

- No floodplains impacts are anticipated as Raymark waste on this parcel is not within 100-year floodplain.
- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 7 and 8 will include placement of institutional controls on the 200 Ferry Boulevard property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Two monitoring wells will be installed to support long-term groundwater monitoring, which will be complemented by one existing monitoring well (MW-113). The existing monitoring well is assumed to be functional and can be utilized for long-term groundwater monitoring. Because Raymark waste will remain above the seasonal high water table, all three wells will be monitored quarterly for 2 years, and annually thereafter. A 30 year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: Paved areas and vegetative covers must be inspected monthly and maintained in good condition. A 30 year monitoring period is used in the present value cost analysis.

4.3.2.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10)

Detailed descriptions of Alternatives 9 and 10 are presented in Section 3.5.6. Raymark waste areas will be excavated to a 4-foot depth. Excavated material will be placed in an in-town consolidation area (Alternative 9) or an out-of-town disposal location (Alternative 10). The property group-specific details include the following:

Excavation and Final Cover

- Approximately 296 CY of Raymark waste will be excavated to a 4 feet depth.

- Raymark waste in paved areas will be excavated to a 4-foot depth and replaced with clean fill. This is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat. Raymark waste in unpaved areas will be excavated to a 4-foot depth and replaced with a vegetated, permeable soil cover.

- Final property contours will be designed to meet 200 Ferry Boulevard and surrounding parcels at current elevations.

Floodplain and Wetlands

- No floodplains impacts are anticipated as Raymark waste on this parcel is not within 100-year floodplain.
- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 9 and 10 will include placement of institutional controls on the 200 Ferry Boulevard property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Two monitoring wells will be installed to support long-term groundwater monitoring, which will be complemented by one existing monitoring wells

(MW-113). The existing monitoring well is assumed to be functional and can be utilized for long-term groundwater monitoring. Because Raymark waste will remain above the seasonal high water table, all three wells will be monitored quarterly for two years and annually thereafter. A 30-year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: Paved areas and vegetative covers must be inspected monthly and maintained in good condition. A 30-year monitoring period is used in the present value cost analysis.

4.3.2.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10)

Raymark waste treatment is presented in Section 3.1.3 for all property groups.

- Based on an evaluation of historical sampling data from <u>all</u> OU6 properties, it is assumed that approximately 10% of excavated Raymark waste will require treatment prior to disposal. Treatment will be required only when excavated materials exhibit concentrations of contaminants in excess of disposal requirements. All treatment will occur at an out-of-town facility.

- For alternatives featuring out-of-town disposal of Raymark waste (Alternatives 4, 6, 8, and 10), the concentration thresholds for treatment will be 10 times UTS thresholds.

- For alternatives featuring in-town consolidation (Alternatives 3, 5, 7, and 9), the concentration thresholds for treatment will be the PHC levels.

- Treatment volume estimates for 200 Ferry Boulevard are based on the assumed quantity of excavation required to implement each alternative. Note that the waste volumes have been rounded up or down as appropriate.

- A 1.5 conversion factor from tons to cubic yards is used.

- Alternatives 3/4
  - 194 CY RW excavated * 1.2 bulking factor = 232 CY
  - 232 CY X 1.5 TON/CY = 349 TON
  - 349 TON * 10% = **35 TONS to be treated (23 CY)**

- Alternatives 5/6
  - 407 CY RW excavated * 1.2 bulking factor= 489 CY
  - 489 CY * 1.5 TON/CY = 732 TON
  - 732 TON * 10% = **73 TONS to be treated (49 CY)**

- Alternatives 7/8
  - 181 CY RW excavated * 1.2 bulking factor = 218 CY
  - 218 CY * 1.5 TON/CY = 326 TON
  - 326 TON * 10% = **33 TONS to be treated (22 CY)**

- Alternatives 9/10
  - 296 CY RW excavated * 1.2 bulking factor = 356 CY
  - 356 CY * 1.5 TON/CY = 533 TON
  - 533 TON * 10% = **53 TONS to be treated (36 CY)**

4.3.2.2 Comparative Analysis of Alternatives for 200 Ferry Boulevard

This section presents the comparative analysis of alternatives for 200 Ferry Boulevard using the criteria described in Section 4.2. The comparative analysis of alternatives for this property group is summarized in a comparison format on Table 4-2A.

4.3.2.2.1 Overall Protection of Human Health and the Environment

Alternative 1 (No Action) will not protect human health or the environment. Alternative 2 (Restrictions with Long-Term Monitoring) can provide limited protection of human health and the environment, if restrictions are monitored and enforced. Alternatives 3 and 4 and 7 through 10 will achieve protection of human health and the environment through the excavation of varying amounts of Raymark waste (low-permeability cap for Alternatives 3 and 4) and the use of institutional controls, rendering the contaminated waste inaccessible. Alternatives 5 and 6 will

protect human health and the environment through the removal of all Raymark waste located on the property group.

4.3.2.2.2 Compliance with ARARs

Alternative 1 (No Action) and Alternative 2 (Restrictions with Long-Term Monitoring) will not comply with ARARs because contaminants in Raymark waste will remain accessible in soils in excess of CT RSRs and federal risk criteria.

The ARARs associated with the implementation of Alternatives 3 through 10 are presented in Section 4.0 of this FS and on Table 4-2C. Alternatives 3 through 6 could be designed to comply with all chemical-specific, action-specific, and location-specific ARARs. Through excavation of Raymark waste to 2 feet (paved areas) or 4 feet (unpaved areas), Alternatives 7 through 10 will render the remaining contaminated soil inaccessible, and will be compliant with the action-specific CT RSR Direct Exposure Criteria. Alternatives 7 through 10 may not comply with the numeric standards of CTDEP's Pollutant Mobility Criteria, however, the RSRs allow for variances and alternate criteria. Alternatives 7 through 10 will comply with all other chemical, action, and location specific ARARs.

4.3.2.2.3 Long-Term Effectiveness and Permanence

The magnitude of residual human health risk associated with Raymark waste will be highest for Alternative 1 (No Action), since no actions will be taken to mitigate human health risks. Residual human health risks for Alternative 2 (Restrictions with Long-Term Monitoring) will be lower than Alternative 1, but still above acceptable human health risk levels.

Residual human health risks after implementation of Alternatives 3 and 4 and Alternatives 7 through 10 will be slightly higher than for Alternatives 5 and 6 because Raymark waste will be left in-place above the seasonal high water table. Alternative 5 and 6 will be more reliable than Alternatives 3 and 4 and 7 through 10 because all Raymark waste will be excavated and protection of human health through direct contact or mobilization of contaminants by rainwater infiltration will not be dependent on maintenance of a low-permeable RCRA cap or a soil or paved cover.

Alternatives 3 and 4, and 7 through 10 can provide protection in the long-term if the cover systems are maintained. Alternatives 5 and 6 will provide the greatest protection to human health and will be the most permanent. Alternatives 3 through 10 each could be designed to allow for redevelopment potential on the property group.

4.3.2.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment

No treatment will be required for Alternative 1 (No Action) or Alternative 2 (Restrictions with Long-Term Monitoring). Alternatives 3 through 10 will require treatment prior to land disposal to address the assumed 10 percent fraction that exceeds the UTS or PHC levels. This treatment will result in the reduction of toxicity, mobility, and volume of Raymark waste. Although the estimated volumes that will require treatment are similar (ranging from 22 to 49 CY), Alternatives 5 and 6 will result in the greatest amount of reduction because a larger quantity of materials will be shipped offsite and is expected to require treatment prior to disposal.

4.3.2.2.5 Short-Term Effectiveness

No on-site actions will be taken under Alternative 1 (No Action) and minimal on-site actions will be taken under Alternative 2 (Restrictions with Long-Term Monitoring); therefore, there will be no short-term impacts to the community, workers, or the environment. Short-term impacts to the community, workers, and the environment from the implementation of Alternatives 3 through 10 will be similar and can be mitigated using engineering controls.

Alternatives 5 and 6 will involve a higher volume of truck traffic to transport Raymark waste and backfill and will require a greater volume of Raymark waste handling than Alternatives 3 and 4 and 7 through 10.

Alternatives 3 through 8 will each require approximately 1 month to complete. Alternatives 9 and 10 will each require 2 months to complete. For Alternatives 3, 5, 7, and 9, the estimated time to complete does not include the amount of time necessary to complete remedial activities at an in-town consolidation location.

4.3.2.2.6 Implementability

Alternatives 3 and 4 (low-permeability cap), Alternatives 5 and 6 (excavation to water table), and Alternatives 7 through 10 (2 to 4-foot excavation) all require excavation, which can be implemented through standard construction and environmental remediation methods. Alternatives 3 and 4 and 7 through 10 require specific site grading, placement of cap/cover materials based on design specifications, and O&M in the future. Alternatives 5 and 6 will involve excavation of the largest volume of Raymark waste (407 CY) and any expansions of the Raymark waste area due to confirmatory sampling will lead to a larger volume of excavated Raymark waste compared to Alternative 7 through 10 due to the excavation depth to the seasonal high water table.

Additional remedial actions will be more difficult to implement for Alternatives 3 and 4 due to the presence of a RCRA cap. Alternatives 7 through 10 are equally amenable to additional remedial actions at the property group, should they be deemed necessary. Alternatives 5 and 6 will be the most amenable to additional actions should they be necessary as all Raymark waste will be removed from the property group.

Alternatives 3 and 4 and 7 through 10 will each require long-term groundwater monitoring. Alternatives 5 and 6 and 9 and 10 will require quarterly groundwater monitoring for only 2 years after which groundwater monitoring may no longer be required. Alternatives 3 and 4 and 7 through 10 will also require long-term operation and maintenance of the cap or soil cover. Long-term operation and maintenance requirements would not be required for Alternatives 5 and 6 as all Raymark waste will be removed from the property group.

Alternatives 3 through 10 will be similar in terms of the ability to coordinate with other agencies.

For Alternatives 3 through 10, each involves conventional construction methods for which the required equipment and technical specialists will be readily available.

4.3.2.2.7 Cost

A comparison of costs for each of the alternatives that were evaluated for 200 Ferry Boulevard is presented on Table 4-2B.

Table 4-2
Summary of Detailed Analysis for 200 Ferry Boulevard
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4 – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8 – Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Overall Protection of Human Health and the Environment	Would not protect human health. RI did not identify any significant habitats for ecological receptors.	Some protection of human health, but human health risks still above acceptable limits. RI did not identify any significant habitats for ecological receptors.	Would protect human health through construction of a RCRA C-compliant cover (multi-component, drainage layer, gas vent layer, E-07 cm/s hydraulic conductivity), over Raymark waste. RI did not identify any significant habitats for ecological receptors.	Would protect human health through the removal of Raymark waste and placement of clean soil in its place. RI did not identify any significant habitats for ecological receptors.	Would protect human health through construction of an engineered barrier over Raymark waste. RI did not identify any significant habitats for ecological receptors.	Would protect human health through construction of an engineered barrier over Raymark waste. RI did not identify any significant habitats for ecological receptors.
Compliance with ARARs	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs.	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-2C.	Would comply with all chemical-specific, location-specific, and action-specific ARARs. See Table 4-2C.	Would comply with all chemical-specific, location-specific, and action-specific ARARs. See Table 4-2C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs with the use of alternate criteria. See Table 4-2C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs with the use of alternate criteria. See Table 4-2C.
Long-Term Effectiveness and Permanence	Magnitude of residual risk high. No risk reduction. 5-year reviews required. No O&M or controls included for long term.	Residual human health risks above acceptable limits. No risk reduction. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would not be adequate to protect human health for the long term.	Residual risk within acceptable limits. Raymark waste will be left-in-place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness. Capping technology reliable.	Residual risk within acceptable limits. Risk reduction would be permanent. Controls would be adequate to ensure long-term effectiveness.	Residual risk within acceptable limits. Raymark waste will be left-in place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.	Residual risk within acceptable limits. Raymark waste will be left-in place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.
Reduction of Toxicity, Mobility, or Volume Through Treatment	None.	None.	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 35 Raymark Waste treated (CY)= 23	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 73 Raymark Waste treated (CY)= 49	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 33 Raymark Waste treated (CY)= 22	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 53 Raymark Waste treated (CY)= 36
Short-Term Effectiveness	No actions, therefore no short-term impacts anticipated. Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures are applied. No adverse impacts to environment anticipated during implementation. Minimal on-site actions (well construction, signage, and fence installation, and groundwater sampling only). Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1] = 232 Approximate truckloads of Raymark waste 19 Approximate truckloads of clean fill 19 Assume 12 CY per truckload. Approximately months to complete remedial action. For Alternative 3, this time frame does not include duration of capping activities at consolidation location. 1 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1] = 489 Approximate truckloads of Raymark waste 41 Approximate truckloads of clean fill 41 Assume 12 CY per truckload. Approximately months to complete remedial action. For Alternative 5, this time frame does not include duration of capping activities at consolidation location. 1 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1] = 218 Approximate truckloads of Raymark waste 18 Approximate truckloads of clean fill 18 Assume 12 CY per truckload. Approximately months to complete remedial action. For Alternative 7, this time frame does not include duration of capping activities at consolidation location. 1 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1] = 356 Approximate truckloads of Raymark waste 30 Approximate truckloads of clean fill 30 Assume 12 CY per truckload. Approximately months to complete remedial action. For Alternative 9, this time frame does not include duration of capping activities at consolidation location. 2 Would achieve RAO.

Table 4-2
Summary of Detailed Analysis for 200 Ferry Boulevard
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4 – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8 – Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Implementability	Not applicable.	Would be implementable, assuming cooperation by property owners. Would require coordination with state/town officials to perform O&M and to document compliance with institutional controls.	Excavation in floodplains not anticipated. May be difficult to implement additional remedial actions if required, because Raymark waste would be beneath RCRA C cover. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development would be hindered by the presence of the low-permeability cap.	Excavation in floodplains not anticipated. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or buildings on 200 Ferry Boulevard would need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use.	Excavation in floodplains not anticipated. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or buildings on 200 Ferry Boulevard would need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by presence of Raymark waste left in-place.	Excavation in floodplains not anticipated. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or buildings on 200 Ferry Boulevard would need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by presence of Raymark waste left in-place.
Cost	**Alternative 1** Capital: $0 O&M (Years 1-2): $0 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: $21,578 PV of Alternative: $21,578 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 2** Capital: $40,543 O&M (Years 1-2): $59,429 O&M (Years 3-30): $32,486 Five-Year Reviews: $10,000/each Present Value of O&M: $473,406 Present Value of Alternative: $513,949 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 3** Capital: $286,211 O&M (Years 1-2): $59,041 O&M (Years 3-30): $32,098 Five-Year Reviews: $10,000/each PV of O&M: $468,593 PV of Alternative: $754,804 **Alternative 4** Capital: $414,786 O&M (Years 1-2): $59,041 O&M (Years 3-30): $32,098 Five-Year Reviews: $10,000/each PV of O&M: $468,593 PV of Alternative: $883,379 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 5** Capital: $233,803 O&M (Years 1-2): $35,924 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: $64,952 PV of Alternative: $298,754 **Alternative 6** Capital: $501,737 O&M (Years 1-2): $35,924 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: $64,952 PV of Alternative: $566,688 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 7** Capital: $226,056 O&M (Years 1-2): $58,909 O&M (Years 3-30): $31,966 Five-Year Reviews: $10,000/each PV of O&M: $466,955 PV of Alternative: $693,010 **Alternative 8** Capital: $344,330 O&M (Years 1-2): $58,909 O&M (Years 3-30): $31,966 Five-Year Reviews: $10,000/each PV of O&M: $466,955 PV of Alternative: $811,285 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 9** Capital: $250,392 O&M (Years 1-2): $58,909 O&M (Years 3-30): $31,966 Five-Year Reviews: $10,000/each PV of O&M: $466,955 PV of Alternative: $717,347 **Alternative 10** Capital: $444,839 O&M (Years 1-2): $58,909 O&M (Years 3-30): $31,966 Five-Year Reviews: $10,000/each PV of O&M: $466,955 PV of Alternative: $911,794 See Cost Estimate Backup Sheets in Appendix G.

[1] A bulking factor of 1.2 was used.

Table 4-2A
Comparative Analysis of Alternatives for 200 Ferry Boulevard
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	2	3	4	5	6	7	8	9	10
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT										
Protection of Human Health	☐	☐	◘	◘	■	■	◘	◘	◘	◘
Protection of the Environment	☐	NA	◘	◘	■	■	◘	◘	◘	◘
COMPLIANCE WITH ARARs										
Chemical-Specific ARARs	☐	☐	■	■	■	■	◘	◘	◘	◘
Location-Specific ARARs	NA	■	■	■	■	■	◘	◘	◘	◘
Action-Specific ARARs	NA	■	■	■	■	■	◘	◘	◘	◘
Other Criteria, Advisories, Guidance	NA	NA	■	■	■	■	◘	◘	◘	◘
LONG-TERM EFFECTIVENESS AND PERMANENCE										
Magnitude of Residual Risk	☐	☐	◘	◘	■	■	◘	◘	◘	◘
Adequacy and Reliability of Controls	☐	☐	◘	◘	■	■	◘	◘	◘	◘
REDUCTION OF TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT										
Treatment/Recycling Processes Utilized	NA	NA	☐	☐	■	■	■	■	■	■
Amount of Hazardous Materials Destroyed or Treated	☐	☐	☐	☐	■	■	◘	◘	◘	◘
Degree of Expected Reductions in Tox, Mob, or Vol	☐	☐	☐	☐	■	■	◘	◘	◘	◘
Irreversibility	☐	☐	■	■	■	■	■	■	■	■
Type and Quantity of [Process] Residuals	☐	☐	■	■	■	■	■	■	■	■
SHORT-TERM EFFECTIVENESS										
Protection of Community During Remedial Actions	NA	■	◘	◘	◘	◘	◘	◘	◘	◘
Protection of Workers During Remedial Actions	NA	■	◘	◘	◘	◘	◘	◘	◘	◘
Environmental Impacts	■	■	◘	◘	◘	◘	◘	◘	◘	◘
Time Until Remedial Action Objectives are Achieved	☐	☐	◘	◘	◘	◘	◘	◘	◘	◘

Table 4-2A
Comparative Analysis of Alternatives for 200 Ferry Boulevard
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	2	3	4	5	6	7	8	9	10
IMPLEMENTABILITY										
Ability to Construct and Operate the Technology	NA	■	■	■	■	■	■	■	■	■
Reliability of the Technology	NA	□	◘	◘	■	■	◘	◘	◘	◘
Ease of Undertaking Additional Remedial Actions, if Necessary	■	■	◘	◘	■	■	◘	◘	◘	◘
Ability to Monitor Effectiveness of the Remedy	NA	NA	◘	◘	◘	◘	◘	◘	◘	◘
Ability to Obtain Approvals from Other Agencies	■	■	■	■	■	■	■	■	■	■
Coordination with Other Agencies	◘	◘	■	■	■	■	■	■	■	■
Availability of Off-Site Treatment, Storage, and Disposal Services and Capacity	NA	NA	NA	NA	■	■	■	■	■	■
Availability of Necessary Equipment and Specialists	NA	■	■	■	■	■	■	■	■	■
Availability of Prospective Technologies	NA	■	■	■	■	■	■	■	■	■
COST										
Capital	$0	$40,543	$286,211	$414,786	$233,803	$501,737	$226,056	$344,330	$250,392	$444,839
Present Value of O&M (First 30 Years)	$21,578	$473,406	$468,593	$468,593	$64,952	$64,952	$466,955	$466,955	$466,955	$466,955
Present Value of the Alternative	$21,578	$513,949	$754,804	$883,379	$298,754	$566,688	$693,010	$811,285	$717,347	$911,794

Notes:

■ = Highest rating (most protective, most effective, most implementable)

◘ = Meets criterion, but another alternative(s) more protective/effective/implementable

□ = Does not meet criterion

Table 4-2B
Cost Estimate Summary for 200 Ferry Boulevard
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Excavation Depth, ft	0	0	3	3	5.5	5.5	2 or 4	2 or 4	4	4
Cap/Cover	NA	NA	RCRA C	RCRA C	NA	NA	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover
Disposal Volumes (CY)										
In-Town Consolidation			209	0	440	0	196	0	320	0
Out-of-Town (not treated)			0	209	0	440	0	196	0	320
Out-of-Town (treated)			23	23	49	49	22	22	36	36
Total Disposal Vol.			**232**	**232**	**489**	**489**	**218**	**218**	**356**	**356**
Cost										
Capital	**$0**	**$40,543**	**$286,211**	**$414,786**	**$233,803**	**$501,737**	**$226,056**	**$344,330**	**$250,392**	**$444,839**
O&M (present value)	**$21,578**	**$473,406**	**$468,593**	**$468,593**	**$64,952**	**$64,952**	**$466,955**	**$466,955**	**$466,955**	**$466,955**
Present Value	**$21,578**	**$513,949**	**$754,804**	**$883,379**	**$298,754**	**$566,688**	**$693,010**	**$811,285**	**$717,347**	**$911,794**

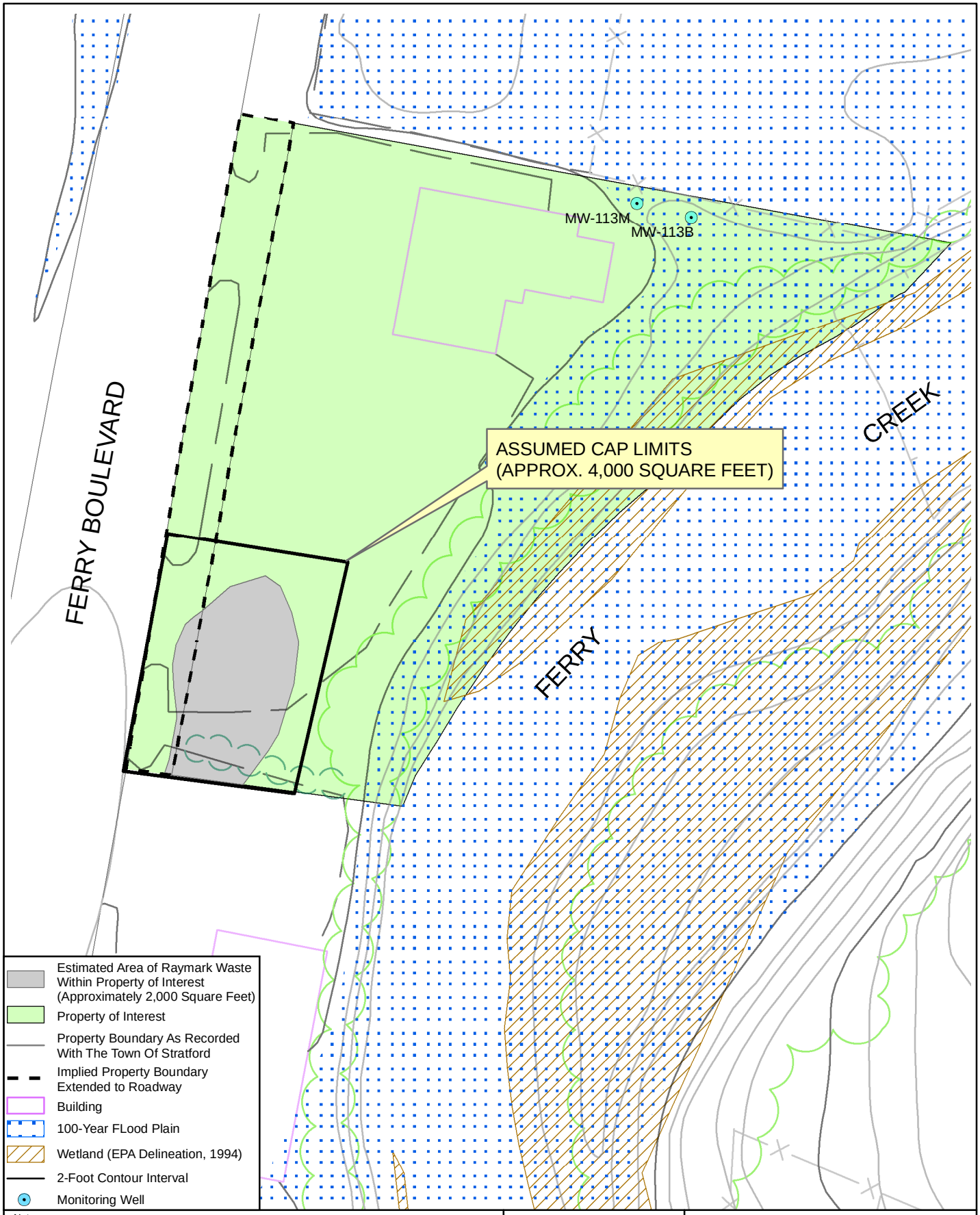
Notes:
Alternative 1 - No Action
Alternative 2 - Restrictions with Long-Term Monitoring
Alternative 3 - Low-Permeability Cap with In-Town Consolidation
Alternative 4 - Low-Permeability Cap with Out-of-Town Disposal
Alternative 5 - Excavation to the Water Table with In-Town Consolidation
Alternative 6 - Excavation to the Water Table with Out-of-Town Disposal
Alternative 7 - Excavation to either 2 or 4 Feet with In-Town Consolidation
Alternative 8 - Excavation to either 2 or 4 Feet with Out-of-Town Disposal
Alternative 9 - Excavation to 4 Feet with In-Town Consolidation
Alternative 10 - Excavation to 4 Feet with Out-of-Town Disposal

Table 4-2C
Preliminary ARAR Summary - 200 Ferry Boulevard
Raymark OU6 - Additional Properties
Strarford, Connecticut

Property Group	ARAR Tables				
	A	B	C	D	E
Alternative 1	X				
Alternative 2	X				
Alternative 3	X			X	X
Alternative 4	X			X	X
Alternative 5	X				
Alternative 6	X				
Alternative 7	X				
Alternative 8	X				
Alternative 9	X				
Alternative 10	X				

A = ARARs for all Alternatives
B = ARAR add-ons for an alternative for the Raymark waste located in the wetlands
C = ARAR add-ons for an alternative for the Raymark waste located in the floodplains
D = ARAR add-ons for alternatives that include low-permeability caps
E = ARAR add-ons for alternatives that include CAMUs

Note:
ARAR tables A-E are found in Volume II, Appendix C of this Feasibility Study.



Notes:
1) Plan not to be used for design.
2) All locations to be considered approximate.
3) Property boundaries are approximate based on Town of Stratford Engineering Department plans.
4) Floodplain extent based on Federal Emergency Management Agency Q3 Flood Data, Community Panel Numbers 090016 0001-0004, Revised June 16, 1992, FEMA, Washington D.C. and modified to Town of Stratford Engineering Plan 10-foot contour.
5) Adapted from TTNUS Remedial Investigation, 2005.

40 20 0 40 Feet

N

Nobis

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
(978) 683-0891
www.nobisengineering.com

FIGURE 4-2

200 FERRY BOULEVARD
FEASABILITY STUDY
RAYMARK SUPERFUND SITE
STRATFORD, CONNECTICUT

Drawn By: D. McGrath	Approved By: H. Ford
Project: 80006	Date: 9/3/09 Rev00

R:\80000 Task Orders\80006 Raymark\Technical Data\GIS_Data\Figures\OU6_FS_Figures\Figure_04-02_200_Ferry_Boulevard.mxd

4.3.3 Ferry Boulevard Properties

The Ferry Boulevard property group consists of four properties that were evaluated as part of the OU6 Remedial Investigation (RI) report (TtNUS, 2005): 230, 250, 280, and 300 Ferry Boulevard (Ferry Boulevard properties). In total, these parcels encompass approximately 7.8 acres of commercially-zoned land located along Ferry Boulevard in Stratford, Connecticut. These parcels are bordered by Ferry Boulevard to the west, Ferry Creek and Ferry Creek wetlands to the north and east, and the 200 Ferry Boulevard parcel (Section 4.4.2) to the south (see Figure 4-3). Each of the Ferry Boulevard Properties is occupied by a building that is utilized by an operating commercial business. The vast majority of the Raymark waste area that was delineated on these parcels is covered by asphalt.

These four parcels are being evaluated as a group for the Feasibility Study (FS) due to their geographical proximity and that the delineated Raymark waste area is one continuous footprint that occupies most of the area of these parcels. As a result, the alternative evaluation and selection will consider these four properties to be one property group, and the same remedy will be selected for all four parcels. This approach will enable a more timely response and provide technical and economic benefits including streamlined design and construction and economies of scale. Approximately 45 percent of the total Raymark waste area lies within the 100-year floodplain.

Key factors associated with the areas and volumes to be addressed at this property group include:

- Raymark waste area: .....170,000 SF (Figure 4-3)
- Total volume of Raymark waste:.....100,741 CY
- Maximum depth of Raymark waste:..... 16 feet bgs
- Average depth to the seasonal high groundwater table:.....6 feet
- Raymark waste area outside of 100-year floodplain:..... 96,000 SF
- Raymark waste area in 100-year floodplain:..... 74,000 SF
- Raymark waste in 100-year floodplain to 6 FT:.....16,444 CY (74,000 SF x 6 FT)
- Raymark waste area under pavement: ..... 143,000 SF
- Raymark waste in unpaved area:..... 27,000 SF
- Raymark waste located below the water table:.....62,963 CY (170,000 SF x 10 FT)

- Alternative 3/4:
  - Raymark waste under pavement to 2.5 FT: ..... 13,241 SF (143,000 SF x 2.5 FT)
  - Raymark waste in unpaved area to 3 FT: ..... 3,000 SF (27,000 SF x 3 FT)
- Alternative 5/6:
  - Raymark waste located above the water table: .....37,778 CY (170,000 SF x 6 FT)
- Alternative 7/8:
  - Raymark waste under pavement to 2 FT: .....10,593 CY (143,000 SF x 2 FT)
  - Raymark waste in unpaved area to 4 FT: .....4,000 CY (27,000 SF x 4 FT)
- Alternative 9/10:
  - Raymark waste to 4 FT: .....25,185 CY (170,000 SF x 4 FT)

The calculation of the average depth to the seasonal high water table of 6 feet below ground surface (bgs) is based on observations of water levels from soil borings advanced in the area. The calculation of the maximum depth of Raymark waste is based on data collected during the RI (TtNUS, 2005).

The detailed analysis of alternatives for this property group is presented below and consists of the following components:

- A list of key assumptions (Section 4.3.3.1) is used as the basis for the detailed analysis of alternatives and for the development of costs for the FS;
- Figure 4-3, which shows a map of Ferry Boulevard, the delineated Raymark waste area, the 100-year floodplain, and the proposed cap footprint;
- Table 4-3, which presents the individual detailed analysis of alternatives for Ferry Boulevard in tabular form;
- The comparative analysis of alternatives for Ferry Boulevard, presented in text form;
- Table 4-3A, which presents a tabular summary of the comparative analysis;
- Table 4-3B, which presents a summary of cost estimates for each of the alternatives;
- Table 4-3C, which provides a summary of ARARs for each of the Ferry Boulevard alternatives; and
- Cost Estimate Backup Sheets for the FS cost estimates, which are presented in Appendix G.

4.3.3.1 Ferry Boulevard Properties Assumptions

Key assumptions associated with each alternative are presented in this section. Pairs of alternatives (3 and 4, 5 and 6, 7 and 8, and 9 and 10) have the same components except for the disposal of Raymark waste, which is either in-town or out-of-town. See Section 3.3 for details on the Remedial Alternatives discussed below. See Table 4-3 for a summary of the details on the analysis for the Ferry Boulevard property group.

4.3.3.1.1 Alternative 1 – No Action

Detailed descriptions of the no action alternative are presented in Section 3.5.1.

4.3.3.1.2 Alternative 2 – Restrictions with Long-Term Monitoring

Detailed descriptions of Alternative 2 are presented in Section 3.5.2. Property group-specific details include the following:

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group, Alternative 2 will include placement of institutional controls on the Ferry Boulevard property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

Operation and Maintenance

- Groundwater Monitoring: Four monitoring wells will be installed to support long-term groundwater monitoring, which will be complemented by two existing monitoring wells (MW-111 to MW-112). The existing monitoring wells are assumed to be functional and can be utilized for long-term groundwater monitoring. Because Raymark waste will remain above the seasonal high water table, all six wells will be monitored quarterly for 2 years, and annually thereafter.

- Existing Surfaces: Monthly surface inspections of both pavement and vegetative covers will be required along with annual reporting to summarize inspection findings and to verify the effectiveness of institutional controls.

4.3.3.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-Of-Town Disposal (Alt. 4)

Detailed descriptions of Alternatives 3 and 4 are presented in Section 3.4.3. Raymark waste areas will be excavated 2.5 feet in paved areas and 3 feet in unpaved areas. Raymark waste within the property group will be consolidated under a RCRA cap. Due to the non-contiguous nature of waste delineated within the Ferry Boulevard property group, additional excavation will be conducted between waste locations to facilitate construction of the RCRA cap and to maintain existing grades after remedial action implementation. Additionally, the clean, uncontaminated excavated soil will be staged for future use during cap construction. Excavated materials will be placed at an in-town consolidation area (Alternative 3) or an out-of-town disposal location (Alternative 4). The property group-specific details for Alternative 3 and 4 include the following:

Excavation Volumes/Final Cover

- Approximately 16,241 CY of Raymark waste and 12,222 CY of non-Raymark waste soil will be excavated 2.5 or 3 feet.
- A low permeable RCRA cap with a footprint of approximately 280,000 square feet (5 acres) will be constructed over non-contiguous Raymark waste area present on the property group (Figure 4-3).
- Final property contours will be designed to meet Ferry Boulevard and surrounding parcels at current elevations.
- The current ground surface within the Raymark waste area on this property group is primarily paved and will be repaved as a final surface cover following cap construction, if practicable. However, a small portion (approximately 27,000 SF) is currently covered with grass, therefore a vegetated RCRA cap is assumed for that area.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated. Once excavated, this area will be backfilled with clean fill and revegetated or repaved to reflect existing conditions, as practicable. There will be no loss in current flood storage capacity or functionality after completion of the remedial actions.

- No wetland impacts are anticipated. Wetlands that contain Raymark waste are present along the eastern perimeter of this property group's boundary, however, this area will be addressed under a future OU3 remedial action for Ferry Creek.

Future Use Restrictions

- Due to the Raymark waste that will remain under the cap after completion of the excavation, Alternatives 3 and 4 will include placement of institutional controls on the Ferry Boulevard property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Four monitoring wells will be installed to support long-term groundwater monitoring, which will be complemented by two existing monitoring wells (MW-111 to MW-112). The existing monitoring wells are assumed to be functional and can be utilized for long-term groundwater monitoring. Because Raymark waste will remain above the seasonal high water table, all six wells will be monitored quarterly for 2 years, and annually thereafter. A 30 year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: The O&M for Alternatives 3 and 4 will require monthly cap inspections with annual reporting to summarize inspection findings and verify the effectiveness of institutional controls. A 30 year monitoring period is used in the present value cost analysis.

4.3.3.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6)

Detailed descriptions of Alternatives 5 and 6 are presented in Section 3.5.4. Raymark waste areas will be excavated to the seasonal high water table. Excavated material will be placed in an in-town consolidation area (Alternative 5) or an out-of-town disposal location (Alternative 6). The property group-specific details include the following:

Excavation Volumes/Final Cover

- Approximately 37,778 CY of Raymark waste will be excavated to the average seasonal high water table of 6 feet from areas outside as well as within the 100-year floodplain. Approximately 1,351 CY of non-Raymark waste soil will additionally be excavated to facilitate safety requirements such as benching/sloping of sidewalls to prevent collapse.

- Raymark waste in <u>paved</u> areas will be excavated to the water table and replaced with clean fill. The top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat. Raymark waste in <u>unpaved</u> areas will be excavated to the water table and replaced with a vegetated, permeable soil cover.

- Final property contours will be designed to meet Ferry Boulevard and surrounding parcels at current elevations.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated the seasonal high water table. Once excavated, this area will be backfilled with clean fill and revegetated or repaved with current elevations and

drainage patterns retained so that the current flood storage capacity will not be diminished after completion of the remedial actions.

- No wetland impacts are anticipated. Wetlands that contain Raymark waste are present along the eastern perimeter of this property group's boundary, however, this area will be addressed under a future OU3 remedial action for Ferry Creek.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 5 and 6 will include placement of institutional controls on the Ferry Boulevard property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA, and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Four monitoring wells will be installed to support long-term groundwater monitoring, which will be complemented by two existing monitoring wells (MW-111 to MW-112). Existing monitoring wells are assumed to be functional and can be utilized for long-term groundwater monitoring. Because all Raymark waste above the seasonal high water table will be removed, all six wells will be monitored quarterly for 2 years, after which groundwater monitoring may no longer be required.

- Cap/Final Cover: Paved areas and vegetative covers must be inspected annually and maintained in good condition.

4.3.3.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8)

Detailed descriptions of Alternatives 7 and 8 are presented in Section 3.5.5. Raymark waste areas will be excavated to either a depth of 2 feet (current paved areas) or a depth of 4 feet (current unpaved areas). Excavated material will be placed in an in-town consolidation area (Alternative 7) or an out-of-town disposal location (Alternative 8). The property group-specific details include the following:

Excavation Volumes/Final Covers

- Approximately 10,593 CY of Raymark waste will be excavated 2 feet from currently paved areas, while an estimated 4,000 CY will be excavated 4 feet from currently unpaved areas.

- Raymark waste in paved areas will be excavated to a 2-foot depth and replaced with clean fill. The top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat. Raymark waste in unpaved areas will be excavated to 4-foot depth and replaced with a vegetated, permeable soil cover.

- Final property contours will be designed to meet Ferry Boulevard and surrounding parcels at current elevations.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated 2 or 4 feet. Once excavated, this area will be backfilled with clean fill and revegetated or repaved with current elevations and drainage patterns retained so that the current flood storage capacity will not be diminished after completion of the remedial actions.

- No wetland impacts are anticipated. Wetlands that contain Raymark waste are present along the eastern perimeter of this property group's boundary, however, this area will be addressed under a future OU3 remedial action for Ferry Creek.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 7 and 8 will include placement of institutional controls on the Ferry Boulevard property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Four monitoring wells will be installed to support long-term groundwater monitoring, which will be complemented by two existing monitoring wells (MW-111 to MW-112). The existing monitoring wells are assumed to be functional and can be utilized for long-term groundwater monitoring. Because Raymark waste will remain above the seasonal high water table, all six wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: Paved areas and vegetative covers must be inspected monthly and maintained in good condition. A 30-year monitoring period is used in the present value cost analysis.

4.3.3.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10)

Detailed descriptions of Alternatives 9 and 10 are presented in Section 3.5.6. Raymark waste areas will be excavated to a 4-foot depth. Excavated material will be placed in an in-town

consolidation area (Alternative 9) or an out-of-town disposal location (Alternative 10). The property group-specific details include the following:

Excavation and Final Cover

- Approximately 25,185 CY of Raymark waste will be excavated to a 4-foot depth.

- Raymark waste in paved areas will be excavated to a 4-foot depth and replaced with clean fill. The top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat. Raymark waste in unpaved areas will be excavated to a 4-foot depth and replaced with a vegetated, permeable soil cover.

- Final property contours will be designed to meet Ferry Boulevard and surrounding parcels at current elevations.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated to 4 feet. Once excavated, this area will be backfilled with clean fill and revegetated or repaved with current elevations and drainage patterns retained so that the current flood storage capacity will not be diminished after completion of the remedial actions.

- No wetland impacts are anticipated. Wetlands that contain Raymark waste are present along the eastern perimeter of this property group's boundary, however, this area will be addressed under a future OU3 remedial action for Ferry Creek.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 9 and 10 will include placement of institutional controls on the Ferry Boulevard property group to prohibit certain types of activities such as excavations

without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Four monitoring wells will be installed to support long-term groundwater monitoring, which will be complemented by two existing monitoring wells (MW-111 to MW-112). The existing monitoring wells are assumed to be functional and can be utilized for long-term groundwater monitoring. Because Raymark waste will remain above seasonal high water table, all six wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: Paved areas and vegetative covers must be inspected monthly and maintained in good condition. A 30-year monitoring period is used in the present value cost analysis.

4.3.3.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10)

Raymark waste treatment is presented in Section 3.1.3 for all property groups.

- Based on an evaluation of historical sampling data from <u>all</u> OU6 properties, it is assumed that approximately 10% of excavated Raymark waste will require treatment prior to disposal. Treatment will be required only when excavated materials exhibit concentrations of contaminants in excess of disposal requirements. All treatment will occur at an out-of-town facility.

- For alternatives featuring out-of-town disposal of Raymark waste (Alternatives 4, 6, 8, and 10), the concentration thresholds for treatment will be 10 times UTS thresholds.

- For alternatives featuring in-town consolidation (Alternatives 3, 5, 7, and 9), the concentration thresholds for treatment will be the PHC levels.

- Treatment volume estimates for Ferry Boulevard Properties are based on the assumed quantity of excavation required to implement each alternative. Note that the waste volumes are rounded up or down as appropriate.

- A 1.5 conversion factor from tons to cubic yards is used.

  - <u>Alternatives 3/4</u>
    - 16,241 CY RW excavated x 1.2 bulking factor = 19,489 CY
    - 19,489 CY * 1.5 TON/CY = 29,234 TON
    - 29,234 TON * 10% = **2,923 TONS to be treated (1,949 CY)**

  - <u>Alternatives 5/6</u>
    - 37,778 CY RW excavated * 1.2 bulking factor = 45,333 CY
    - 45,333 CY * 1.5 TON/CY = 68,001 TON
    - 68,001 TON * 10% = **6,800 TONS to be treated (4,533 CY)**

  - <u>Alternatives 7/8</u>
    - 14,593 CY RW excavated * 1.2 bulking factor = 17,511 CY
    - 17,511 CY * 1.5 TON/CY = 26,267 TON
    - 26,267 TON * 10% = **2,627 TONS to be treated (1,751 CY)**

  - <u>Alternatives 9/10</u>
    - 25,185 CY RW excavated * 1.2 bulking factor = 30,222 CY
    - 30,222 CY * 1.5 TON/CY = 45,333 TON
    - 45,333 TON * 10% = **4,533 TONS to be treated (3,022 CY)**

4.3.3.2 Comparative Analysis of Alternatives for Ferry Boulevard Properties

This section presents the comparative analysis of alternatives for Ferry Boulevard Properties using the criteria described in Section 4.2. The comparative analysis of alternatives for this property group is summarized in a comparison format on Table 4-3A.

4.3.3.2.1 Overall Protection of Human Health and the Environment

Alternative 1 (No Action) will not protect human health or the environment. Alternative 2 (Restrictions with Long-Term Monitoring) can provide limited protection of human health and the environment, if restrictions are monitored and enforced. Alternatives 3 and 4 and 7 through 10 will achieve protection of human health and the environment through the excavation of varying amounts of Raymark waste (low-permeability cap for Alternative 3 and 4) and the use of institutional controls, rendering the contaminated waste inaccessible. Alternatives 5 and 6 will also protect human health and the environment through the removal of all Raymark waste located above the seasonal high water table and the use of institutional controls.

4.3.3.2.2 Compliance with ARARs

Alternative 1 (No Action) and Alternative 2 (Restrictions with Long-Term Monitoring) will not comply with ARARs because contaminants in Raymark waste will remain accessible in soils in excess of CT RSRs and federal risk criteria.

The ARARs associated with the implementation of Alternatives 3 through 10 are presented in Section 4.0 of this FS and on Table 4-3C. Alternatives 3 through 6 could be designed to comply with all chemical-specific, action-specific, and location-specific ARARs. Through excavation of Raymark waste to 2 feet (paved areas) or 4 feet (unpaved areas), Alternatives 7 through 10 will render the remaining contaminated soil inaccessible and will be compliant with the action-specific CT RSR Direct Exposure Criteria. Alternatives 7 through 10 may not comply with the numeric standards of CTDEP's Pollutant Mobility Criteria, however, the RSRs allow for variances and alternate criteria. Alternatives 7 through 10 will comply with all other chemical, action, and location-specific ARARs.

4.3.3.2.3 Long-Term Effectiveness and Permanence

The magnitude of residual human health risk associated with Raymark waste will be highest for Alternative 1 (No Action), since no actions will be taken to mitigate human health risks. Residual human health risks for Alternative 2 (Restrictions with Long-Term Monitoring) will be lower than Alternative 1, but still above acceptable human health risk levels.

Residual human health risks after implementation of Alternatives 3 and 4 and Alternatives 7 through 10 will be slightly higher than for Alternatives 5 and 6 because Raymark waste will be left in-place above the seasonal high water table. Alternatives 5 and 6 will be more reliable than Alternatives 3 and 4 and 7 through 10 because there will be no Raymark waste in-place above the seasonal high water table and protection of human health through direct contact or mobilization of contaminants by rainwater infiltration will not be dependent on maintenance of a low-permeability cap or a soil or paved cover.

Alternatives 3 and 4 and 7 through 10 can provide protection in the long-term if the cover systems are maintained. Alternatives 5 and 6 will provide the greatest protection to human health and will be the most permanent. Alternative 3 through 10 could each be designed to allow for redevelopment potential on the property group.

4.3.3.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment

Alternatives 3 through 10 will require treatment prior to land disposal to address the assumed 10 percent fraction that exceeds the UTS or PHC levels. This treatment will result in reduction of toxicity, mobility, and volume of Raymark waste. Although, the estimated volumes that will require treatment are similar (ranging from 1,751 to 4,533 CY), Alternatives 5 and 6 will result in the greatest amount of reduction because a larger quantity of materials will be shipped offsite and is expected to require treatment prior to disposal.

4.3.3.2.5 Short-Term Effectiveness

No on-site actions will be taken under Alternative 1 (No Action) and minimal on-site actions will be taken under Alternative 2 (Restrictions with Long-Term Monitoring); therefore, there will be no short-term impacts to the community, workers, or the environment. Short-term impacts to

the community, workers, and the environment from the implementation of Alternatives 3 through 10 will be similar and can be mitigated using engineering controls.

Alternatives 5 and 6 will involve a higher volume of truck traffic to transport Raymark waste and backfill will require a greater volume of Raymark waste handling than Alternatives 3 and 4 and 7 through 10.

Alternatives 3 and 4 and 9 and 10 will take approximately 12 months to complete, while Alternatives 5 and 6 will each require approximately 20 months to complete. Alternatives 7 and 8 will each require approximately 8 months to complete. For Alternatives 3, 5, 7, and 9, the estimated time to complete does not include the amount of time necessary to complete remedial activities at an in-town consolidation location.

4.3.3.2.6 Implementability

Alternatives 3 and 4 (low-permeability cap), Alternatives 5 and 6 (excavation to the water table), and Alternatives 7 through 10 (2 to 4-foot excavation) all require excavation, which can be implemented through standard construction and environmental remediation methods. Alternatives 3 and 4 and 7 through 10 require specific site grading, placement of cap/cover materials based on design specifications, and O&M in the future. Alternatives 5 and 6 will involve excavation of the largest volume of Raymark waste (37,778 CY), and any expansions of the Raymark waste area due to confirmatory sampling will lead to a larger volume of excavated Raymark waste compared to Alternative 7 through 10 due to the excavation depth to the seasonal high water table.

Additional remedial actions will be more difficult to implement for Alternatives 3 and 4 due to the presence of a RCRA cap. Alternatives 7 through 10 are equally amenable to additional remedial actions at the property group, should they be deemed necessary. Alternatives 5 and 6 will be the most amenable to additional actions should they be necessary as all Raymark waste will be removed to the seasonal high water table.

Alternatives 3 and 4 and 7 through 10 will each require long-term groundwater monitoring. Alternatives 5 and 6 and 9 and 10 will require quarterly monitoring for only 2 years after which

groundwater monitoring may no longer be required. Alternatives 3 and 4 and 7 though 10 will also require long-term operation and maintenance of the cap or soil cover.

Alternatives 3 through 10 will be similar in terms of the ability to coordinate with other agencies.

For Alternatives 3 through 10, each involve conventional construction methods for which the required equipment and technical specialists will be readily available.

4.3.3.2.7 Cost

A comparison of costs for each of the alternatives that were evaluated for Ferry Boulevard is presented on Table 4-3B.

Table 4-3
Summary of Detailed Analysis for Ferry Boulevard Properties
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4 – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8 – Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Overall Protection of Human Health and the Environment	Would not protect human health. RI did not identify any significant habitats for ecological receptors.	Some protection of human health, but human health risks still above acceptable limits. RI did not identify any significant habitats for ecological receptors.	Would protect human health through construction of a RCRA C-compliant cover (multi-component, drainage layer, gas vent layer, E-07 cm/s hydraulic conductivity), over Raymark waste. RI did not identify any significant habitats for ecological receptors.	Would protect human health through the removal of Raymark waste and placement of clean soil in its place. RI did not identify any significant habitats for ecological receptors.	Would protect human health through construction of an engineered barrier over Raymark waste. RI did not identify any significant habitats for ecological receptors.	Would protect human health through construction of an engineered barrier over Raymark waste. RI did not identify any significant habitats for ecological receptors.
Compliance with ARARs	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs.	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-3C.	Would comply with all chemical-specific, location-specific, and action-specific ARARs. See Table 4-3C.	Would comply with all chemical-specific, location-specific, and action-specific ARARs. See Table 4-3C.	Does not comply with numeric criteria of the Pollutant Mobility Criteria of the RSRs, however, the RSRs allow for waivers and alternate criteria. See Table 4-3C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs with the use of waivers and/or alternate criteria. See Table 4-3C.
Long-Term Effectiveness and Permanence	Magnitude of residual risk high. No risk reduction. 5-year reviews required. No O&M or controls included for long term.	Residual human health risks above acceptable limits. No risk reduction. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would not be adequate to protect human health for the long term.	Residual risk within acceptable limits. Raymark waste will be left-in-place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness. Capping technology reliable. Additional design analysis of cap in floodplains will be required during remedial design phase.	Residual risk within acceptable limits. Risk reduction would be permanent. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.	Residual risk within acceptable limits. Raymark waste will be left-in place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.	Residual risk within acceptable limits. Raymark waste will be left-in place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.
Reduction of Toxicity, Mobility, or Volume Through Treatment	None.	None.	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 2,923 Raymark Waste treated (CY)= 1,949	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 6,800 Raymark Waste treated (CY)= 4,533	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 2,627 Raymark Waste treated (CY)= 1,751	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 4,533 Raymark Waste treated (CY)= 3,022
Short-Term Effectiveness	No actions, therefore no short-term impacts anticipated. Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures are applied. No adverse impacts to environment anticipated during implementation. Minimal on-site actions (well construction, signage, and fence installation, and groundwater sampling only). Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1] = 19,489 Approximate truckloads of Raymark waste 1624 Approximate truckloads of clean fill 1624 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 3, this time frame does not include duration of capping activities at consolidation location. 12 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1] = 45,333 Approximate truckloads of Raymark waste 3778 Approximate truckloads of clean fill 3778 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 5, this time frame does not include duration of capping activities at consolidation location. 20 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1] = 17,511 Approximate truckloads of Raymark waste 1459 Approximate truckloads of clean fill 1459 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 7, this time frame does not include duration of capping activities at consolidation location. 8 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1] = 30,222 Approximate truckloads of Raymark waste 2519 Approximate truckloads of clean fill 2519 Assume 12 CY per truckload. Approximately months to complete remedial action. For Alternative 9, this time frame does not include duration of capping activities at consolidation location. 12 Would achieve RAO.

Table 4-3
Summary of Detailed Analysis for Ferry Boulevard Properties
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4 – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8 – Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Implementability	Not applicable.	Would be implementable, assuming cooperation by property owners. Would require coordination with state/town officials to perform O&M and to document compliance with institutional controls.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. May be difficult to implement additional remedial actions if required, because Raymark waste would be beneath RCRA C cover. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development would be hindered by the presence of the low-permeability cap.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or buildings on Ferry Boulevard would need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by presence of Raymark waste left in-place.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or buildings on Ferry Boulevard would need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by presence of Raymark waste left in-place.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or buildings on Ferry Boulevard would need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by presence of Raymark waste left in-place.
Cost	**Alternative 1** Capital: $0 O&M (Years 1-2): $0 O&M (Years 3-30): $0 Five-Year Reviews: $25,000/each PV of O&M: $53,945 PV of Alternative: $53,945 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 2** Capital: $180,740 O&M (Years 1-2): $113,679 O&M (Years 3-30): $73,891 Five-Year Reviews: $25,000/each PV of O&M: $1,042,803 PV of Alternative: $1,223,542 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 3** Capital: $7,629,583 O&M (Years 1-2): $105,934 O&M (Years 3-30): $66,146 Five-Year Reviews: $25,000/each PV of O&M: $946,694 PV of Alternative: $8,576,277 **Alternative 4** Capital: $18,323,308 O&M (Years 1-2): $105,934 O&M (Years 3-30): $66,146 Five-Year Reviews: $25,000/each PV of O&M: $946,694 PV of Alternative: $19,270,002 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 5** Capital: $7,697,916 O&M (Years 1-2): $91,128 O&M (Years 3-30): $38,079 Five-Year Reviews: $25,000/each PV of O&M: $622,380 PV of Alternative: $8,320,296 **Alternative 6** Capital: $32,588,135 O&M (Years 1-2): $91,128 O&M (Years 3-30): $38,079 Five-Year Reviews: $25,000/each PV of O&M: $622,380 PV of Alternative: $33,210,515 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 7** Capital: $3,714,099 O&M (Years 1-2): $104,258 O&M (Years 3-30): $64,470 Five-Year Reviews: $25,000/each PV of O&M: $925,899 PV of Alternative: $4,639,997 **Alternative 8** Capital: $13,326,601 O&M (Years 1-2): $104,258 O&M (Years 3-30): $64,470 Five-Year Reviews: $25,000/each PV of O&M: $925,899 PV of Alternative: $14,252,499 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 9** Capital: $5,484,294 O&M (Years 1-2): $104,258 O&M (Years 3-30): $64,470 Five-Year Reviews: $25,000/each PV of O&M: $925,899 PV of Alternative: $6,410,192 **Alternative 10** Capital: $22,077,005 O&M (Years 1-2): $104,258 O&M (Years 3-30): $64,470 Five-Year Reviews: $25,000/each PV of O&M: $925,899 PV of Alternative: $23,002,904 See Cost Estimate Backup Sheets in Appendix G.

[1] A bulking factor of 1.2 was used.

Table 4-3A
Comparative Analysis of Alternatives for Ferry Boulevard Properties
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	2	3	4	5	6	7	8	9	10
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT										
Protection of Human Health	□	□	◘	◘	■	■	◘	◘	◘	◘
Protection of the Environment	□	NA	◘	◘	■	■	◘	◘	◘	◘
COMPLIANCE WITH ARARs										
Chemical-Specific ARARs	□	□	■	■	■	■	◘	◘	◘	◘
Location-Specific ARARs	NA	■	■	■	■	■	◘	◘	◘	◘
Action-Specific ARARs	NA	■	■	■	■	■	◘	◘	◘	◘
Other Criteria, Advisories, Guidance	NA	NA	■	■	■	■	◘	◘	◘	◘
LONG-TERM EFFECTIVENESS AND PERMANENCE										
Magnitude of Residual Risk	□	□	◘	◘	■	■	◘	◘	◘	◘
Adequacy and Reliability of Controls	□	□	◘	◘	■	■	◘	◘	◘	◘
REDUCTION OF TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT										
Treatment/Recycling Processes Utilized	NA	NA	□	□	■	■	■	■	■	■
Amount of Hazardous Materials Destroyed or Treated	□	□	□	□	■	■	◘	◘	◘	◘
Degree of Expected Reductions in Tox, Mob, or Vol	□	□	□	□	■	■	◘	◘	◘	◘
Irreversibility	□	□	■	■	■	■	■	■	■	■
Type and Quantity of [Process] Residuals	□	□	■	■	■	■	■	■	■	■
SHORT-TERM EFFECTIVENESS										
Protection of Community During Remedial Actions	NA	■	◘	◘	◘	◘	◘	◘	◘	◘
Protection of Workers During Remedial Actions	NA	■	◘	◘	◘	◘	◘	◘	◘	◘
Environmental Impacts	■	■	◘	◘	◘	◘	◘	◘	◘	◘
Time Until Remedial Action Objectives are Achieved	□	□	◘	◘	◘	◘	◘	◘	◘	◘

Table 4-3A
Comparative Analysis of Alternatives for Ferry Boulevard Properties
Raymark OU6 - Additional Properties
Stratford, Connecticut
Page 2 of 2

	ALTERNATIVE									
	1	2	3	4	5	6	7	8	9	10
IMPLEMENTABILITY										
Ability to Construct and Operate the Technology	NA	■	■	■	■	■	■	■	■	■
Reliability of the Technology	NA	□	◘	◘	■	■	◘	◘	◘	◘
Ease of Undertaking Additional Remedial Actions, if Necessary	■	■	◘	◘	■	■	◘	◘	◘	◘
Ability to Monitor Effectiveness of the Remedy	NA	NA	◘	◘	◘	◘	◘	◘	◘	◘
Ability to Obtain Approvals from Other Agencies	■	■	■	■	■	■	■	■	■	■
Coordination with Other Agencies	◘	◘	■	■	■	■	■	■	■	■
Availability of Off-Site Treatment, Storage, and Disposal Services and Capacity	NA	NA	NA	NA	■	■	■	■	■	■
Availability of Necessary Equipment and Specialists	NA	■	■	■	■	■	■	■	■	■
Availability of Prospective Technologies	NA	■	■	■	■	■	■	■	■	■
COST										
Capital	$0	$180,740	$7,629,583	$18,323,308	$7,697,916	$32,588,135	$3,714,099	$13,326,601	$5,484,294	$22,077,005
Present Value of O&M (First 30 Years)	$53,945	$1,042,803	$946,694	$946,694	$622,380	$622,380	$925,899	$925,899	$925,899	$925,899
Present Value of the Alternative	$53,945	$1,223,542	$8,576,277	$19,270,002	$8,320,296	$33,210,515	$4,639,997	$14,252,499	$6,410,192	$23,002,904

Notes:

■ = Highest rating (most protective, most effective, most implementable)

◘ = Meets criterion, but another alternative(s) more protective/effective/implementable

□ = Does not meet criterion

Table 4-3B
Cost Estimate Summary for Ferry Boulevard Properties
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Excavation Depth, ft	0	0	3	3	6	6	2 or 4	2 or 4	4	4
Cap/Cover	NA	NA	RCRA C	RCRA C	NA	NA	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover
Disposal Volumes (CY)										
In-Town Consolidation	NA	NA	17540	0	40800	0	15760	0	27200	0
Out-of-Town Disposal (no treatment)	NA	NA	0	17540	0	40800	0	15760	0	27200
Out-of-Town Disposal (treatment)	NA	NA	1949	1949	4533	4533	1751	1751	3022	3022
Total Disposal Vol.	**NA**	**NA**	**19489**	**19489**	**45333**	**45333**	**17511**	**17511**	**30222**	**30222**
Cost										
Capital	**$0**	**$180,740**	**$7,629,583**	**$18,323,308**	**$7,697,916**	**$32,588,135**	**$3,714,099**	**$13,326,601**	**$5,484,294**	**$22,077,005**
O&M (present value)	**$53,945**	**$1,042,803**	**$946,694**	**$946,694**	**$622,380**	**$622,380**	**$925,899**	**$925,899**	**$925,899**	**$925,899**
Present Value	**$53,945**	**$1,223,542**	**$8,576,277**	**$19,270,002**	**$8,320,296**	**$33,210,515**	**$4,639,997**	**$14,252,499**	**$6,410,192**	**$23,002,904**

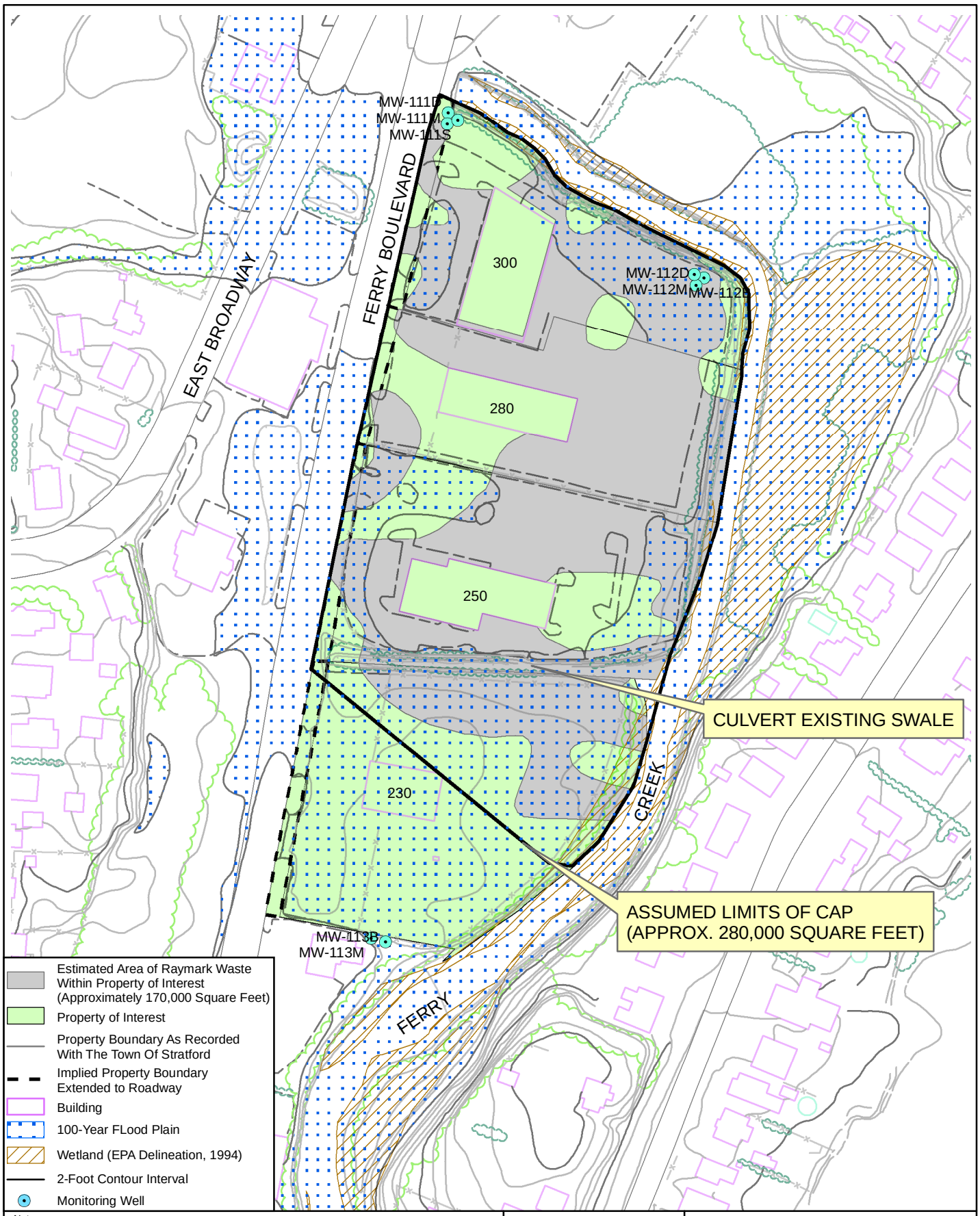
Notes:
Alternative 1 - No Action
Alternative 2 - Restrictions With Long-Term Monitoring
Alternative 3 - Low-Permeability Cap With In-Town Consolidation
Alternative 4 - Low-Permeability Cap With Out-Of-Town Disposal
Alternative 5 - Excavation To The Water Table With In-Town Consolidation
Alternative 6 - Excavation To The Water Table With Out-Of-Town Disposal
Alternative 7 - Excavation To Either 2 Or 4 Feet With In-Town Consolidation
Alternative 8 - Excavation To Either 2 Or 4 Feet With Out-Of-Town Disposal
Alternative 9 - Excavation To 4 Feet With In-Town Consolidation
Alternative 10 - Excavation To 4 Feet With Out-Of-Town Disposal

Table 4-3C
Preliminary ARAR Summary - Ferry Boulevard Properties
Raymark OU6 - Additional Properties
Stratford, Connecticut

Property Group	ARAR Tables				
	A	B	C	D	E
Alternative 1	X				
Alternative 2	X		X		
Alternative 3	X		X	X	X
Alternative 4	X		X	X	X
Alternative 5	X		X		
Alternative 6	X		X		
Alternative 7	X		X		
Alternative 8	X		X		
Alternative 9	X		X		
Alternative 10	X		X		

A = ARARs for all Alternatives
B = ARAR add-ons for an alternative for the Raymark waste located in the wetlands
C = ARAR add-ons for an alternative for the Raymark waste located in the floodplains
D = ARAR add-ons for alternatives that include low-permeability caps
E = ARAR add-ons for alternatives that include CAMUs

Note:
ARAR tables A-E are found in Volume II, Appendix C of this Feasibility Study.



Notes:
1) Plan not to be used for design.
2) All locations to be considered approximate.
3) Property boundaries are approximate based on Town of Stratford Engineering Department plans.
4) Floodplain extent based on Federal Emergency Management Agency Q3 Flood Data, Community Panel Numbers 090016 0001-0004, Revised June 16, 1992, FEMA, Washington D.C. and modified to Town of Stratford Engineering Plan 10-foot contour.
5) Adapted from TTNUS Remedial Investigation, 2005.

150 75 0 150 Feet

N

Nobis

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
(978) 683-0891
www.nobisengineering.com

FIGURE 4-3

230, 250, 280, 300 FERRY BOULEVARD
FEASABILITY STUDY
RAYMARK SUPERFUND SITE
STRATFORD, CONNECTICUT

Drawn By: D. McGrath	Approved By: H. Ford
Project: 80006	Date: 9/3/09 Rev00

R:\80000 Task Orders\80006 Raymark\Technical Data\GIS_Data\Figures\OU6_FS_Figures\Figure_04-03_Ferr_Boulevard.mxd

4.3.4 Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue Properties

This property group consists of two parcels totaling approximately 2.2 acres located to the north of Ferry Creek in the Town of Stratford, Connecticut (Figure 4-4). They are bordered by the 326 Ferry Boulevard parcel to the west (Section 4.4.5), residential properties along Willow Avenue to the north, residential properties along Housatonic Avenue to the east, and Ferry Creek and associated wetlands to the south. The Lot Behind 326 Ferry Boulevard is approximately 1.7 acres of commercially-zoned land (retail) and the Vacant Lot at Housatonic Avenue is approximately 0.5 acres of residentially zoned land.

These properties are both currently unoccupied and undeveloped, and contain no structures. The remnants of old concrete foundations are present on the Lot Behind 326 Ferry Boulevard. The properties are primarily vegetated with grasses, shrubs, and woodland vegetation. Approximately 35% of the total Raymark waste area lies within the 100-year floodplain. These properties are being evaluated together because of their proximity to each other and the fact that a Raymark waste area was delineated that spans the border between the two parcels. This approach will enable a more timely response and provide a technical and economic benefit including streamlined design and construction of economies of scale.

These parcels are being considered as part of a potential in-town consolidation area for Raymark waste excavated from other properties (Ferry Creek culvert scenario). This section does <u>not</u> evaluate the feasibility of utilizing these parcels as part of the Ferry Creek consolidation area. The evaluation of potential consolidation areas is included in Appendix F of this FS.

Key factors associated with the areas and volumes to be addressed at this property group include:

- Raymark waste area: .....39,000 SF (Figure 4-4)
- Total volume of Raymark waste:.....14,444 CY
- Maximum depth of Raymark waste:.....10 feet bgs
- Average depth to the seasonal high groundwater table:..... 6 feet
- Raymark waste area outside of 100-year floodplain:..... 25,000 SF

- Raymark waste area in 100-year floodplain:..... 14,000 SF
- Raymark waste in 100-year floodplain to 6 FT:.....3,111 CY (14,000 SF x 6 FT)
- Raymark waste area under pavement: ..... 0 SF
- Raymark waste in unpaved areas:..... 39,000 SF
- Raymark waste located below the water table:.....5,777 CY (39,000 SF x 4 FT)
- Alternatives 3/4:
  - Raymark waste under pavement to 2.5 FT: .....0 CY (0 SF x 2.5 FT)
  - Raymark waste in unpaved area to 3 FT: .....4,333 CY (39,000 SF x 3 FT)
- Alternatives 5/6:
  - Raymark waste located above the water table: .....8,667 CY (39,000 SF x 6 FT)
- Alternatives 7/8:
  - Raymark waste under pavement to 2 FT: .....0 CY (0 SF x 2 FT)
  - Raymark waste in unpaved area to 4 FT: .....5,778 CY (39,000 SF x 4 FT)
- Alternatives 9/10:
  - Raymark waste to 4 FT: .....5,778 CY (39,000 SF x 4 FT)

The calculation of the average depth to the seasonal high water table of 6 feet below ground surface (bgs) is based on observations of water levels from soil borings advanced in the area. The calculation of the maximum depth of Raymark waste is based on data collected during the RI (TtNUS, 2005).

The detailed analysis of alternatives for this property group is presented below and consists of the following components:

- A list of key assumptions (Section 4.3.4.1) is used as the basis for the detailed analysis of alternatives and for the development of costs for the FS;
- Figure 4-4, which shows a map of Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue, the delineated Raymark waste area, the 100-year floodplain, and the proposed cap footprint;
- Table 4-4, which presents the individual detailed analysis of alternatives for Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue in tabular form;

- The comparative analysis of alternatives for Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue, presented in text form;
- Table 4-4A, which presents a tabular summary of the comparative analysis;
- Table 4-4B, which presents a summary of cost estimates for each of the alternatives;
- Table 4-4C, which provides a summary of ARARs for each of the Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue alternatives; and
- Cost Estimate Backup Sheets for the FS cost estimates, which are presented in Appendix G.

4.3.4.1 The Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue Assumptions

Key assumptions associated with each alternative are presented in this section. Pairs of alternatives (3 and 4, 5 and 6, 7 and 8, and 9 and 10) have the same components except for the disposal of Raymark waste which is either in-town or out-of-town. See Section 3.3 for details on the Remedial Alternatives discussed below. See Table 4-4 for a summary of the details on the analysis for the Lot Behind 236 Ferry Boulevard and Vacant Lot at Housatonic Avenue property group.

4.3.4.1.1 Alternative 1 – No Action

Detailed descriptions of the no action alternative are presented in Section 3.5.1.

4.3.4.1.2 Alternative 2 – Restrictions with Long-Term Monitoring

Detailed descriptions of Alternative 2 are presented in Section 3.5.2. Property group-specific details include the following:

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group, Alternative 2 will include placement of institutional controls on the Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

Operation and Maintenance

- Groundwater Monitoring: Two monitoring wells will be installed to support long-term groundwater monitoring, which will be complemented by two existing monitoring wells (MW-110 and MW-528). The existing monitoring wells are assumed to be functional and can be utilized for long-term groundwater monitoring. Because Raymark waste will remain above the seasonal high water table, all four wells will be monitored quarterly for 2 years and annually thereafter.

- Existing Surfaces: Monthly surface inspections of vegetative covers will be required along with annual reporting to summarize inspection findings and to verify the effectiveness of institutional controls.

4.3.4.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4)

Detailed descriptions of Alternatives 3 and 4 are presented in Section 3.5.3. Because there is no pavement on the parcels, all Raymark waste areas will be excavated 3 feet. Raymark waste within the property group will be consolidated under a RCRA cap. Due to the non-contiguous nature of waste delineated within the Lot Behind 236 Ferry Boulevard and Vacant Lot at Housatonic Avenue property group, additional excavation will be conducted between waste locations to facilitate construction of the RCRA cap to maintain existing grades after remedial action implementation. Additionally, the clean, uncontaminated excavated soil will be staged for future use during cap construction. Excavated materials will be placed at an in-town consolidation area (Alternative 3) or an out-of-town disposal location (Alternative 4). The property group-specific details for Alternatives 3 and 4 include the following:

Excavation Volumes/Final Cover

- Approximately 4,333 CY of Raymark waste and 2,333 CY of non-Raymark waste soil will be excavated 3 feet.

- A low permeable RCRA cap with a footprint of approximately 60,000 square feet (1.37 acres) will be constructed over non-contiguous Raymark waste areas present on the property group (Figure 4-4).

- Final property contours will be designed to meet Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue and surrounding parcels at current elevations.

- The current ground surface within the Raymark waste area on this property group is covered with grass, therefore, a vegetated RCRA cap is assumed.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark Waste within the 100-year floodplain will be excavated 3 feet. Once excavated, this area will be backfilled with clean fill and revegetated to reflect existing conditions, as practicable. There will be no loss in current flood storage capacity or functionality after completion of the remedial actions.

- No wetland impacts are anticipated. Wetlands that contain Raymark waste are present along the southern perimeter of this property group's boundary, however, this area will be addressed under a future OU3 remedial action for Ferry Creek.

Future Use Restrictions

- Due to the Raymark waste that will remain under the cap after completion of the excavation, Alternatives 3 and 4 will include placement of institutional controls on the Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Two monitoring wells will be installed to support long-term groundwater monitoring, which will be complemented by two existing monitoring wells (MW-110 and MW 528). The existing monitoring wells are assumed to be functional and can be utilized for long-term groundwater monitoring. Because Raymark waste will remain above the seasonal high water table, all four wells will be monitored quarterly for two years and annually thereafter. A 30 year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: The O&M for Alternatives 3 and 4 will require monthly cap inspections with annual reporting to summarize inspection findings and verify the effectiveness of institutional controls. A 30 year monitoring period is used in the present value cost analysis.

4.3.4.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6)

Detailed descriptions of Alternatives 5 and 6 are presented in Section 3.4.4. Raymark waste areas will be excavated to the seasonal high water table. Excavated material will be placed in an in-town consolidation area (Alternative 5) or an out-of-town disposal location (Alternative 6). The property group-specific details include the following:

Excavation Volumes/Final Cover

- Approximately 8,667 CY of Raymark waste will be excavated to the average seasonal high water table of 6 feet. Approximately 578 CY of non-Raymark waste soil will additionally be excavated to facilitate safety requirements such as benching/sloping of sidewalls to prevent collapse.

- Raymark waste areas will be excavated to the water table and replaced with a vegetated, permeable soil cover.

- Final property contours will be designed to meet Lot Behind 236 Ferry Boulevard and Vacant Lot at Housatonic Avenue and surrounding parcels at current elevations.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark Waste within the 100-year floodplain will be excavated to the seasonal high water table. Once excavated, this area will be backfilled with clean fill and revegetated with current elevations and drainage patterns retained so that the current flood storage capacity will not be diminished after completion of the remedial actions.

- No wetland impacts are anticipated. Wetlands that contain Raymark waste are present along the southern perimeter of this property group's boundary, however, this area will be addressed under a future OU3 remedial action for Ferry Creek

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 5 and 6 will include placement of institutional controls on the Lot Behind 236 Ferry Boulevard and Vacant Lot at Housatonic Avenue property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Two monitoring wells will be installed to support long-term groundwater monitoring, which will be complemented by two existing monitoring wells (MW-110 and MW 528). The existing monitoring wells are assumed to be functional and can be utilized for long-term groundwater monitoring. Because all Raymark waste

above the seasonal high water table will be removed, all four wells will be monitored quarterly for 2 years, after which groundwater monitoring may no longer be required.

- Cap/Final Cover: Vegetative covers must be inspected annually and maintained in good condition.

4.3.4.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8)

Detailed descriptions of Alternatives 7 and 8 are presented in Section 3.5.5. For this property group, it is assumed that Raymark waste is excavated to either a depth of 2 (current paved areas) or 4 feet (current unpaved areas). Since the entire parcel is not paved, excavation to 2 feet is not applicable. This results in only 4 feet excavations, which is the same as Alternatives 9 and 10. Because of this, Alternatives 7 and 8 are not evaluated.

4.3.4.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10)

Detailed descriptions of Alternatives 9 and 10 are presented in Section 3.5.6. Raymark waste areas will be excavated to a 4-foot depth. Excavated material will be placed in an in-town consolidation area (Alternative 9) or an out-of-town disposal location (Alternative 10). The property group-specific details include the following:

Excavation Volumes/Final Cover

- Approximately 5,778 CY of Raymark waste will be excavated to a 4-foot depth.
- Raymark waste will be excavated to a 4-foot depth and replaced with a vegetated, permeable soil cover.
- Final property contours will be designed to meet Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue and surrounding parcels at current elevations.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated 4 feet. Once excavated, this area will be backfilled with

clean fill and revegetated with current elevations and drainage patterns retained so that the current flood storage capacity will not be diminished after completion of the remedial actions.

- No wetland impacts are anticipated. Wetlands that contain Raymark waste are present along the southern perimeter of this property group's boundary, however, this area will be addressed under a future OU3 remedial action for Ferry Creek.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 9 and 10 will include placement of institutional controls on the Lot Behind 236 Ferry Boulevard and Vacant Lot at Housatonic Avenue property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Two monitoring wells will be installed to support long-term groundwater monitoring, which will be complemented by two existing monitoring wells (MW-110 and MW 528). The existing monitoring wells are assumed to be functional and can be utilized for long-term groundwater monitoring. Because Raymark waste will remain above the seasonal high water table, all four wells will be sampled quarterly for 2 years, and annually thereafter. A 30 year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: Vegetative covers must be inspected monthly and maintained in good condition. A 30 year monitoring period is used in the present value cost analysis.

4.3.4.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10)

Raymark waste treatment is presented in Section 3.1.3 for all property groups.

- Based on an evaluation of historical sampling data from <u>all</u> OU6 properties, it is assumed that approximately 10% of excavated Raymark waste will require treatment prior to disposal. Treatment will be required only when excavated materials exhibit concentrations of contaminants in excess of disposal requirements. All treatment will occur at an out-of-town facility.

- For alternatives featuring out-of-town disposal of Raymark waste (Alternatives 4, 6, and 10), the concentration thresholds for treatment will be 10 times UTS thresholds.

- For alternatives featuring in-town consolidation (Alternatives 3, 5, and 9), the concentration thresholds for treatment will be the PHC levels.

- Treatment volume estimates for the Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue are based on the assumed quantity of excavation required to implement each alternative. Note that the waste volumes are rounded up or down as appropriate.

- A 1.5 conversion factor from tons to cubic yards is used.

  - <u>Alternatives 3/4</u>
    - 4,333 CY RW excavated x 1.2 bulking factor = 5,200 CY
    - 5,200 CY x 1.5 TON/CY = 7,800 TON
    - 7,800 TON * 10% = 780 **TONS to be treated (520 CY)**

  - <u>Alternatives 5/6</u>
    - 8,667 CY RW excavated * 1.2 bulking factor= 10,400 CY
    - 10,400 CY * 1.5 TON/CY = 15,600 TON
    - 15,600 TON * 10% = 1,560 **TONS to be treated (1,040 CY)**

- Alternatives 7/8
  - Not applicable.

- Alternatives 9/10
  - 5,778 CY RW excavated * 1.2 bulking factor = 6,933 CY
  - 6,933 CY * 1.5 TON/CY = 10,400 TON
  - 10,400 TON * 10% = **1,040 TONS to be treated (693 CY)**

4.3.4.2 Comparative Analysis of Alternatives for The Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue

This section presents the comparative analysis of alternatives for the Lot Behind 326 Boulevard and Vacant Lot at Housatonic Avenue using the criteria described in Section 4.2. The comparative analysis of alternatives for this property group is summarized in a comparison format on Table 4-4A.

4.3.4.2.1 Overall Protection of Human Health and the Environment

Alternative 1 (No Action) will not protect human health or the environment. Alternative 2 (Restrictions with Long-Term Monitoring) can provide limited protection of human health and the environment, if restrictions are monitored and enforced. Alternatives 3 through 6 and 9 and 10 will achieve protection of human health and the environment through the excavation of varying amounts of Raymark waste (low-permeability cap for Alternatives 3 and 4), rendering the contaminated waste inaccessible with the use of institutional controls.

4.3.4.2.2 Compliance with ARARs

Alternative 1 (No Action) and Alternative 2 (Restrictions with Long-Term Monitoring) will not comply with ARARs because contaminants in Raymark waste will remain accessible in soils in excess of CT RSRs and federal risk criteria.

The ARARs associated with the implementation of Alternatives 3 through 6 and 9 and 10 are presented in Section 4.0 of this FS and on Table 4-4C. Alternatives 3 through 6 could be designed to comply with all chemical-specific, action-specific, and location-specific ARARs. Through excavation of Raymark waste to 4 feet, Alternatives 9 and 10 will render the remaining

contaminated soil inaccessible and will be compliant with the action-specific CT RSR Direct Exposure Criteria. Alternatives 9 and 10 may not comply with the numeric standards of CTDEP's Pollutant Mobility Criteria, however, RSRs allow for variances and alternate criteria. Alternatives 9 and 10 will comply with all other chemical, action and location-specific ARARs.

4.3.4.2.3 Long-Term Effectiveness and Permanence

The magnitude of residual human health risk associated with Raymark waste will be highest for Alternative 1 (No Action), since no actions will be taken to mitigate human health risks. Residual human health risks for Alternative 2 (Restrictions with Long-Term Monitoring) will be lower than Alternative 1, but still above acceptable human health risk levels.

Residual human health risks after implementation of Alternatives 3 and 4 and Alternatives 9 and 10 will be slightly higher than for Alternatives 5 and 6 because Raymark waste will be left in-place above the seasonal high water table. Alternatives 5 and 6 will be more reliable than Alternatives 3 and 4 and 9 and 10 because there will be no Raymark waste left in-place above the seasonal high water table and protection of human health through direct contact or mobilization of contaminants by rainwater infiltration will not be dependent on maintenance of a low-permeable RCRA cap or a soil cover.

Alternatives 3 and 4 and 9 and 10 can provide protection in the long-term if the cover systems are maintained. Alternatives 5 and 6 will provide the greatest protection to human health and will be the most permanent. Alternatives 3 through 6 and 9 and 10 could each be designed to allow for redevelopment potential on the property group.

4.3.4.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment

Alternatives 3 through 6 and 9 and 10 will require treatment prior to land disposal to address the assumed 10 percent fraction that exceeds the UTS or PHC levels. This treatment will result in reduction of toxicity, mobility, and volume of Raymark waste. Although, the estimated volumes that will require treatment are similar (ranging from 520 to 1,040 CY), Alternatives 5 and 6 will result in the greatest amount of reduction because a larger quantity of materials will be shipped offsite and is expected to require treatment prior to disposal.

4.3.4.2.5 Short-Term Effectiveness

No on-site actions will be taken under Alternative 1 (No Action) and minimal on-site actions will be taken under Alternative 2 (Restrictions with Long-Term Monitoring); therefore, there will be no short-term impacts to the community, workers, or the environment. Short-term impacts to the community, workers, and the environment from the implementation of Alternatives 3 through 6 and 9 and 10 will be similar and can be mitigated using engineering controls.

Alternatives 5 and 6 will involve a higher volume of truck traffic to transport Raymark waste and backfill and will require greater Raymark waste handling than Alternatives 3 and 4 and 9 and 10.

Alternatives 3 through 6 and 9 and 10 will take approximately 6 months to complete. For Alternatives 3, 5, and 9, the estimated time to complete does not include the amount of time necessary to complete remedial activities at an in-town consolidation location.

4.3.4.2.6 Implementability

Alternatives 3 and 4 (low-permeability cap), Alternatives 5 and 6 (excavation to water table), and Alternatives 9 and 10 (4-foot excavation) all require excavation, which can be implemented through standard construction and environmental remediation methods. Alternatives 3 and 4 and 9 and 10 require specific site grading, placement of cap/cover materials based on design specifications, and O&M in the future. Alternatives 5 and 6 will involve excavation of the largest volume of Raymark waste (8,667 CY), and any expansions of the Raymark waste area due to confirmatory sampling will lead to a larger volume of excavated Raymark waste compared to Alternative 9 and 10 due to the excavation depth to the seasonal high water table.

Additional remedial actions will be more difficult to implement for Alternatives 3 and 4 due to the presence of a RCRA cap. Alternatives 9 and 10 are equally amenable to additional remedial actions at the property group, should they be deemed necessary. Alternatives 5 and 6 will be the most amenable to additional actions should they be necessary as all Raymark waste will be removed to the seasonal high water table.

Alternatives 3 and 4 and 9 and 10 will each require long-term groundwater monitoring. Alternatives 5 and 6 will require quarterly groundwater monitoring for only 2 years after which

groundwater monitoring may no longer be required. Alternatives 3 and 4 and 9 and 10 will also require long-term operation and maintenance of the cap or soil cover.

Alternatives 3 through 6 and 9 and 10 will be similar in terms of the ability to coordinate with other agencies.

For Alternatives 3 through 10, each involves conventional construction methods for which the required equipment and technical specialists will be readily available.

4.3.4.2.7 Cost

A comparison of costs for each of the alternatives that were evaluated for the Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue is presented on Table 4-4B

Table 4-4
Summary of Detailed Analysis for Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4 – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8[1] – Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Overall Protection of Human Health and the Environment	Would not protect human health. RI did not indentify any significant habitats for ecological receptors.	Some protection of human health, but human health risks still above acceptable limits. RI did not indentify any significant habitats for ecological receptors.	Would protect human health through construction of a RCRA C-compliant cover (multi-component, drainage layer, gas vent layer, E-07 cm/s hydraulic conductivity), over Raymark waste. RI did not indentify any significant habitats for ecological receptors.	Would protect human health through the removal of Raymark waste and placement of clean soil in its place. RI did not indentify any significant habitats for ecological receptors.	NA	Would protect human health through construction of an engineered barrier over Raymark waste. RI did not indentify any significant habitats for ecological receptors.
Compliance with ARARs	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs.	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-4C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-4C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-4C.	NA	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs with the use of waivers and/or alternate criteria. See Table 4-4C.
Long-Term Effectiveness and Permanence	Magnitude of residual risk high. No risk reduction. 5-year reviews required. No O&M or controls included for long term.	Residual human health risks above acceptable limits. No risk reduction. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would not be adequate to protect human health for the long-term.	Residual risk within acceptable limits. Raymark waste willl be left-in place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness. Capping technology reliable. Additional design analysis of cap in floodplains will be required during remedial design phase.	Residual risk within acceptable limits. Risk reduction would be permanent. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.	NA	Residual risk within acceptable limits. Raymark waste willl be left-in place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.
Reduction of Toxicity, Mobility, or Volume Through Treatment	None.	None.	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 780 Raymark Waste treated (CY)= 520	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 1,560 Raymark Waste treated (CY)= 1,040	NA	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 1,040 Raymark Waste treated (CY)= 693
Short-Term Effectiveness	No actions, therefore no short-term impacts anticipated. Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures are applied. No adverse impacts to environment anticipated during implementation. Minimal on-site actions (well construction, signage, and fence installation, and groundwater sampling only). Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[2] = 5,200 Approximate truckloads of Raymark waste 433 Approximate truckloads of clean fill 433 Assume 12 CY per truckload. Approximately months to complete remedial action. For Alternative 3, this time frame does not include duration of capping activities at consolidation location. 6 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[2] = 10,400 Approximate truckloads of Raymark waste 867 Approximate truckloads of clean fill 867 Assume 12 CY per truckload. Approximately months to complete remedial action. For Alternative 5, this time frame does not include duration of capping activities at consolidation location. 6 Would achieve RAO.	NA	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[2] = 6,933 Approximate truckloads of Raymark waste 578 Approximate truckloads of clean fill 578 Assume 12 CY per truckload. Approximately months to complete remedial action. For Alternative 9, this time frame does not include duration of capping activities at consolidation location. 6 Would achieve RAO.

Table 4-4
Summary of Detailed Analysis for Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4 – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8[1] – Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Implementability	Not applicable.	Would be implementable, assuming cooperation by property owners. Would require coordination with state/town officials to perform O&M and to document compliance with institutional controls.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Low-permeability cap would not be located within floodplain. May be difficult to implement additional remedial actions if required, because Raymark waste would be beneath RCRA C cover. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development could be hindered by the presence of the low-permeability cap.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by the presence of Raymark waste left in-place.	NA	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by the presence of Raymark waste left in-place.
Cost	**Alternative 1** Capital: $0 O&M (Years 1-2): $0 O&M (Years 3-30): $0 Five-Year Reviews: $15,000/each PV of O&M: $32,367 PV of Alternative: $32,367 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 2** Capital: $86,948 O&M (Years 1-2): $73,157 O&M (Years 3-30): $41,932 Five-Year Reviews: $15,000/each PV of O&M: $609,161 PV of Alternative: $696,109 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 3** Capital: $1,905,640 O&M (Years 1-2): $70,062 O&M (Years 3-30): $38,838 Five-Year Reviews: $15,000/each PV of O&M: $570,758 PV of Alternative: $2,476,399 **Alternative 4** Capital: $4,761,704 O&M (Years 1-2): $70,062 O&M (Years 3-30): $38,838 Five-Year Reviews: $15,000/each PV of O&M: $570,758 PV of Alternative: $5,332,462 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 5** Capital: $1,888,290 O&M (Years 1-2): $56,431 O&M (Years 3-30): $14,798 Five-Year Reviews: $15,000/each PV of O&M: $291,270 PV of Alternative: $2,179,560 **Alternative 6** Capital: $7,598,115 O&M (Years 1-2): $56,431 O&M (Years 3-30): $14,798 Five-Year Reviews: $15,000/each PV of O&M: $291,270 PV of Alternative: $7,889,385 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 7** Capital: NA O&M (Years 1-2): $0 O&M (Years 3-30): $0 Five-Year Reviews: $15,000/each PV of O&M: NA PV of Alternative: NA **Alternative 8** Capital: NA O&M (Years 1-2): $0 O&M (Years 3-30): $0 Five-Year Reviews: $15,000/each PV of O&M: NA PV of Alternative: NA See Cost Estimate Backup Sheets in Appendix G.	**Alternative 9** Capital: $1,341,103 O&M (Years 1-2): $69,742 O&M (Years 3-30): $38,518 Five-Year Reviews: $15,000/each PV of O&M: $566,788 PV of Alternative: $1,907,891 **Alternative 10** Capital: $5,147,653 O&M (Years 1-2): $69,742 O&M (Years 3-30): $38,518 Five-Year Reviews: $15,000/each PV of O&M: $566,788 PV of Alternative: $5,714,441 See Cost Estimate Backup Sheets in Appendix G.

[1] Alternatives 7 and 8 were not evaluated.
[2] A bulking factor of 1.2 was used.

Table 4-4A
Comparative Analysis of Alternatives for Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE[1]									
	1	2	3	4	5	6	7	8	9	10
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT										
Protection of Human Health	☐	☐	◘	NA	■	■	NA	NA	◘	◘
Protection of the Environment	☐	☐	◘	NA	■	■	NA	NA	◘	◘
COMPLIANCE WITH ARARs										
Chemical-Specific ARARs	☐	☐	■	NA	■	■	NA	NA	◘	◘
Location-Specific ARARs	NA	■	■	NA	■	■	NA	NA	◘	◘
Action-Specific ARARs	NA	■	■	NA	■	■	NA	NA	◘	◘
Other Criteria, Advisories, Guidance	NA	NA	■	NA	■	■	NA	NA	◘	◘
LONG-TERM EFFECTIVENESS AND PERMANENCE										
Magnitude of Residual Risk	☐	☐	◘	NA	■	■	NA	NA	◘	◘
Adequacy and Reliability of Controls	☐	☐	◘	NA	■	■	NA	NA	◘	◘
REDUCTION OF TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT										
Treatment/Recycling Processes Utilized	NA	NA	☐	NA	■	■	NA	NA	■	■
Amount of Hazardous Materials Destroyed or Treated	☐	☐	☐	NA	■	■	NA	NA	◘	◘
Degree of Expected Reductions in Tox, Mob, or Vol	☐	☐	☐	NA	■	■	NA	NA	◘	◘
Irreversibility	☐	☐	■	NA	■	■	NA	NA	■	■
Type and Quantity of [Process] Residuals	☐	☐	■	NA	■	■	NA	NA	■	■
SHORT-TERM EFFECTIVENESS										
Protection of Community During Remedial Actions	NA	■	◘	NA	◘	◘	NA	NA	◘	◘
Protection of Workers During Remedial Actions	NA	■	◘	NA	◘	◘	NA	NA	◘	◘
Environmental Impacts	■	■	◘	NA	◘	◘	NA	NA	◘	◘
Time Until Remedial Action Objectives are Achieved	☐	☐	◘	NA	◘	◘	NA	NA	◘	◘

Table 4-4A
Comparative Analysis of Alternatives for Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE[1]									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
IMPLEMENTABILITY										
Ability to Construct and Operate the Technology	NA	■	■	NA	■	■	NA	NA	■	■
Reliability of the Technology	NA	□	◘	NA	■	■	NA	NA	◘	◘
Ease of Undertaking Additional Remedial Actions, if Necessary	■	■	◘	NA	■	■	NA	NA	◘	◘
Ability to Monitor Effectiveness of the Remedy	NA	NA	◘	NA	◘	◘	NA	NA	◘	◘
Ability to Obtain Approvals from Other Agencies	■	■	■	NA	■	■	NA	NA	■	■
Coordination with Other Agencies	◘	◘	■	NA	■	■	NA	NA	■	■
Availability of Off-Site Treatment, Storage, and Disposal Services and Capacity	NA	NA	NA	NA	■	■	NA	NA	■	■
Availability of Necessary Equipment and Specialists	NA	■	■	NA	■	■	NA	NA	■	■
Availability of Prospective Technologies	NA	■	■	NA	■	■	NA	NA	■	■
COST										
Capital	$0	$86,948	$1,905,640	$4,761,704	$1,888,290	$7,598,115	NA	NA	$1,341,103	$5,147,653
Present Value of O&M (First 30 Years)	$32,367	$609,161	$570,758	$570,758	$291,270	$291,270	NA	NA	$566,788	$566,788
Present Value of the Alternative	$32,367	$696,109	$2,476,399	$5,332,462	$2,179,560	$7,889,385	NA	NA	$1,907,891	$5,714,441

[1] Alternatives 7 and 8 were not evaluated.

Notes:

■ = Highest rating (most protective, most effective, most implementable)

◘ = Meets criterion, but another alternative(s) more protective/effective/implementable

□ = Does not meet criterion

Table 4-4B
Cost Estimate Summary for Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Excavation Depth, ft	0	0	3	3	6	6	2 or 4	2 or 4	4	4
Cap/Cover	NA	NA	RCRA C	RCRA C	NA	NA	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover
Disposal Volumes (CY)										
In-Town Consolidation			4680	0	9360	0	0	0	6240	0
Out-of-Town (not treated)			0	4,680	0	9,360	0	0	0	6,240
Out-of-Town (treated)			520	520	1,040	1,040	0	0	693	693
Total Disposal Vol.			**5200**	**5200**	**10400**	**10400**	**0**	**0**	**6933**	**6933**
Cost										
Capital	**$0**	**$86,948**	**$1,905,640**	**$4,761,704**	**$1,888,290**	**$7,598,115**	**NA**	**NA**	**$1,341,103**	**$5,147,653**
O&M (present value)	**$32,367**	**$609,161**	**$570,758**	**$570,758**	**$291,270**	**$291,270**	**NA**	**NA**	**$566,788**	**$566,788**
Present Value	**$32,367**	**$696,109**	**$2,476,399**	**$5,332,462**	**$2,179,560**	**$7,889,385**	**NA**	**NA**	**$1,907,891**	**$5,714,441**

Notes:
Alternative 1 - No Action
Alternative 2 - Restrictions With Long-Term Monitoring
Alternative 3 - Low-Permeability Cap With In-Town Consolidation
Alternative 4 - Low-Permeability Cap With Out-Of-Town Disposal
Alternative 5 - Excavation To The Water Table With In-Town Consolidation
Alternative 6 - Excavation To The Water Table With Out-Of-Town Disposal
Alternative 7 - Excavation To Either 2 Or 4 Feet With In-Town Consolidation (Not Applicable)
Alternative 8 - Excavation To Either 2 Or 4 Feet With Out-Of-Town Disposal (Not Applicable)
Alternative 9 - Excavation To 4 Feet With In-Town Consolidation
Alternative 10 - Excavation To 4 Feet With Out-Of-Town Disposal

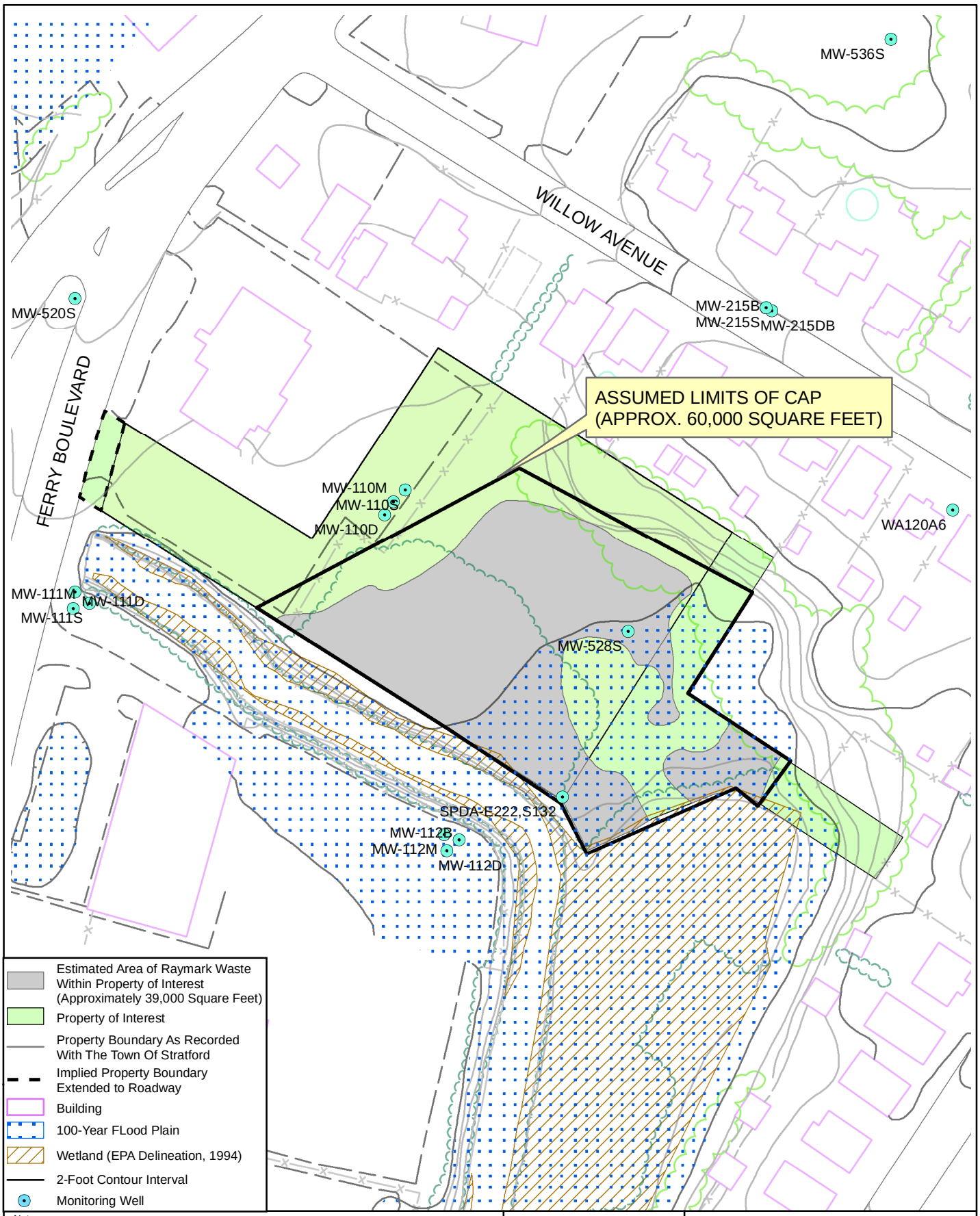
Table 4-4C
Preliminary ARAR Summary - Lot Behind 326 Ferry Boulevard and Vacant Lot and Housatonic Avenue
Raymark OU6 - Additional Properties
Stratford, Connecticut

Property Group	ARAR Tables[1]				
	A	B	C	D	E
Alternative 1	X				
Alternative 2	X		X		
Alternative 3	X		X	X	X
Alternative 4	X		X	X	X
Alternative 5	X		X		
Alternative 6	X		X		
Alternative 7					
Alternative 8					
Alternative 9	X		X		
Alternative 10	X		X		

[1] Alternatives 7/8 were not evaluated.

A = ARARs for all Alternatives
B = ARAR add-ons for an alternative for the Raymark waste located in the wetlands
C = ARAR add-ons for an alternative for the Raymark waste located in the floodplains
D = ARAR add-ons for alternatives that include low-permeability caps
E = ARAR add-ons for alternatives that include CAMUs

Note:
ARAR tables A-E are found in Volume II, Appendix C of this Feasibility Study.



Notes:
1) Plan not to be used for design.
2) All locations to be considered approximate.
3) Property boundaries are approximate based on Town of Stratford Engineering Department plans.
4) Floodplain extent based on Federal Emergency Management Agency Q3 Flood Data, Community Panel Numbers 090016 0001-0004, Revised June 16, 1992, FEMA, Washington D.C. and modified to Town of Stratford Engineering Plan 10-foot contour.
5) Adapted from TTNUS Remedial Investigation, 2005.

100 50 0 100 Feet

N

Nobis

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
(978) 683-0891
www.nobisengineering.com

FIGURE 4-4

LOT BEHIND 326 FERRY BOULEVARD & VACANT HOUSATONIC LOT
FEASABILITY STUDY
RAYMARK SUPERFUND SITE
STRATFORD, CONNECTICUT

Drawn By: D. McGrath	Approved By: H. Ford
Project: 80006	Date: 9/3/09 Rev00

R:\80000 Task Orders\80006 Raymark\Technical Data\GIS_Data\Figures\OU6_FS_Figures\Lot_Behind_326FB_Vacant_Hous_Lot.mxd

4.3.5 326 Ferry Boulevard Property

The 326 Ferry Boulevard parcel consists of approximately 0.8 acres of commercially-zoned (retail) land located on Ferry Boulevard in Stratford, Connecticut. It is one of the properties that was evaluated in the OU6 RI (TtNUS, 2005). The parcel is bordered to the east by the Lot Behind 326 Ferry Boulevard (Section 4.4.4), to the west by Ferry Boulevard, to the south by a channeled portion of Ferry Creek, and to the north by a gasoline station and several residential properties (Figure 4-5).

The 326 Ferry Boulevard parcel is currently occupied by a restaurant, which is the only building on the property. The remainder of the property is a paved parking lot that is generally flat throughout. This property group does not lie within the 100-year flood plain.

Key factors associated with the areas and volumes to be addressed at this property group include:

- Raymark waste area: .....2,700 SF (Figure 4-5)
- Total volume of Raymark waste:.....1000 CY
- Maximum depth of Raymark waste:.....10 feet bgs
- Average depth to the seasonal high groundwater table:.....5 feet
- Raymark waste area outside of 100-year floodplain: ..... 2,700 SF
- Raymark waste area in 100-year floodplain:..... 0 SF
- Raymark waste in 100-year floodplain to 5 FT:.....0 CY
- Raymark waste area under pavement: ..... 2,700 SF
- Raymark waste in unpaved area:..... 0 SF
- Raymark waste located below the water table:.....500 CY (2,700 SF x 5 FT)
- Alternatives 3/4:
  - Raymark waste under pavement to 2.5 FT: .....250 CY (2,700 SF x 2.5 FT)
  - Raymark waste in unpaved area to 3 FT: .....0 CY
- Alternatives 5/6:
  - Raymark waste located above the water table: .....500 CY (2,700 SF x 5 FT)
- Alternatives 7/8:
  - Raymark waste under pavement to 2 FT: .....200 CY (2,700 SF x 2 FT)
  - Raymark waste in unpaved area to 4 FT: .....0 CY

- Alternative 9/10:
  - Raymark waste to 4 FT: .....400 CY (2,700 SF x 4 FT)

The calculation of the average depth to the seasonal high water table of 5 feet below ground surface (bgs) is based on observations of water levels from soil borings advanced in the area. The calculation of the maximum depth of Raymark waste is based on data collected during the RI (TtNUS, 2005).

The detailed analysis of alternatives for this property group is presented below and consists of the following components:

- A list of key assumptions (Section 4.3.5.1) that is used as the basis for the detailed analysis of alternatives and for the development of costs for the FS;
- Figure 4-4, which shows a map of 326 Ferry Boulevard, the delineated Raymark waste area, the 100-year floodplain, and the proposed cap footprint;
- Table 4-5, which presents the individual detailed analysis of alternatives for 326 Ferry Boulevard in tabular form;
- The comparative analysis of alternatives for 326 Ferry Boulevard, presented in text form;
- Table 4-5A, which presents a tabular summary of the comparative analysis;
- Table 4-5B, which presents a summary of cost estimates for each of the alternatives;
- Table 4-5C, which provides a summary of ARARs for each of the 326 Ferry Boulevard alternatives; and
- Cost Estimate Backup Sheets for the FS cost estimates, which are presented in Appendix G.

4.3.5.1 326 Ferry Boulevard Assumptions

Key assumptions associated with each alternative are presented in this section. Pairs of alternatives (3 and 4, 5 and 6, 7 and 8, and 9 and 10) have the same components except for the disposal of Raymark waste which is either in-town or out-of-town. See Section 3.3 for details on the Remedial Alternatives discussed below. See Table 4-5 for a summary of the details on the analysis for the 326 Ferry Boulevard property group.

4.3.5.1.1 Alternative 1 – No Action

Detailed descriptions of the no action alternative are presented in Section 3.5.1.

4.3.5.1.2 Alternative 2 – Restrictions with Long-Term Monitoring

Detailed descriptions of Alternative 2 are presented in Section 3.5.2. Property group-specific details include the following:

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group, Alternative 2 will include placement of institutional controls on the 326 Ferry Boulevard property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above the seasonal high water table, all three wells will be monitored quarterly for 2 years, and annually thereafter.

- Existing Surfaces: Monthly surface inspections of pavement will be required along with annual reporting to summarize inspection findings and to verify the effectiveness of institutional controls.

4.3.5.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4)

Detailed descriptions of Alternatives 3 and 4 are presented in Section 3.5.3. As all of the Raymark waste is within paved areas, excavation depths of Raymark waste will be 2.5 feet. Raymark waste within the property group will be consolidated under a RCRA cap with existing

grades maintained after remedial action implementation. The clean, uncontaminated excavated soil will be staged for future use during cap construction. Excavated materials will be placed at an in-town consolidation area (Alternative 3) or an out-of-town disposal location (Alternative 4). The property group-specific details for Alternative 3 and 4 include the following:

Excavation Volumes/Final Cover

- Approximately 250 CY of Raymark waste and 213 CY of non-Raymark waste soil will be excavated 2.5 feet.
- A low permeable RCRA cap with a footprint of approximately 5,000 square feet (0.15 acres) will be constructed over Raymark waste areas present on the property group (Figure 4-5).
- Final property contours will be designed to meet 326 Ferry Boulevard and surrounding parcels at current elevations.
- The current ground surface within the Raymark waste area on this property group is primarily paved and will be repaved as a final surface cover following cap construction, if practicable.

Floodplain and Wetlands

- No floodplains are present in the area of Raymark waste on this parcel.
- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 3 and 4 will include placement of institutional controls on the 326 Ferry Boulevard property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above the seasonal high water table, all three wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: The O&M for Alternatives 3 and 4 will require monthly cap inspections with annual reporting to summarize inspection findings and verify the effectiveness of institutional controls. A 30-year monitoring period is used in the present value cost analysis.

4.3.5.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6)

Detailed descriptions of Alternatives 5 and 6 are presented in Section 3.5.4. Raymark waste areas will be excavated to the seasonal high water table. Excavated material will be placed in an in-town consolidation area (Alternative 5) or an out-of-town disposal location (Alternative 6). The property group-specific details include the following:

Excavation Volumes/Final Cover

- Approximately 500 CY of Raymark waste will be excavated to the average seasonal high water table of 5 feet. Approximately 107 CY of non-Raymark waste soil will additionally be excavated to facilitate safety requirements such as benching/sloping of sidewalls to prevent collapse.

- Raymark waste will be excavated to the water table and replaced with clean fill. Because the Raymark waste area is currently paved, the top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat.

- Final property contours will be designed to meet 326 Ferry Boulevard and surrounding parcels at current elevations.

Floodplain and Wetlands

- No floodplains impacts are present in the area of Raymark waste on this parcel.
- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 5 and 6 will include placement of institutional controls on the 326 Ferry Boulevard property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because all Raymark waste above the seasonal high water table will be removed, all three wells will be monitored quarterly for 2 years, after which groundwater monitoring may no longer be required.

- Cap/Final Cover: Paved areas must be inspected annually and maintained in good condition.

4.3.5.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8)

Detailed descriptions of Alternatives 7 and 8 are presented in Section 3.5.5. As all of the Raymark waste is within paved areas, excavation depths of Raymark waste will be 2.5 feet. Excavated material will be placed in an in-town consolidation area (Alternative 7) or an out-of-town disposal location (Alternative 8). The property group-specific details include the following:

Excavation Volumes/Final Covers

- Approximately 200 CY of Raymark waste will be excavated 2 feet.
- Raymark waste will be excavated to a 2-foot depth and replaced with clean fill. Because the Raymark waste area is currently paved, the top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat.
- Final property contours will be designed to meet 326 Ferry Boulevard and surrounding parcels at current elevations.

Floodplain and Wetlands

- No floodplains are present in the area of Raymark waste on this parcel.
- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 7 and 8 will include placement of institutional controls on the 326 Ferry Boulevard property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above the seasonal high water table, all three wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: Paved areas must be inspected monthly and maintained in good condition. A 30-year monitoring period is used in the present value cost analysis.

4.3.5.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10)

Detailed descriptions of Alternatives 9 and 10 are presented in Section 3.5.5. Raymark waste areas will be excavated to a 4-foot depth. Excavated material will be placed in an in-town consolidation area (Alternative 9) or an out-of-town disposal location (Alternative 10). The property group-specific details include the following:

Excavation and Final Cover

- Approximately 400 CY of Raymark waste will be excavated to a 4-foot depth.
- Raymark waste will be excavated to a 4-foot depth and replaced with clean fill. The top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat.
- Final property contours will be designed to meet 326 Ferry Boulevard Property and surrounding parcels at current elevations.

Floodplain and Wetlands

- No floodplains are present in the area of Raymark waste on this parcel.
- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 9 and 10 will include placement of institutional controls on the 326 Ferry Boulevard property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above seasonal high water table, all three wells will be monitored quarterly for 2 years and annually thereafter. A 30-year long-term moniotoring period is used in the present value cost analysis.

- Cap/Final Cover: Paved areas must be inspected monthly and maintained in good condition. A 30-year monitoring period is used in the present value cost analysis.

4.3.5.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10)

Raymark waste treatment is described in Section 3.1.3 for all property groups.

- Based on an evaluation of historical sampling data from <u>all</u> OU6 properties, it is assumed that approximately 10% of excavated Raymark waste will require treatment prior to disposal. Treatment will be required only when excavated materials exhibit concentrations of contaminants in excess of disposal requirements. All treatment will occur at an out-of-town facility.

- For alternatives featuring out-of-town disposal of Raymark waste (Alternatives 4, 6, 8, and 10), the concentration thresholds for treatment will be 10 times UTS thresholds.

- For alternatives featuring in-town consolidation (Alternatives 3, 5, 7, and 9), the concentration thresholds will be the PHC levels.

- Treatment volume estimates for 326 Ferry Boulevard are based on the assumed quantity of excavation required to implement each alternative. Note that the waste volumes are rounded up or down as appropriate.

- A 1.5 conversion factor from tons to cubic yards is used.

  - <u>Alternatives 3/4</u>
    - 250 CY excavated * 1.2 bulking factor= 300 CY
    - 300 CY X 1.5 TON/CY = 450 TON
    - 450 TON * 10% = **45 TONS to be treated (30 CY)**

  - <u>Alternatives 5/6</u>
    - 500 CY RW excavated * 1.2 bulking factor = 600 CY
    - 600 CY * 1.5 TON/CY = 900 TON
    - 900 TON * 10% = **90 TONS to be treated (60 CY)**

  - <u>Alternatives 7/8</u>
    - 200 CY RW excavated * 1.2 bulking factor = 240 CY
    - 240 CY * 1.5 TON/CY = 360 TON
    - 360 TON * 10% = **36 TONS to be treated (24 CY)**

  - <u>Alternatives 9/10</u>
    - 400 CY RW excavated * 1.2 bulking factor = 480 CY
    - 480 CY * 1.5 TON/CY = 720 TON
    - 72 TON * 10% = **72 TONS to be treated (48 CY)**

4.3.5.2 Comparative Analysis of Alternatives for 326 Ferry Boulevard

This section presents the comparative analysis of alternatives for 326 Ferry Boulevard using the criteria described in Section 4.2. The comparative analysis of alternatives for this property is summarized in comparison format on Table 4-5A.

4.3.5.2.1 Overall Protection of Human Health and the Environment

Alternative 1 (No Action) will not protect human health or the environment. Alternative 2 (Restrictions with Long-Term Monitoring) can provide limited protection of human health and the environment, if restrictions are monitored and enforced. Alternatives 3 and 4 and 7 through 10 will achieve protection of human health and the environment through the excavation of varying amounts of Raymark waste (low-permeability cap for Alternative 3 and 4) and the use of institutional controls, rendering the contaminated waste inaccessible. Alternatives 5 and 6 will also protect human health and the environment through the removal of all Raymark waste located above the seasonal high water table and the use of institutional controls.

4.3.5.2.2 Compliance with ARARs

Alternative 1 (No Action) and Alternative 2 (Restrictions with Long-Term Monitoring) will not comply with ARARs because contaminants in Raymark waste will remain accessible in soils in excess of CT RSRs and federal risk criteria.

The ARARs associated with the implementation of Alternatives 3 through 10 are presented in Section 4.0 of this FS and on Table 4-5C. Alternatives 3 through 6 could be designed to comply with all chemical-specific, action-specific, and location-specific ARARs. Through excavation of Raymark waste to 2 feet or 4 feet, Alternatives 7 through 10 will render the remaining contaminated soil inaccessible and will be compliant with the action-specific CT RSR Direct Exposure Criteria. Alternatives 7 through 10 may not comply with the numeric standards of CTDEP's Pollutant Mobility Criteria, however, the RSRs allow for variances and alternate criteria. Alternatives 7 through 10 will comply with all other chemical, action, and location-specific ARARs.

4.3.5.2.3 Long-Term Effectiveness and Permanence

The magnitude of residual human health risk associated with Raymark waste will be highest for Alternative 1 (No Action), since no actions will be taken to mitigate human health risks. Residual human health risks for Alternative 2 (Restrictions with Long-Term Monitoring) will be lower than Alternative 1, but still above acceptable human health risk levels.

Residual human health risks after implementation of Alternatives 3 and 4 and Alternatives 7 through 10 will be slightly higher than for Alternatives 5 and 6 because Raymark waste will be left in-place above the seasonal high water table. Alternatives 5 and 6 will be more reliable than Alternatives 3 and 4 and 7 through 10 because there will be no Raymark waste in-place above the seasonal high water table and protection of human health through direct contact or mobilization of contaminants by rainwater infiltration will not be dependent on maintenance of a low-permeable RCRA cap or a soil or paved cover.

Alternatives 3 and 4 and 7 through 10 can provide protection in the long-term if the cover systems are maintained. Alternatives 5 and 6 will provide the greatest protection to human health and will be the most permanent. Alternative 3 through 10 could each be designed to allow for redevelopment potential on the property group.

4.3.5.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment

No treatment will be required for Alternative 1 (No Action) or Alternative 2 (Restrictions with Long-Term Monitoring). Alternatives 3 through 10 will require treatment prior to land disposal to address the assumed 10 percent fraction that exceeds the UTS or PHC levels. This treatment will result in the reduction of toxicity, mobility, and volume of Raymark waste. Although the estimated volumes that will require treatment are similar (ranging from 24 to 60 CY), Alternatives 5 and 6 will result in the greatest amount of reduction because a larger quantity of materials will be shipped offsite and is expected to require treatment prior to disposal.

4.3.5.2.5 Short-Term Effectiveness

No on-site actions will be taken under Alternative 1 (No Action) and minimal on-site actions will be taken under Alternative 2 (Restrictions with Long-Term Monitoring); therefore, there will be no short-term impacts to the community, workers, or the environment. Short-term impacts to

the community, workers, and the environment from the implementation of Alternatives 3 through 10 will be similar and can be mitigated using engineering controls.

Alternatives 5 and 6 will involve a higher volume of truck traffic to transport Raymark waste and backfill will require a greater volume of Raymark waste handling than Alternatives 3 and 4 and 7 through 10.

Alternatives 3 and 4 and 7 and 8 will take approximately 2 months to complete, while Alternatives 5 and 6 and 9 and 10 will each require approximately 3 months to complete. For Alternatives 3, 5, 7, and 9, the estimated time to complete does not include the amount of time necessary to complete remedial activities at an in-town consolidation location.

4.3.5.2.6 Implementability

Alternatives 3 and 4 (low-permeability cap), Alternatives 5 and 6 (excavation to the water table), and Alternatives 7 through 10 (2 to 4-foot excavation) all require excavation, which can be implemented through standard construction and environmental remediation methods. Alternatives 3 and 4 and 7 through 10 require specific site grading, placement of cap/cover materials based on design specifications, and O&M in the future. Alternatives 5 and 6 will involve excavation of the largest volume of Raymark waste (500 CY), and any expansions of the Raymark waste area due to confirmatory sampling will lead to a larger volume of excavated Raymark waste compared to Alternative 7 through 10 due to the excavation depth to the seasonal high water table.

Additional remedial actions will be more difficult to implement for Alternatives 3 and 4 due to the presence of a RCRA cap. Alternatives 7 through 10 are equally amenable to additional remedial actions at the property group, should they be deemed necessary. Alternatives 5 and 6 will be the most amenable to additional actions should they be necessary as all Raymark waste will be removed to the seasonal high water table.

Alternatives 3 and 4 and 7 through 10 will each require long-term groundwater monitoring. Alternatives 5 and 6 will require quarterly groundwater monitoring for only 2 years after which groundwater monitoring may no longer be required. Alternatives 3 and 4 and 7 though 10 will also require long-term operation and maintenance of the cap or soil cover.

Alternatives 3 through 10 will be similar in terms of the ability to coordinate with other agencies.

For Alternatives 3 through 10, each involves conventional construction methods for which the required equipment and technical specialists will be readily available.

4.3.5.2.7 Cost

A comparison of costs for each of the alternatives that were evaluated for 326 Ferry Boulevard is presented on Table 4-5B.

Table 4-5
Summary of Detailed Analysis for 326 Ferry Boulevard
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4 – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8 – Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Overall Protection of Human Health and the Environment	Would not protect human health. RI did not identify any significant habitats for ecological receptors.	Some protection of human health, but human health risks still above acceptable limits. RI did not identify any significant habitats for ecological receptors.	Would protect human health through construction of a RCRA C-compliant cover (multi-component, drainage layer, gas vent layer, E-07 cm/s hydraulic conductivity), over Raymark waste. RI did not identify any significant habitats for ecological receptors.	Would protect human health through the removal of Raymark waste and placement of clean soil in its place. RI did not identify any significant habitats for ecological receptors.	Would protect human health through construction of an engineered barrier over Raymark waste. RI did not identify any significant habitats for ecological receptors.	Would protect human health through construction of an engineered barrier over Raymark waste. RI did not identify any significant habitats for ecological receptors.
Compliance with ARARs	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs.	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-5C.	Would comply with all chemical-specific (RSRs), and action-specific (RCRA) ARARs. See Table 4-5C.	Would comply with all chemical-specific (RSRs), and action-specific (RCRA) ARARs. See Table 4-5C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs with the use of waivers and/or alternate criteria. See Table 4-5C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs with the use of waivers and/or alternate criteria. See Table 4-5C.
Long-Term Effectiveness and Permanence	Magnitude of residual risk high. No risk reduction. 5-year reviews required. No O&M or controls included for long term.	Residual human health risks above acceptable limits. No risk reduction. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would not be adequate to protect human health for the long-term.	Residual risk within acceptable limits. Raymark waste willl be left-in place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness. Capping technology reliable.	Residual risk within acceptable limits. Risk reduction would be permanent. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.	Residual risk within acceptable limits. Raymark waste willl be left-in place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.	Residual risk within acceptable limits. Raymark waste willl be left-in place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.
Reduction of Toxicity, Mobility, or Volume Through Treatment	None.	None.	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 45 Raymark Waste treated (CY)= 30	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 90 Raymark Waste treated (CY)= 60	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 36 Raymark Waste treated (CY)= 24	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 72 Raymark Waste treated (CY)= 48
Short-Term Effectiveness	No actions, therefore no short-term impacts anticipated. Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures are applied. No adverse impacts to environment anticipated during implementation. Minimal on-site actions (well construction, signage, and fence installation, and groundwater sampling only). Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1] = 300 Approximate truckloads of Raymark waste 25 Approximate truckloads of clean fill 25 Assume 12 CY per truckload. Approximately months to complete remedial action. For Alternative 3, this time frame does not include duration of capping activities at consolidation location. 2 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1] = 600 Approximate truckloads of Raymark waste 50 Approximate truckloads of clean fill 50 Assume 12 CY per truckload. Approximately months to complete remedial action. For Alternative 5, this time frame does not include duration of capping activities at consolidation location. 3 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1] = 240 Approximate truckloads of Raymark waste 20 Approximate truckloads of clean fill 20 Assume 12 CY per truckload. Approximately months to complete remedial action. For Alternative 7, this time frame does not include duration of capping activities at consolidation location. 2 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1] = 480 Approximate truckloads of Raymark waste 40 Approximate truckloads of clean fill 40 Assume 12 CY per truckload. Approximately months to complete remedial action. For Alternative 9, this time frame does not include duration of capping activities at consolidation location. 3 Would achieve RAO.

Table 4-5
Summary of Detailed Analysis for 326 Ferry Boulevard
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4 – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8 – Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Implementability	Not applicable.	Would be implementable, assuming cooperation by property owners. Would require coordination with state/town officials to perform O&M and to document compliance with institutional controls.	Excavation in floodplains not anticipated. May be difficult to implement additional remedial actions if required, because Raymark waste would be beneath RCRA C cover. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development could be hindered by the presence of the low-permeability cap.	Excavation in floodplains not anticipated. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or building on 326 Ferry Boulevard would need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by the presence of Raymark waste left in-place.	Excavation in floodplains not anticipated. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or building on 326 Ferry Boulevard would need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by the presence of Raymark waste left in-place.	Excavation in floodplains not anticipated. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or building on 326 Ferry Boulevard would need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by the presence of Raymark waste left in-place.
Cost	**Alternative 1** Capital: $0 O&M (Years 1-2): $0 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: $21,578 PV of Alternative: $21,578 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 2** Capital: $43,993 O&M (Years 1-2): $59,876 O&M (Years 3-30): $32,933 Five-Year Reviews: $10,000/each Present Value of O&M: $478,962 PV of Alternative: $522,956 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 3** Capital: $319,275 O&M (Years 1-2): $58,249 O&M (Years 3-30): $31,306 Five-Year Reviews: $10,000/each PV of O&M: $458,768 PV of Alternative: $778,043 **Alternative 4** Capital: $483,074 O&M (Years 1-2): $58,249 O&M (Years 3-30): $31,306 Five-Year Reviews: $10,000/each PV of O&M: $458,768 PV of Alternative: $941,842 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 5** Capital: $307,216 O&M (Years 1-2): $46,149 O&M (Years 3-30): $10,225 Five-Year Reviews: $10,000/each PV of O&M: $213,411 PV of Alternative: $520,627 **Alternative 6** Capital: $637,116 O&M (Years 1-2): $46,149 O&M (Years 3-30): $10,225 Five-Year Reviews: $10,000/each PV of O&M: $213,411 PV of Alternative: $850,527 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 7** Capital: $246,509 O&M (Years 1-2): $58,041 O&M (Years 3-30): $31,097 Five-Year Reviews: $10,000/each PV of O&M: $456,182 PV of Alternative: $702,690 **Alternative 8** Capital: $377,087 O&M (Years 1-2): $58,041 O&M (Years 3-30): $31,097 Five-Year Reviews: $10,000/each PV of O&M: $456,182 PV of Alternative: $833,269 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 9** Capital: $285,303 O&M (Years 1-2): $58,041 O&M (Years 3-30): $31,097 Five-Year Reviews: $10,000/each PV of O&M: $456,182 PV of Alternative: $741,484 **Alternative 10** Capital: $548,762 O&M (Years 1-2): $58,041 O&M (Years 3-30): $31,097 Five-Year Reviews: $10,000/each PV of O&M: $456,182 PV of Alternative: $1,004,944 See Cost Estimate Backup Sheets in Appendix G.

[1] A bulking factor of 1.2 was used.

Table 4-5A
Comparative Analysis of Alternatives for 326 Ferry Boulevard
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	2	3	4	5	6	7	8	9	10
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT										
Protection of Human Health	☐	☐	◘	◘	■	■	◘	◘	◘	◘
Protection of the Environment	☐	☐	◘	◘	■	■	◘	◘	◘	◘
COMPLIANCE WITH ARARs										
Chemical-Specific ARARs	☐	☐	■	■	■	■	◘	◘	◘	◘
Location-Specific ARARs	NA	■	■	■	■	■	◘	◘	◘	◘
Action-Specific ARARs	NA	■	■	■	■	■	◘	◘	◘	◘
Other Criteria, Advisories, Guidance	NA	NA	■	■	■	■	◘	◘	◘	◘
LONG-TERM EFFECTIVENESS AND PERMANENCE										
Magnitude of Residual Risk	☐	☐	◘	◘	■	■	◘	◘	◘	◘
Adequacy and Reliability of Controls	☐	☐	◘	◘	■	■	◘	◘	◘	◘
REDUCTION OF TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT										
Treatment/Recycling Processes Utilized	NA	NA	☐	☐	■	■	■	■	■	■
Amount of Hazardous Materials Destroyed or Treated	☐	☐	☐	☐	■	■	◘	◘	◘	◘
Degree of Expected Reductions in Tox, Mob, or Vol	☐	☐	☐	☐	■	■	◘	◘	◘	◘
Irreversibility	☐	☐	■	■	■	■	■	■	■	■
Type and Quantity of [Process] Residuals	☐	☐	■	■	■	■	■	■	■	■
SHORT-TERM EFFECTIVENESS										
Protection of Community During Remedial Actions	NA	■	◘	◘	◘	◘	◘	◘	◘	◘
Protection of Workers During Remedial Actions	NA	■	◘	◘	◘	◘	◘	◘	◘	◘
Environmental Impacts	■	■	◘	◘	◘	◘	◘	◘	◘	◘
Time Until Remedial Action Objectives are Achieved	☐	☐	◘	◘	◘	◘	◘	◘	◘	◘

Table 4-5A
Comparative Analysis of Alternatives for 326 Ferry Boulevard
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	2	3	4	5	6	7	8	9	10
IMPLEMENTABILITY										
Ability to Construct and Operate the Technology	NA	■	■	■	■	■	■	■	■	■
Reliability of the Technology	NA	□	◘	◘	■	■	◘	◘	◘	◘
Ease of Undertaking Additional Remedial Actions, if Necessary	■	■	◘	◘	■	■	◘	◘	◘	◘
Ability to Monitor Effectiveness of the Remedy	NA	NA	◘	◘	◘	◘	◘	◘	◘	◘
Ability to Obtain Approvals from Other Agencies	■	■	■	■	■	■	■	■	■	■
Coordination with Other Agencies	◘	◘	■	■	■	■	■	■	■	■
Availability of Off-Site Treatment, Storage, and Disposal Services and Capacity	NA	NA	NA	NA	■	■	■	■	■	■
Availability of Necessary Equipment and Specialists	NA	■	■	■	■	■	■	■	■	■
Availability of Prospective Technologies	NA	■	■	■	■	■	■	■	■	■
COST										
Capital	$0	$43,993	$319,275	$483,074	$307,216	$637,116	$246,509	$377,087	$285,303	$548,762
Present Value of O&M (First 30 Years)	$21,578	$478,962	$458,768	$458,768	$213,411	$213,411	$456,182	$456,182	$456,182	$456,182
Present Value of the Alternative	$21,578	$522,956	$778,043	$941,842	$520,627	$850,527	$702,690	$833,269	$741,484	$1,004,944

Notes:

■ = Highest rating (most protective, most effective, most implementable)

◘ = Meets criterion, but another alternative(s) more protective/effective/implementable

□ = Does not meet criterion

Table 4-5B
Cost Estimate Summary for 326 Ferry Boulevard
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Excavation Depth, ft	0	0	3	3	5	5	2 or 4	2 or 4	4	4
Cap/Cover	NA	NA	RCRA C	RCRA C	NA	NA	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover
Disposal Volumes (CY)										
In-Town Consolidation			270	0	540	0	216	0	432	0
Out-of-Town (not treated)			0	270	0	540	0	216	0	432
Out-of-Town (treated)			30	30	60	60	24	24	48	48
Total Disposal Vol.			**300**	**300**	**600**	**600**	**240**	**240**	**480**	**480**
Cost										
Capital	**$0**	**$43,993**	**$319,275**	**$483,074**	**$307,216**	**$637,116**	**$246,509**	**$377,087**	**$285,303**	**$548,762**
O&M (present value)	**$21,578**	**$478,962**	**$458,768**	**$458,768**	**$213,411**	**$213,411**	**$456,182**	**$456,182**	**$456,182**	**$456,182**
Present Value	**$21,578**	**$522,956**	**$778,043**	**$941,842**	**$520,627**	**$850,527**	**$702,690**	**$833,269**	**$741,484**	**$1,004,944**

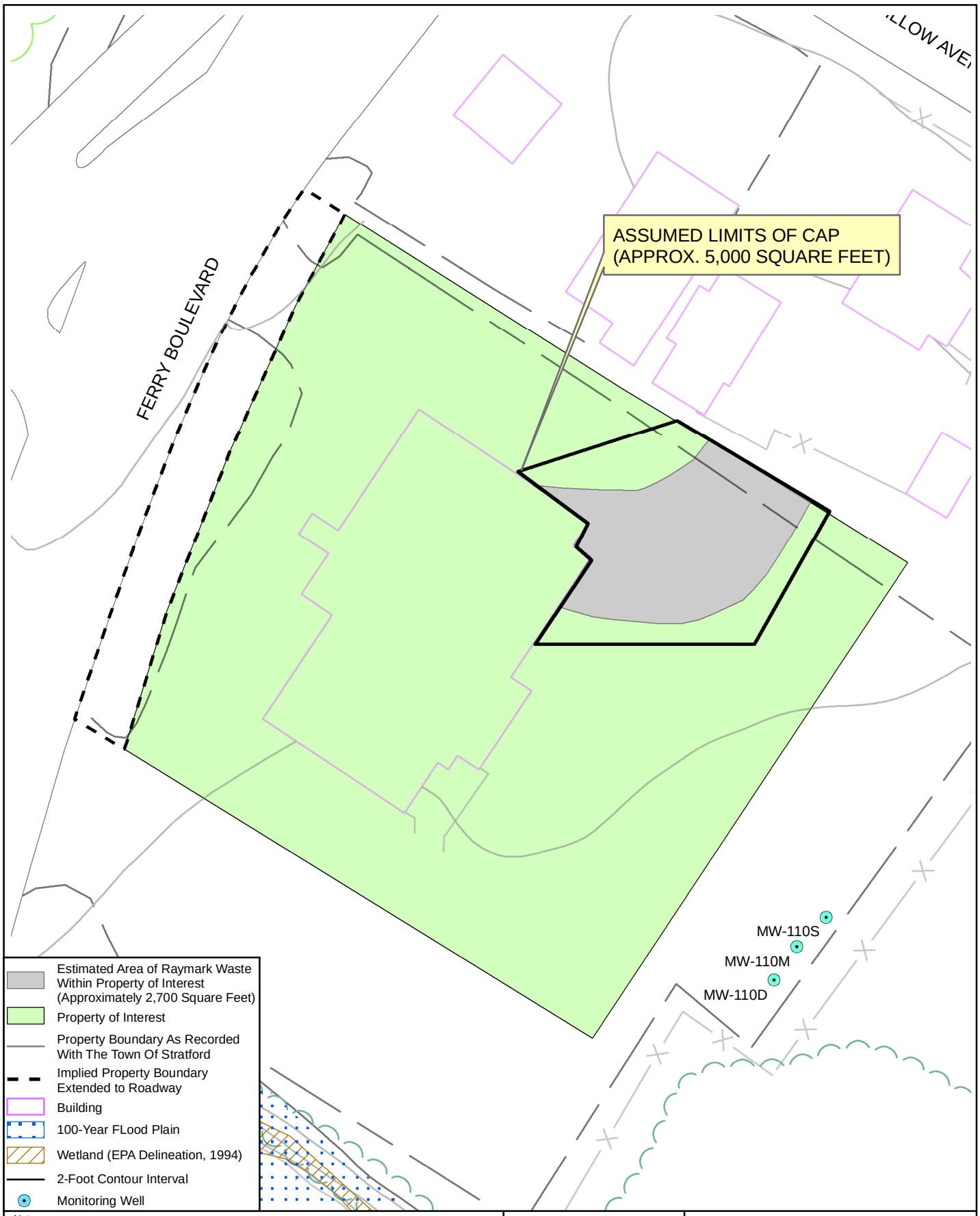
Notes:
Alternative 1 - No Action
Alternative 2 - Restrictions With Long-Term Monitoring
Alternative 3 - Low-Permeability Cap With In-Town Consolidation
Alternative 4 - Low-Permeability Cap With Out-Of-Town Disposal
Alternative 5 - Excavation To The Water Table With In-Town Consolidation
Alternative 6 - Excavation To The Water Table With Out-Of-Town Disposal
Alternative 7 - Excavation To Either 2 Or 4 Feet With In-Town Consolidation
Alternative 8 - Excavation To Either 2 Or 4 Feet With Out-Of-Town Disposal
Alternative 9 - Excavation To 4 Feet With In-Town Consolidation
Alternative 10 - Excavation To 4 Feet With Out-Of-Town Disposal

Table 4-5C
Preliminary ARAR Summary - 326 Ferry Boulevard
Raymark OU6 - Additional Properties
Stratford, Connecticut

Property Group	ARAR Tables				
	A	B	C	D	E
Alternative 1	X				
Alternative 2	X		X		
Alternative 3	X		X	X	X
Alternative 4	X		X	X	X
Alternative 5	X		X		
Alternative 6	X		X		
Alternative 7	X		X		
Alternative 8	X		X		
Alternative 9	X		X		
Alternative 10	X		X		

A = ARARs for all Alternatives
B = ARAR add-ons for an alternative for the Raymark waste located in the wetlands
C = ARAR add-ons for an alternative for the Raymark waste located in the floodplains
D = ARAR add-ons for alternatives that include low-permeability caps
E = ARAR add-ons for alternatives that include CAMUs

Note:
ARAR tables A-E are found in Volume II, Appendix C of this Feasibility Study.



Notes:
1) Plan not to be used for design.
2) All locations to be considered approximate.
3) Property boundaries are approximate based on Town of Stratford Engineering Department plans.
4) Floodplain extent based on Federal Emergency Management Agency Q3 Flood Data, Community Panel Numbers 090016 0001-0004, Revised June 16, 1992, FEMA, Washington D.C. and modified to Town of Stratford Engineering Plan 10-foot contour.
5) Adapted from TTNUS Remedial Investigation, 2005.

40 20 0 40 Feet

N

Nobis

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
(978) 683-0891
www.nobisengineering.com

FIGURE 4-5

326 FERRY BOULEVARD
FEASABILITY STUDY
RAYMARK SUPERFUND SITE
STRATFORD, CONNECTICUT

Drawn By: D. McGrath	Approved By: H. Ford
Project: 80006	Date: 9/3/09 Rev00

R:\80000 Task Orders\80006 Raymark\Technical Data\GIS_Data\Figures\OU6_FS_Figures\Figure_04-05_326_FB.mxd

4.3.6 576 and 600 East Broadway Property

576 and 600 East Broadway is a single parcel of commercially-zoned (light industrial) land totaling approximately 6 acres located on East Broadway, Stratford, Connecticut. This parcel is located on the west side of East Broadway, bounded to the north by the Vacant DOT Lot abutting I-95, to the northeast by Ferry Creek, and to the south and west by residential neighborhoods.

576 East Broadway is presently occupied by one building that contains a wood shop and warehouse. 600 East Broadway is currently unoccupied and presently overgrown with grasses, weeds, and shrubs. Large trees are present around the perimeter of the property. Much of the area located near the perimeter of this property group lies within the 100-year floodplain, but a large portion of the center of 600 East Broadway rises above the 100-year flood elevation.

Key factors associated with the areas and volumes to be addressed at this property group include:

- Raymark waste area: .....64,000 SF (Figure 4-6)
- Total volume of Raymark waste:.....42,667 CY
- Maximum depth of Raymark waste:.....18 feet bgs
- Average depth to the seasonal high groundwater table:.....6 feet
- Raymark waste area outside of 100-year floodplain:..... 28,000 SF
- Raymark waste area in 100-year floodplain:..... 36,000 SF
- Raymark waste in 100-year floodplain to 6 FT:.....8,000 CY (36,000 SF x 6 FT)
- Raymark waste area under pavement: ..... 4,700 SF
- Raymark waste area in unpaved area: ..... 59,300 SF
- Raymark waste located below the water table:.....28,445 CY (64,000 SF x 12 FT)
- Alternative 3/4:
  - Raymark waste in 100-year floodplain to 4 FT:.....5,333 CY (36,000 SF x 4 FT)
- Alternative 5/6:
  - Raymark waste located above the water table: .....14,222 CY (64,000 SF x 6 FT)
- Alternative 7/8:
  - Raymark waste under pavement to 2 FT: .....348 CY (4,700 SF x 2 FT)
  - Raymark waste in unpaved area to 4 FT: ..... 8,785 CY (59,000 SF x 4 FT)

- Alternative 9/10:
  - Raymark waste to 4 FT: .....9,481 CY (64,000 SF x 4 FT)

The calculation of the average depth to the seasonal high water table of 6 feet below ground surface (bgs) is based on observations of water levels from soil borings advanced in the area. The calculation of the maximum depth of Raymark waste is based on data collected during the RI (TtNUS, 2005).

The detailed analysis of alternatives for this property group is presented below and consists of the following components:

- A list of key assumptions (Section 4.3.6.1) is used as the basis for the detailed analysis of alternatives and for the development of costs for the FS;
- Figure 4-6, which shows a map of 576/600 East Broadway, the delineated Raymark waste area, the 100-year floodplain, and the proposed cap footprint;
- Table 4-6, which presents the individual detailed analysis of alternatives for 576/600 East Broadway in tabular form;
- The comparative analysis of alternatives for 576/600 East Broadway, presented in text form;
- Table 4-6A, which presents a tabular summary of the comparative analysis;
- Table 4-6B, which presents a summary of cost estimates for each of the alternatives;
- Table 4-6C, which provides a summary of ARARs for each of the 576/600 East Broadway alternatives; and
- Cost Estimate Backup Sheets for the FS cost estimates, which are presented in Appendix G.

4.3.6.1 576 and 600 East Broadway Assumptions

Key assumptions associated with each alternative are presented in this section. Pairs of alternatives (3 and 4, 5 and 6, 7 and 8, and 9 and 10) have the same components except for the disposal of Raymark waste, which is either in-town or out-of-town. See Section 3.3 for details on the Remedial Alternatives discussed below. See Table 4-6 for a summary of the details on the analysis for the 576 and 600 East Broadway property group.

4.3.6.1.1 Alternative 1 – No Action

Detailed descriptions of the no action alternative are presented in Section 3.5.1.

4.3.6.1.2 Alternative 2 – Restrictions with Long-Term Monitoring

Detailed descriptions of Alternative 2 are presented in Section 3.5.2. Property group-specific details include the following:

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group, Alternative 2 will include placement of institutional controls on the 576/600 East Broadway property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

Operation and Maintenance

- Groundwater Monitoring: One monitoring well will be installed to support long-term groundwater monitoring, which will be complemented by four existing monitoring wells (MW-101 to MW-104). The existing monitoring wells are assumed to be functional and can be utilized for long-term groundwater monitoring. Because Raymark waste will remain above the seasonal high water table, all five wells will be monitored quarterly for 2 years, and annually thereafter.

- Existing Surfaces: Monthly surface inspections of both pavement and vegetative covers will be required along with annual reporting to summarize inspection findings and to verify the effectiveness of institutional controls.

4.3.6.1.3 Alternatives 3 and 4 – Low- Permeability Cap with In-Town consolidation (Alt.3) and Out-of-Town Disposal (Alt.4)

Detailed descriptions of Alternative 3 are presented in Section 3.5.3. An alternative of capping in place with out-of-town disposal (Alternative 4) is not evaluated because there is sufficient

capacity on the property group to cap all Raymark waste present. Raymark waste within the property group will be consolidated under a RCRA cap and existing grades will be modified as necessary as described below for Alternative 3. In addition, treatment will not be required as all Raymark waste will remain within the property group. The property group-specific details for Alternative 3 include the following:

Excavation Volumes/Final Cover

- Approximately 5,333 CY of Raymark waste currently within the 100-year floodplain will be excavated 4 feet and consolidated on the property group at locations above the 100-year floodplain. All Raymark waste will remain on the property group.

- A low permeable RCRA cap with a footprint of approximately 132,000 square feet (2.8 acres) will be constructed over Raymark waste areas present on the property group (Figure 4-6).

- Final property contours will be designed to meet East Broadway and surrounding parcels at current elevations. The final property contours will rise toward the center of 600 East Broadway (the highest point on the property is currently approximately 14.5 feet above msl, which will rise approximately 4-5 feet after consolidation).

- The current ground surface within the Raymark waste area on this property group is primarily covered with grass, therefore, a vegetated RCRA cap is assumed. However, a small portion (approximately 4,700 SF) is currently paved will be repaved for that area as a final surface cover following cap construction, if practicable.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated 4 feet. Once excavated, this area will be backfilled with clean fill and revegetated or repaved to reflect existing conditions, as practicable. There will be no loss in current flood storage capacity or functionality after completion of the remedial actions. The portion of the property group that will be capped will be above the 100-year floodplain.

- No wetland impacts are anticipated. Wetlands that contain Raymark waste are present within the northeastern portion of this property group's boundary, however, this area will be addressed under a future OU3 remedial action for Ferry Creek.

Future Use Restrictions

- Due to the Raymark waste that will remain under the cap after completion of the excavation, Alternative 3 will include placement of institution controls on the 576/600 East Broadway property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: One monitoring well will be installed to support long-term groundwater monitoring, which will be complemented by four existing monitoring wells (MW-101 to MW-104). The existing monitoring wells are assumed to be functional and can be utilized for long-term groundwater monitoring. Because Raymark waste will remain above the seasonal high water table, all five wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: The O&M for Alternative 3 will require monthly cap inspections with annual reporting to summarize inspection findings and verify the effectiveness of institutional controls. A 30-year monitoring period is used in the present value cost analysis.

4.3.6.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Atl. 5) or Out-of-Town Disposal (Alt.6)

Detailed descriptions of Alternatives 5 and 6 are presented in Section 3.5.4. Raymark waste areas will be excavated to the seasonal high water table. Excavated material will be placed in an in-town consolidation area (Alternative 5) or an out-of-town disposal location (Alternative 6). The property group-specific details include the following:

Excavation Volumes/Final Cover

- Approximately 14,222 CY of Raymark waste will be excavated to the average seasonal high water table of 6 feet. Approximately 2,844 CY of non-Raymark waste soil will additionally be excavated to facilitate safety requirements such as benching/sloping of sidewalls to prevent collapse.

- Raymark waste in paved areas will be excavated to the water table and replaced with clean fill. The top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat. Raymark waste in unpaved areas will be excavated to the water table and replaced with a vegetated, permeable soil cover.

- Final property contours will be designed to meet 576/600 East Broadway and surrounding parcels at current elevations.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated to the seasonal high water table. Once excavated, this area will be backfilled with clean fill and revegetated or repaved with current elevations and drainage patterns retained so that the current flood storage capacity will not be diminished after completion of the remedial actions.

- No wetland impacts are anticipated. Wetlands that contain Raymark waste are present within the northeastern portion of this property group's boundary, however, Raymark

waste present in this area will be addressed under a future OU3 remedial action for Ferry Creek.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 5 and 6 will include placement of institutional controls on the 576/600 East Broadway property group to prohibit certain type of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: One monitoring well will be installed to support long-term groundwater monitoring, which will be complemented by four existing monitoring wells (MW-101 to MW-104). The existing monitoring wells are assumed to be functional and can be utilized for long-term groundwater monitoring. Because all Raymark waste above the seasonal high water table will be removed, all five wells will be monitored quarterly for 2 years, after which groundwater monitoring may no longer be required.
  Cap/Final Cover: Paved areas and vegetative covers must be inspected annually and maintained in good condition.

4.3.6.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8)

Detailed descriptions of Alternatives 7 and 8 are presented in Section 3.5.5. Raymark waste areas will be excavated to either a depth of 2 feet (current paved areas) or a depth of 4 feet (current unpaved areas). Excavated material will be placed in an in-town consolidation area (Alternative 7) or an out-of-town disposal location (Alternative 8). The property group-specific details include the following:

Excavation Volumes/Final Cover

- Approximately 348 CY of Raymark waste will be excavated 2 feet from currently paved areas, while an estimated 8,785 CY will be excavated 4 feet from currently unpaved areas.

- Raymark waste in paved areas will be excavated to a 2-foot depth and replaced with clean fill. The top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat. Raymark waste in unpaved areas will be excavated to a 4-foot depth and replaced with a vegetated, permeable soil cover.

- Final property contours will be designed to meet 576/600 East Broadway and surrounding parcels at current elevations.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated 2 or 4 feet. Once excavated, this area will be backfilled with clean fill and revegetated or repaved with current elevations and drainage patterns retained so that the current flood storage capacity will not be diminished after completion of the remedial actions.

- No wetland impacts are anticipated. Wetlands that contain Raymark waste are present within the northeastern portion of this property group's boundary, however, Raymark waste present in this area will be addressed under a future OU3 remedial action for Ferry Creek.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 7 and 8 will include placement of institutional controls on the 576/600 East Broadway property group to prohibit certain types of activities such as

excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: One monitoring well will be installed to support long-term groundwater monitoring, which will be complemented by four existing monitoring wells (MW-101 to MW-104). The existing monitoring wells are assumed to be functional and can be utilized for long-term groundwater monitoring. Because Raymark waste will remain above the seasonal high water table, all five wells will be monitored quarterly for 2 years, and annually thereafter. A 30 year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: Paved areas and vegetative covers must be inspected monthly and maintained in good condition. A 30 year monitoring period is used in the present value cost analysis.

4.3.6.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt.10)

Detailed descriptions of Alternatives 9 and 10 are presented in Section 3.5.6. Raymark waste areas will be excavated to a 4-foot depth. Excavated material will be placed in an in-town consolidation area (Alternative 9) or an out-of-town disposal location (Alternative 10). The property group-specific details include the following:

Excavation Volumes/Final Cover

- Approximately 9,481 CY of Raymark waste will be excavated to a 4-foot depth.
- Raymark waste in <u>paved</u> areas will be excavated to a 4-foot depth and replaced with clean fill. The top of fill is assumed to include an 18-inch thick layer of base materials

and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat. Raymark waste in unpaved areas will be excavated to a 4-foot depth and replaced with a vegetated, permeable soil cover.

- Final property contours will be designed to meet 576/600 East Broadway and surrounding parcels at current elevations.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated 4 feet. Once excavated, this area will be backfilled with clean fill and revegetated or repaved with current elevations and drainage patterns retained so that the current flood storage capacity will not be diminished after completion of the remedial actions.

- No wetland impacts are anticipated. Wetlands that contain Raymark waste are present within the northeastern portion of this property group's boundary. However, Raymark waste present in this area will be addressed under a future OU3 remedial action for Ferry Creek.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 9 and 10 will include placement of institutional controls on the 576/600 East Broadway property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: One monitoring well will be installed to support long-term groundwater monitoring, which will be complemented by four existing monitoring wells (MW-101 to MW-104). The existing monitoring wells are assumed to be functional and can be utilized for long-term groundwater monitoring. Because Raymark waste will remain above the seasonal high water table, all five wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: Paved areas and vegetative covers must be inspected monthly and maintained in good condition. A 30-year monitoring period is used in the present value cost analysis.

4.3.6.1.7 Treatment of Raymark Waste (applies to Alternatives 5 through 10)

Raymark waste treatment is presented in Section 3.1.3 for all property groups.

- Based on an evaluation of historical sampling data from <u>all</u> OU6 properties, it is assumed that approximately 10% of excavated Raymark waste will require treatment prior to disposal. Treatment will be required only when excavated materials exhibit concentrations of contaminants in excess of disposal requirements. All treatment will occur at an out-of-town facility.

- For alternatives featuring out-of-town disposal of Raymark waste (Alternatives 6, 8, and 10), the concentration thresholds for treatment will be 10 times UTS thresholds.

- For alternatives featuring in-town consolidation (Alternatives 5, 7, and 9), the concentration thresholds for treatment will be the PHC levels.

- Treatment volume estimates for 576/600 East Broadway are based on the assumed quantity of excavation required to implement each alternative. Note that the waste volumes are rounded up or down as appropriate.

- A 1.5 conversion factor from tons to cubic yards is used.

  - Alternative 3/4
    - Not applicable.

  - Alternatives 5/6
    - 14,222 CY RW excavated * 1.2 bulking factor = 17,067 CY
    - 17,067 CY * 1.5 TON/CY = 25,559 TON
    - 25,559 TON * 10% = **2,560 TONS to be treated (1,707 CY)**

  - Alternatives 7/8
    - 9,133 CY RW excavated * 1.2 bulking factor = 10,960 CY
    - 10,960 CY * 1.5 TON/CY = 16,440 TON
    - 16,440 TON * 10% = **1,644 TONS to be treated (1,096 CY)**

  - Alternatives 9/10
    - 9,481 CY RW excavated * 1.2 bulking factor = 11,378 CY
    - 11,378 CY * 1.5 TON/CY = 17,067 TON
    - 17,067 TON * 10% = **1,707 TONS to be treated (1,138 CY)**

4.3.6.2 Comparative Analysis of Alternatives for 576/600 East Broadway

This section presents the comparative analysis of alternatives for 576/600 East Broadway using the criteria described in Section 4.2. The comparative analysis of alternatives for this property group is summarized in a comparison format on Table 4-6A.

4.3.6.2.1 Overall Protection of Human Health and the Environment

Alternative 1 (No Action) will not protect human health or the environment. Alternative 2 (Restrictions with Long-Term Monitoring) can provide limited protection of human health and the environment, if restrictions are monitored and enforced. Alternatives 3 and 7 through 10 will achieve protection of human health and the environment through the excavation of varying amounts of Raymark waste (low-permeability cap for Alternative 3) and the use of institutional controls, rendering the contaminated waste inaccessible. Alternatives 5 and 6 will also protect

human health and the environment through the removal of all Raymark waste located above the seasonal high water table and the use of institutional controls.

4.3.6.2.2 Compliance with ARARs

Alternative 1 (No Action) and Alternative 2 (Restrictions with Long-Term Monitoring) will not comply with ARARs because contaminants in Raymark waste will remain accessible in soils in excess of CT RSRs and federal risk criteria.

The ARARs associated with the implementation of Alternatives 3 and 5 through 10 are presented in Section 4.0 of this FS and on Table 4-6C. Alternatives 3, 5, and 6 could be designed to comply with all chemical-specific, action-specific, and location-specific ARARs. Through excavation of Raymark waste to 2 feet (paved areas) or 4 feet (unpaved areas), Alternatives 7 through 10 will render the remaining contaminated soil inaccessible and will be compliant with the action-specific CT RSR Direct Exposure Criteria. Alternatives 7 through 10 may not comply with the numeric standards of CTDEP's Pollutant Mobility Criteria, however, the RSRs allow for variances and alternate criteria. Alternatives 7 through 10 will comply with all other chemical, action, and location-specific ARARs.

4.3.6.2.3 Long-Term Effectiveness and Permanence

The magnitude of residual human health risk associated with Raymark waste will be highest for Alternative 1 (No Action), since no actions will be taken to mitigate human health risks. Residual human health risks for Alternative 2 (Restrictions with Long-Term Monitoring) will be lower than Alternative 1, but still above acceptable human health risk levels.

Residual human health risks after implementation of Alternatives 3 and Alternatives 7 through 10 will be slightly higher than for Alternatives 5 and 6 because Raymark waste will be left in-place above the seasonal high water table. Alternatives 5 and 6 will be more reliable than Alternatives 3 and 7 through 10 because there will be no Raymark waste in-place above the seasonal high water table and protection of human health through direct contact or mobilization of contaminants by rainwater infiltration will not be dependent on maintenance of a low-permeable RCRA cap or a soil or paved cover.

Alternatives 3 and 7 through 10 can provide protection in the long-term if the cover systems are maintained. Alternatives 5 and 6 will provide the greatest protection to human health and will be the most permanent. Alternative 3 and 5 through 10 each could be designed to allow for redevelopment potential on the property group.

4.3.6.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment

No treatment will be required for Alternative 1 (No Action), Alternative 2 (Restrictions with Long-Term Monitoring) or Alternative 3 (Low-Permeability Cap with In-Town Consolidation). Alternatives 5 through 10 will require treatment prior to land disposal to address the assumed 10 percent fraction that exceeds the UTS or PHC levels. This treatment will result in the reduction of toxicity, mobility, and volume of Raymark waste. Although the estimated volumes that will require treatment are similar (ranging from 1,096 to 1,706 CY), Alternative 5 and 6 will result in the greatest amount of reduction because a larger quantity of materials will be shipped offsite and is expected to require treatment prior to disposal.

4.3.6.2.5 Short-Term Effectiveness

No on-site actions will be taken under Alternative 1 (No Action) and minimal on-site actions will be taken under Alternative 2 (Restrictions with Long-Term Monitoring); therefore, there will be no short-term impacts to the community, workers, or the environment. Short-term impacts to the community, workers, and the environment from the implementation of Alternatives 3 and 5 through 10 will be similar and can be mitigated using engineering controls.

Alternatives 5 and 6 will involve a higher volume of truck traffic to transport Raymark waste and backfill and will require a greater volume of Raymark waste handling than Alternatives 3 and 7 through 10.

Alternative 3 will take approximately 14 months to complete, while Alternatives 5 and 6 will each require approximately 10 months to complete. Alternatives 7 through 10 will each require approximately 8 months to complete. For Alternatives 5, 7, and 9, the estimated time to complete does not include the amount of time necessary to complete remedial activities at an in-town consolidation location.

4.3.6.2.6 Implementability

Alternative 3 (low-permeability cap), Alternatives 5 and 6 (excavation to water table), and Alternatives 7 through 10 (2 to 4-foot excavation) all require excavation, which can be implemented through standard construction and environmental remediation methods. Alternatives 3 and 7 through 10 require specific site grading, placement of cap/cover materials based on design specifications, and O&M in the future. Alternatives 5 and 6 will involve excavation of the largest volume of Raymark waste (14,222 CY) and any expansion of the Raymark waste area due to confirmatory sampling will lead to a larger volume of excavated Raymark waste compared to Alternative 7 through 10 due to the excavation depth to the seasonal high water table.

Additional remedial actions will be more difficult to implement for Alternative 3 due to the presence of a RCRA cap. Alternatives 7 through 10 are equally amenable to additional remedial actions at the property group, should they be deemed necessary. Alternatives 5 and 6 will be the most amenable to additional actions should they be necessary as all Raymark waste will be removed to the seasonal high water table.

Alternatives 3 and 7 through 10 will each require long-term groundwater monitoring. Alternatives 5 and 6 will require quarterly groundwater monitoring for only 2 years after which groundwater monitoring may no longer be required. Alternatives 3 and 7 through 10 will also require long term operation and maintenance of the cap or soil cover.

Alternatives 3 and 5 through 10 will be similar in terms of the ability to coordinate with other agencies.

Alternatives 3 and 5 through 10, each involve conventional construction methods for which the required equipment and technical specialists will be readily available.

4.3.6.2.7 Cost

A comparison of costs for each of the alternatives that were evaluated for 576/600 East Broadway is presented on Table 4-6B.

Table 4-6
Summary of Detailed Analysis for 576/600 East Broadway
Raymark OU6 - Additional Propertes
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4 -- Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal[1]	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8 – Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Overall Protection of Human Health and the Environment	Would not protect human health. RI did not indentify any significant habitats for ecological receptors.	Some protection of human health, but human health risks still above acceptable limits. RI did not indentify any significant habitats for ecological receptors.	Would protect human health through construction of a RCRA C-compliant cover (multi-component, drainage layer, gas vent layer, E-07 cm/s hydraulic conductivity) over Raymark waste. RI did not indentify any significant habitats for ecological receptors.	Would protect human health through the removal of Raymark waste and placement of clean soil in its place. RI did not indentify any significant habitats for ecological receptors.	Would protect human health through construction of an engineered barrier over Raymark waste. RI did not indentify any significant habitats for ecological receptors.	Would protect human health through construction of an engineered barrier over Raymark waste. RI did not indentify any significant habitats for ecological receptors.
Compliance with ARARs	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs.	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-6C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-6C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-6C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs with the use of alternate criteria. See Table 4-6C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs with the use of alternate criteria. See Table 4-6C.
Long-Term Effectiveness and Permanence	Magnitude of residual risk high. No risk reduction. 5-year reviews required. No O&M or controls included for long term. Would not achieve RAO.	Residual human health risks above acceptable limits. No risk reduction. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would not be adequate to protect human health for the long-term. Would not achieve RAO.	Residual risk within acceptable limits. Raymark waste willl be left-in place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness. Capping technology reliable. Would achieve RAO.	Residual risk within acceptable limits. Risk reduction would be permanent. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness. Would achieve RAO.	Residual risk within acceptable limits. Raymark waste willl be left-in place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness. Would achieve RAO.	Residual risk within acceptable limits. Raymark waste willl be left-in place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness. Would achieve RAO.
Reduction of Toxicity, Mobility, or Volume Through Treatment	None.	None.	Treatment not required since all Raymark waste will remain within the property group. Raymark Waste treated (tons)= 0 Raymark Waste treated (CY)= 0	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 2,560 Raymark Waste treated (CY)= 1,707	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 1,644 Raymark Waste treated (CY)= 1,096	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 1,707 Raymark Waste treated (CY)= 1,138
Short-Term Effectiveness	No actions, therefore no short-term impacts anticipated. Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures are applied. No adverse impacts to environment anticipated during implementation. Minimal on-site actions (well construction, signage, and fence installation, and groundwater sampling only). Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[2] = 6,400 Approximate truckloads of Raymark waste 533 Approximate truckloads of clean fill 533 Assume 12 CY per truckload. Approximate months to complete remedial action. 14 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[2] = 17,067 Approximate truckloads of Raymark waste 1422 Approximate truckloads of clean fill 1422 Assume12 CY per truckload. Approximate months to complete remedial action. For Alternative 5, this time frame does not include duration of capping activities at consolidation location. 10 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[2] = 10,960 Approximate truckloads of Raymark waste 913 Approximate truckloads of clean fill 913 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 7, this time frame does not include duration of capping activities at consolidation location. 8 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[2] = 11,378 Approximate truckloads of Raymark waste 948 Approximate truckloads of clean fill 948 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 9, this time frame does not include duration of capping activities at consolidation location. 8 Would achieve RAO.

Table 4-6
Summary of Detailed Analysis for 576/600 East Broadway
Raymark OU6 - Additional Propertes
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4 -- Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal[1]	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8 – Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Implementability	Not applicable.	Would be implementable, assuming cooperation by property owners. Would require coordination with state/town officials to perform O&M and to document compliance with institutional controls.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. May be difficult to implement additional remedial actions if required, because Raymark waste would be beneath RCRA C cover. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform long-term O&M and to document compliance with institutional controls. Required equipment and specialists readily available. Technology available and in full-scale use. Future development could be hindered by the presence of the low-permeability cap.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or building on 576 East Broadway would need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform short-term O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by the presence of Raymark waste left in place.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or building on 576 East Broadway would need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform long-term O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by the presence of Raymark waste left in place.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or building on 576 East Broadway would need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform short-term O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by the presence of Raymark waste left in place.
Cost	**<u>Alternative 1</u>** Capital: $0 O&M (Years 1-2): $0 O&M (Years 3-30): $0 Five-Year Reviews: $15,000/each PV of O&M: $32,367 PV of Alternative: $32,367 See Cost Estimate Backup Sheets in Appendix G.	**<u>Alternative 2</u>** Capital: $156,957 O&M (Years 1-2): $79,880 O&M (Years 3-30): $46,234 Five-Year Reviews: $15,000/each Present Value of O&M: $666,925 PV of Alternative: $823,882 See Cost Estimate Backup Sheets in Appendix G.	**<u>Alternative 3</u>** Capital: $2,735,437 O&M (Years 1-2): $75,612 O&M (Years 3-30): $41,966 Five-Year Reviews: $15,000/each PV of O&M: $613,959 PV of Alternative: $3,349,396 **<u>Alternative 4</u> (Not Applicable to 576 and 600 East Broadway Property Group)** Capital: NA O&M (Years 1-2): NA O&M (Years 3-30): NA Five-Year Reviews: NA PV of O&M: NA PV of Alternative: NA See Cost Estimate Backup Sheets in Appendix G.	**<u>Alternative 5</u>** Capital: $3,059,326 O&M (Years 1-2): $60,414 O&M (Years 3-30): $15,553 Five-Year Reviews: $15,000/each PV of O&M: $306,473 PV of Alternative: $3,365,799 **<u>Alternative 6</u>** Capital: $12,430,357 O&M (Years 1-2): $60,414 O&M (Years 3-30): $15,553 Five-Year Reviews: $15,000/each PV of O&M: $306,473 PV of Alternative: $12,736,830 See Cost Estimate Backup Sheets in Appendix G.	**<u>Alternative 7</u>** Capital: $2,074,496 O&M (Years 1-2): $74,028 O&M (Years 3-30): $40,382 Five-Year Reviews: $15,000/each PV of O&M: $594,298 PV of Alternative: $2,668,794 **<u>Alternative 8</u>** Capital: $8,092,074 O&M (Years 1-2): $74,028 O&M (Years 3-30): $40,382 Five-Year Reviews: $15,000/each PV of O&M: $594,298 PV of Alternative: $8,686,372 See Cost Estimate Backup Sheets in Appendix G.	**<u>Alternative 9</u>** Capital: $2,132,498 O&M (Years 1-2): $74,028 O&M (Years 3-30): $40,382 Five-Year Reviews: $15,000/each PV of O&M: $594,298 PV of Alternative: $2,726,796 **<u>Alternative 10</u>** Capital: $8,379,084 O&M (Years 1-2): $74,028 O&M (Years 3-30): $40,382 Five-Year Reviews: $15,000/each PV of O&M: $594,298 PV of Alternative: $8,973,382 See Cost Estimate Backup Sheets in Appendix G.

[1] Alternative 4 was not evaluated.
[2] A bulking factor of 1.2 was used.

Table 4-6A
Comparative Analysis of Alternatives for 576/600 East Broadway
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE[1]									
	1	2	3	4	5	6	7	8	9	10
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT										
Protection of Human Health	☐	☐	◘	NA	■	■	◘	◘	◘	◘
Protection of the Environment	☐	☐	◘	NA	■	■	◘	◘	◘	◘
COMPLIANCE WITH ARARs										
Chemical-Specific ARARs	☐	☐	■	NA	■	■	◘	◘	◘	◘
Location-Specific ARARs	NA	■	■	NA	■	■	◘	◘	◘	◘
Action-Specific ARARs	NA	■	■	NA	■	■	◘	◘	◘	◘
Other Criteria, Advisories, Guidance	NA	NA	■	NA	■	■	◘	◘	◘	◘
LONG-TERM EFFECTIVENESS AND PERMANENCE										
Magnitude of Residual Risk	☐	☐	◘	NA	■	■	◘	◘	◘	◘
Adequacy and Reliability of Controls	☐	☐	◘	NA	■	■	◘	◘	◘	◘
REDUCTION OF TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT										
Treatment/Recycling Processes Utilized	NA	NA	☐	NA	■	■	■	■	■	■
Amount of Hazardous Materials Destroyed or Treated	☐	☐	☐	NA	■	■	◘	◘	◘	◘
Degree of Expected Reductions in Tox, Mob, or Vol	☐	☐	☐	NA	■	■	◘	◘	◘	◘
Irreversibility	☐	☐	■	NA	■	■	■	■	■	■
Type and Quantity of [Process] Residuals	☐	☐	■	NA	■	■	■	■	■	■
SHORT-TERM EFFECTIVENESS										
Protection of Community During Remedial Actions	NA	■	◘	NA	◘	◘	◘	◘	◘	◘
Protection of Workers During Remedial Actions	NA	■	◘	NA	◘	◘	◘	◘	◘	◘
Environmental Impacts	■	■	◘	NA	◘	◘	◘	◘	◘	◘
Time Until Remedial Action Objectives are Achieved	☐	☐	◘	NA	◘	◘	◘	◘	◘	◘

Table 4-6A
Comparative Analysis of Alternatives for 576/600 East Broadway
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE[1]									
	1	2	3	4	5	6	7	8	9	10
IMPLEMENTABILITY										
Ability to Construct and Operate the Technology	NA	■	■	NA	■	■	■	■	■	■
Reliability of the Technology	NA	□	◘	NA	■	■	◘	◘	◘	◘
Ease of Undertaking Additional Remedial Actions, if Necessary	■	■	◘	NA	■	■	◘	◘	◘	◘
Ability to Monitor Effectiveness of the Remedy	NA	NA	◘	NA	◘	◘	◘	◘	◘	◘
Ability to Obtain Approvals from Other Agencies	■	■	■	NA	■	■	■	■	■	■
Coordination with Other Agencies	◘	◘	■	NA	■	■	■	■	■	■
Availability of Off-Site Treatment, Storage, and Disposal Services and Capacity	NA	NA	NA	NA	■	■	■	■	■	■
Availability of Necessary Equipment and Specialists	NA	■	■	NA	■	■	■	■	■	■
Availability of Prospective Technologies	NA	■	■	NA	■	■	■	■	■	■
COST										
Capital	$0	$156,957	$2,735,437	NA	$3,059,326	$12,430,357	$2,074,496	$8,092,074	$2,132,498	$8,379,084
Present Value of O&M (First 30 Years)	$32,367	$666,925	$613,959	NA	$306,473	$306,473	$594,298	$594,298	$594,298	$594,298
Present Value of the Alternative	$32,367	$823,882	$3,349,396	NA	$3,365,799	$12,736,830	$2,668,794	$8,686,372	$2,726,796	$8,973,382

[1] Alternative 4 was not evaluated.

Notes:

■ = Highest rating (most protective, most effective, most implementable)

◘ = Meets criterion, but another alternative(s) more protective/effective/implementable

□ = Does not meet criterion

Table 4-6B
Cost Estimate Summary for 576/600 East Broadway
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Excavation Depth (FT)	0	0	4	NA	6	6	2 or 4	2 or 4	4	4
Cap/Cover	NA	NA	RCRA C	NA	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover
Disposal Volumes (CY)										
In-Town Consolidation [1]			6,400	0	15,360	0	9,864	0	10,240	0
Out-of-Town Disposal (not treated)			0	0	0	15,360	0	9,864	0	10,240
Out-of-Town Disposal (treated)			0	0	1,707	1,707	1,096	1,096	1,138	1,138
Total Disposal Vol.			**6,400**	**0**	**17,067**	**17,067**	**10,960**	**10,960**	**11,378**	**11,378**
Cost										
Capital	**$0**	**$156,957**	**$2,735,437**	NA	**$3,059,326**	**$12,430,357**	**$2,074,496**	**$8,092,074**	**$2,132,498**	**$8,379,084**
O&M (present value)	**$32,367**	**$666,925**	**$613,959**	NA	**$306,473**	**$306,473**	**$594,298**	**$594,298**	**$594,298**	**$594,298**
Present Value	**$32,367**	**$823,882**	**$3,349,396**	NA	**$3,365,799**	**$12,736,830**	**$2,668,794**	**$8,686,372**	**$2,726,796**	**$8,973,382**

Notes:
[1] In-Town Consolidation disposal volume for Alternative 3 represents Raymark Waste to be excavated and consolidated under the the RCRA cap being constructed within the property grou
Alternative 1 - No Action
Alternative 2 - Restrictions with Long-Term Monitoring
Alternative 3 - Low-Permeability Cap with In-Town Consolidation
Alternative 4 - Low-Permeability Cap with Out-Of-Town Consolidation (Not Applicable to 576 and 600 East Broadway Property Group)
Alternative 5 - Excavation to the Water Table with In-Town Consolidation
Alternative 6 - Excavation to the Water Table with Out-Of-Town Disposal
Alternative 7 - Excavation to either 2 or 4 Feet with In-Town Consolidation
Alternative 8 - Excavation to either 2 or 4 Feet with Out-Of-Town Disposal
Alternative 9 - Excavation to 4 Feet with In-Town Consolidation
Alternative 10 - Excavation to 4 Feet with Out-Of-Town Disposal
NA = not applicable
FT = foot
CY = cubic yard
O&M = operations and maintenance

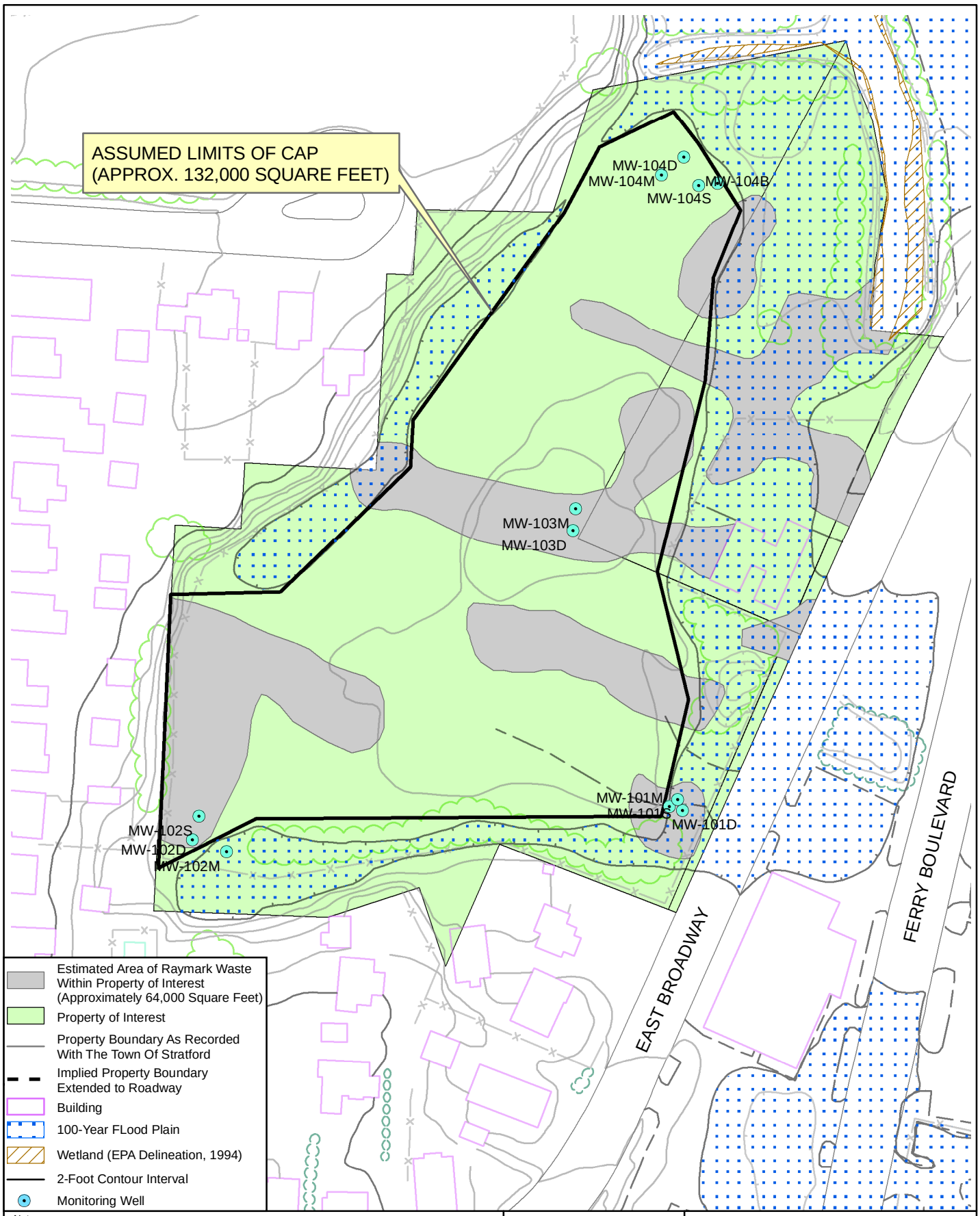
Table 4-6C
Preliminary ARAR Summary - 576/600 East Broadway
Raymark OU6 - Additional Properties
Stratford, Connecticut

Property Group	ARAR Tables				
	A	B	C	D	E
Alternative 1	X				
Alternative 2	X		X		
Alternative 3	X		X	X	X
Alternative 4[1]					
Alternative 5	X		X		
Alternative 6	X		X		
Alternative 7	X		X		
Alternative 8	X		X		
Alternative 9	X		X		
Alternative 10	X		X		

[1] Alternative 4 was not evaluated.

A = ARARs for all Alternatives
B = ARAR add-ons for an alternative for the Raymark waste located in the wetlands
C = ARAR add-ons for an alternative for the Raymark waste located in the floodplains
D = ARAR add-ons for alternatives that include low-permeability caps
E = ARAR add-ons for alternatives that include CAMUs

Note:
ARAR tables A-E are found in Volume II, Appendix C of this Feasibility Study.



Notes:
1) Plan not to be used for design.
2) All locations to be considered approximate.
3) Property boundaries are approximate based on Town of Stratford Engineering Department plans.
4) Floodplain extent based on Federal Emergency Management Agency Q3 Flood Data, Community Panel Numbers 090016 0001-0004, Revised June 16, 1992, FEMA, Washington D.C. and modified to Town of Stratford Engineering Plan 10-foot contour.
5) Adapted from TTNUS Remedial Investigation, 2005.

100 50 0 100 Feet

N

Nobis

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
(978) 683-0891
www.nobisengineering.com

FIGURE 4-6

576/600 EAST BROADWAY
FEASABILITY STUDY
RAYMARK SUPERFUND SITE
STRATFORD, CONNECTICUT

Drawn By: D. McGrath	Approved By: H. Ford
Project: 80006	Date: 9/3/09 Rev00

R:\80000 Task Orders\80006 Raymark\Technical Data\GIS_Data\Figures\OU6_FS_Figures\Figure_04-06_576_600_East_Broadway.mxd

4.3.7 Vacant DOT Lot Abutting I-95 Property

The Vacant DOT Lot Abutting I-95 was evaluated as part of the OU6 Remedial Investigation (RI) report (TtNUS, 2005). This parcel encompasses approximately 2.4 acres of commercially-zoned land located on the western side of Ferry Boulevard in Stratford, Connecticut (see Figure 4-7). The property is bordered by Ferry Boulevard to the east, 335 Ferry Boulevard and Ferry Creek to the south, Interstate-95 (I-95) to the north, and a vacant lot to the west. Portions of the property abut the 345 Ferry Boulevard property to the west, north, and east. Two other OU6 properties, 576 and 600 East Broadway (Section 4.4.6), are located on the other side of Ferry Creek. The property is undeveloped and vegetated with grasses, trees, and shrubs, with some paved sidewalks. Approximately 50 percent of this property is a steep embankment along I-95. A large portion of the property group lies within the 100-year floodplain.

Key factors associated with the areas and volumes to be addressed at this property group include:

- Raymark waste area: .....9,133 SF (Figure 4-7)
- Total volume of Raymark waste:.....2,606 CY
- Maximum depth of Raymark waste:.....8 feet bgs
- Average depth to the seasonal high groundwater table:.....8 feet
- Raymark waste area outside of 100-year floodplain: ..... 1,133 SF
- Raymark waste area in 100-year floodplain:..... 8,000 SF
- Raymark waste in 100-year floodplain to 8 FT:.....2,370 CY (8,000 SF x 8 FT)
- Raymark waste area under pavement: ..... 4,566 SF
- Raymark waste in unpaved areas:..... 4,567 SF
- Raymark waste located below the water table:.....0 CY
- Alternative 3/4:
  - Raymark waste under pavement to 2.5 FT: ..... 423 CY (4,566 SF X 2.5 FT)
  - Raymark waste in unpaved area to 3 FT: .....507 CY 9 4567 CY x 3 FT)
- Alternative 5/6:
  - Raymark waste located above the water table: .....2,706 CY (9,133 FT x 8 FT)
- Alternative 7/8:
  - Raymark waste under pavement to 2 FT: .....338 CY (4,566 SF x 2 FT)
  - Raymark waste in unpaved area to 4 FT: .....677 CY (4,567 SF x 4 FT)

- Alternative 9/10:
  - Raymark waste to 4 FT: .....1,353 CY (9,133 SF x 4 FT)

The calculation of the average depth to the seasonal high water table of 8 feet below ground surface (bgs) is based on observations of water levels from soil borings advanced in the area. The calculation of the maximum depth of Raymark waste is based on data collected during the RI (TtNUS, 2005).

The detailed analysis of alternatives for this property group is presented below and consists of the following components:

- A list of key assumptions (Section 4.3.7.1) that is used as the basis for the detailed analysis of alternatives and for the development of costs for the FS;
- Figure 4-7, which shows a map of Vacant DOT Lot Abutting I-95, the delineated Raymark waste area, the 100-year floodplain, and the proposed cap footprint;
- Table 4-7, which presents the individual detailed analysis of alternatives for Vacant DOT Lot Abutting I-95 in tabular form;
- The comparative analysis of alternatives for Vacant DOT Lot Abutting I-95, presented in text form;
- Table 4-7A, which presents a tabular summary of the comparative analysis;
- Table 4-7B, which presents a summary of cost estimates for each of the alternatives;
- Table 4-7C, which provides a summary of ARARs for each of the Vacant DOT Lot Abutting I-95 alternatives; and
- Cost Estimate Backup Sheets for the FS cost estimates, which are presented in Appendix G.

4.3.7.1 Vacant DOT Lot Abutting I-95 Assumptions

Key assumptions associated with each alternative are presented in this section. Pairs of alternatives (3 and 4, 5 and 6, 7 and 8, and 9 and 10) have the same components except for the disposal of Raymark waste which is either in-town or out-of-town. See Section 3.3 for details on the Remedial Alternatives discussed below. See Table 4-7 for a summary of the details on the analysis for the Vacant DOT Lot Abutting 1-95 property group.

4.3.7.1.1 Alternative 1 – No Action

Detailed descriptions of the no action alternative are presented in Section 3.5.1.

4.3.7.1.2 Alternative 2 – Restrictions with Long-Term Monitoring

Detailed descriptions of Alternative 2 are presented in Section 3.5.2. Property group-specific details include the following:

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group, Alternative 2 will include placement of institutional controls on the Vacant DOT Lot Abutting 1-95 property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

Operation and Maintenance

- Groundwater Monitoring: Seven monitoring wells will be installed to support long-term groundwater monitoring, which will be complemented by two existing monitoring wells (MW-503 and MW 212). The existing monitoring wells are assumed to be functional and can be used for long-term groundwater monitoring. Because Raymark waste will remain above the seasonal high water table, all nine wells will be monitored quarterly for 2 years, and annually thereafter.

- Existing Surfaces: Monthly surface inspections of both pavement and vegetative covers will be required along with annual reporting to summarize inspection findings and to verify the effectiveness of institutional controls.

4.3.7.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4)

Detailed descriptions of Alternatives 3 and 4 are presented in Section 3.5.3. Raymark waste areas will be excavated 2.5 feet in paved areas and 3 feet in unpaved areas. Raymark waste

within the property group will be consolidated under 3 RCRA caps. Due to the non-contiguous nature of waste delineated within the Vacant DOT Lot Abutting 1-95 property group, additional excavation will be conducted between waste locations to facilitate construction of the RCRA caps to maintain existing grades after remedial action implementation. Additionally, the clean, uncontaminated excavated soil will be staged for future use during cap construction. Excavated materials will be placed at an in-town consolidation area (Alternative 3) or an out-of-town disposal location (Alternative 4). The property group-specific details for Alternative 3 and 4 include the following:

Excavation Volumes/Final Cover

- Approximately 930 CY of Raymark waste and 1,985 CY of non-Raymark waste soil will be excavated 2.5 or 3 feet.
- Three low permeable RCRA caps with a total footprint of approximately 27,000 square feet (0.62 acres) will be constructed over non-contiguous Raymark waste present on the property group (Figure 4-7).
- Final property contours will be designed to meet Vacant DOT Lot Abutting 1-95 and surrounding parcels at current elevations.
- The current ground surface within the Raymark waste area on this property group is covered with grass, therefore a vegetated RCRA cap is assumed. However, a portion (approximately 4,566 SF) is currently paved and will be repaved as a final surface cover following cap construction, if practicable.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated 2.5 or 3 feet. Once excavated, this area will be backfilled with clean fill and revegetated or repaved to reflect existing conditions, as practicable. There will be no loss in current flood storage capacity or functionality after completion of the remedial actions.

- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain under the cap after completion of the excavation, Alternatives 3 and 4 will include placement of institutional controls on the Vacant DOT Lot Abutting 1-95 property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Seven monitoring wells will be installed to support long-term groundwater monitoring, which will be complemented by two existing monitoring wells (MW-503 and MW 212). The existing monitoring wells are assumed to be functional and can be used for long-term groundwater monitoring. Because Raymark waste will remain above the seasonal high water table, all nine wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: The O&M for Alternatives 3 and 4 will require monthly cap inspections with annual reporting to summarize inspection findings and verify the effectiveness of institutional controls. A 30-year monitoring period is used in the present value cost analysis.

4.3.7.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6)

Detailed descriptions of Alternatives 5 and 6 are presented in Section 3.5.4. Raymark waste areas will be excavated to the seasonal high water table. Excavated material will be placed in an in-town consolidation area (Alternative 5) or an out-of-town disposal location (Alternative 6). The property group-specific details include the following:

Excavation Volumes/Final Cover

- Approximately 2,706 CY of Raymark waste will be excavated to the average seasonal high water table of 8 feet Approximately 620 of non-Raymark waste soil will additionally be excavated to facilitate safety requirements such as benching/sloping of sidewalls to prevent collapse.

- Raymark waste in currently paved areas will be excavated to the water table and replaced with clean fill. The top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 30inches which includes a layer of binder coarse and a layer of top coat. Raymark waste in unpaved areas will be excavated to the water table and replaced with a vegetated, permeable soil cover.

- Final property contours will be designed to meet Vacant DOT Lot Abutting 1-95 and surrounding parcels at current elevations.

- Because all Raymark waste is located above the seasonal high water table, complete excavation of all Raymark waste will occur.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated the seasonal high water table. Once excavated, this area will be backfilled with clean fill and revegetated or repaved with current elevations and drainage patterns retained so that the current flood storage capacity will not be diminished after completion of the remedial actions.

- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- No future use restrictions are anticipated as all Raymark waste will be removed.

Operation and Maintenance

- Groundwater Monitoring: Seven monitoring wells will be installed to support long-term groundwater monitoring, which will be complemented by two existing monitoring wells (MW-503 and MW 212). The existing monitoring wells are assumed to be functional and can be used for long-term groundwater monitoring. To verify that all Raymark waste is removed from the property group, all nine wells will be monitored quarterly for 2 years, after which groundwater monitoring may no longer be required.

4.3.7.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8)

Detailed descriptions of Alternatives 7 and 8 are presented in Section 3.5.5. Raymark waste areas will be excavated to either a depth of 2 feet (current paved areas) or a depth of 4 feet (current unpaved areas). Excavated material will be placed in an in-town consolidation area (Alternative 7) or an out-of-town disposal location (Alternative 8). The property group-specific details include the following:

Excavation Volumes/Final Covers

- Approximately 338 CY of Raymark waste will be excavated 2 feet from currently paved areas, while an estimated 677 CY will be excavated 4 feet from currently unpaved areas.
- Raymark waste in currently paved areas will be excavated to a 2-foot depth and replaced with clean fill. The top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat. Raymark waste in unpaved areas will be excavated to a 4-foot depth and replaced with a vegetated, permeable soil cover.
- Final property contours will be designed to meet Vacant DOT Lot Abutting 1-95 and surrounding parcels at current elevations.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated 2 or 4 feet. Once excavated, this area will be backfilled with

clean fill and revegetated with current elevations and drainage patterns retained so that the current flood storage capacity will not be diminished after completion of the remedial actions.

- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 7 and 8 will include placement of institutional controls on the Vacant DOT Lot Abutting I-95 property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Seven monitoring wells will be installed to support long-term groundwater monitoring, which will be complemented by two existing monitoring wells (MW-503 and MW 212). The existing monitoring wells are assumed to be functional and can be used for long-term groundwater monitoring. Because Raymark waste will remain above the seasonal high water table, all nine wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: Paved areas and vegetative covers must be inspected monthly and maintained in good condition. A 30-year monitoring period is used in the present value cost analysis.

4.3.7.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10)

Detailed descriptions of Alternatives 9 and 10 are presented in Section 3.5.7. Raymark waste areas will be excavated to a 4-foot depth. Excavated material will be placed in an in-town consolidation area (Alternative 9) or an out-of-town disposal location (Alternative 10). The property group-specific details include the following:

Excavation Volumes /Final Cover

- Approximately 1,353 CY of Raymark waste will be excavated to a 4-foot depth.
- Raymark waste in paved areas will be excavated to a 4-foot depth and replaced with clean fill. The top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat. Raymark waste in unpaved areas will be excavated to a 4-foot depth and replaced with a vegetated, permeable soil cover.
- Final property contours will be designed to meet Vacant DOT Lot Abutting 1-95 and surrounding parcels at current elevations.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated to 4 feet. Once excavated, this area will be backfilled with clean fill and revegetated or repaved with current elevations and drainage patterns retained so that the current flood storage capacity will not be diminished after completion of the remedial actions.

- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 9 and 10 will include placement of institutional controls on the Vacant DOT Lot Abutting 1-95 property group to prohibit certain types of activities such

as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Seven monitoring wells will be installed to support long-term groundwater monitoring, which will be complemented by two existing monitoring wells (MW-503 and MW 212). The existing monitoring wells are assumed to be functional and can be used for long-term groundwater monitoring. Because Raymark waste will remain above the seasonal high water table, all nine wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: Paved areas and vegetative covers must be inspected monthly and maintained in good condition. A 30-year monitoring period is used in the present value cost analysis.

4.3.7.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10)

Raymark waste treatment is presented in Section 3.1.3 for all property groups.

- Based on an evaluation of historical sampling data from <u>all</u> OU6 properties, it is assumed that approximately 10% of excavated Raymark waste will require treatment prior to disposal. Treatment will be required only when excavated materials exhibit concentrations of contaminants in excess of disposal requirements. All treatment will occur at an out-of-town facility.

- For alternatives featuring out-of-town disposal of Raymark waste (Alternatives 4, 6, 8, and 10), the concentration thresholds for treatment will be 10 times UTS thresholds.

- For alternatives featuring in-town consolidation (Alternatives 3, 5, 7, and 9), the concentration thresholds for treatment will be the PHC levels.

- Treatment volume estimates for Vacant DOT Lot Abutting I-95 are based on the assumed quantity of excavation required to implement each alternative. Note that the waste volumes are rounded up or down as appropriate.

- A 1.5 conversion factor from tons to cubic yards is used.

  - <u>Alternatives 3/4</u>
    - 930 CY RW excavated * 1.2 bulking factor = 1,116 CY
    - 1,116 CY X 1.5 TON/CY = 1,674 TON
    - 1,674 TON * 10% = **167 TONS to be treated (112 CY)**

  - <u>Alternatives 5/6</u>
    - 2,706 CY RW excavated * 1.2 bulking factor = 3,247 CY
    - 3,247 CY * 1.5 TON/CY = 4,871 TON
    - 4,871 TON * 10% = **487 TONS to be treated (325 CY)**

  - <u>Alternatives 7/8</u>
    - 1,015 CY RW excavated * 1.2 = 1,218 CY
    - 1,218 CY * 1.5 TON/CY = 1,827 TON
    - 1,827 TON * 10% = **183 TONS to be treated (122 CY)**

  - <u>Alternatives 9/10</u>
    - 1,353 CY RW excavated * 1.2 = 1,624 CY
    - 1,624 CY * 1.5 TON/CY = 2,435 TON
    - 2,435 TON * 10% = **244 TONS to be treated (162 CY)**

4.3.7.2 Comparative Analysis of Alternatives for Vacant DOT Lot Abutting I-95

This section presents the comparative analysis of alternatives for the Vacant DOT Lot abutting I-95 using the criteria described in Section 4.2. The comparative analysis of alternatives for this property is summarized in comparison format on Table 4-7A.

4.3.7.2.1 Overall Protection of Human Health and the Environment

Alternative 1 (No Action) will not protect human health or the environment. Alternative 2 (Restrictions with Long-Term Monitoring) can provide limited protection of human health and the environment, if restrictions are monitored and enforced. Alternatives 3 and 4 and 7 through 10 will achieve protection of human health and the environment through the excavation of varying amounts of Raymark waste (low-permeability cap for Alternatives 3 and 4) and the use of institutional controls, rendering the contaminated waste inaccessible. Alternatives 5 and 6 will also protect human health and the environment through the removal of all Raymark waste located on the property group.

4.3.7.2.2 Compliance with ARARs

Alternative 1 (No Action) and Alternative 2 (Restrictions with Long-Term Monitoring) will not comply with ARARs because contaminants in Raymark waste will remain accessible in soils in excess of CT RSRs and federal risk criteria.

The ARARs associated with the implementation of Alternatives 3 through 10 are presented in Section 4.0 of this FS and on Table 4-7C. Alternatives 3 through 6 could be designed to comply with all chemical-specific, action-specific, and location-specific ARARs. Through excavation of Raymark waste to 2 feet (paved areas) or 4 feet (unpaved areas), Alternatives 7 through 10 will render the remaining contaminated soil inaccessible and will be compliant with the action-specific CT RSR Direct Exposure Criteria. Alternatives 7 through 10 may not comply with the numeric standards of CTDEP's Pollutant Mobility Criteria, however, the RSRs allow for variances and alternate criteria. Alternatives 7 through 10 will comply with all other chemical, action, and location-specific ARARs.

4.3.7.2.3 Long-Term Effectiveness and Permanence

The magnitude of residual human health risk associated with Raymark waste will be highest for Alternative 1 (No Action), since no actions will be taken to mitigate human health risks. Residual human health risks for Alternative 2 (Restrictions with Long-Term Monitoring) will be lower than Alternative 1, but still above acceptable human health risk levels.

Residual human health risks after implementation of Alternatives 3 and 4 and Alternatives 7 through 10 will be slightly higher than for Alternatives 5 and 6 because Raymark waste will be left in-place above the water table. Alternative 5 and 6 will be more reliable than Alternatives 3 and 4 and 7 through 10 because all Raymark waste will be excavated and protection of human health through direct contact or mobilization of contaminants by rainwater infiltration will not be dependent on maintenance of a low-permeable RCRA cap or a soil or paved cover.

Alternatives 3 and 4, and 7 through 10 can provide protection in the long-term if the cover systems are maintained. Alternatives 5 and 6 will provide the greatest protection to human health and will be the most permanent. Alternative 3 through 10 could each be designed to allow for redevelopment potential on the property group.

4.3.7.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment

No treatment will be required for Alternative 1 (No Action) or Alternative 2 (Restrictions with Long-Term Monitoring). Alternatives 3 through 10 will require treatment prior to land disposal to address the assumed 10 percent fraction that exceeds the UTS or PHC levels. This treatment will result in the reduction of toxicity, mobility, and volume of Raymark waste. Although the estimated volumes that will require treatment are similar (ranging from 112 to 325 CY), Alternatives 5 and 6 will result in the greatest amount of reduction because a larger quantity of materials will be shipped offsite and is expected to require treatment prior to disposal.

4.3.7.2.5 Short-Term Effectiveness

No on-site actions will be taken under Alternative 1 (No Action) and minimal on-site actions will be taken under Alternative 2 (Restrictions with Long-Term Monitoring); therefore, there will be no short-term impacts to the community, workers, or the environment. Short-term impacts to

the community, workers, and the environment from the implementation of Alternatives 3 through 10 will be similar and can be mitigated using engineering controls.

Alternatives 5 and 6 will involve a higher volume of truck traffic to transport Raymark waste and backfill and will require a greater volume of Raymark waste handling than Alternatives 3 and 4 and 7 through 10.

Alternatives 3 and 4 will take approximately 2 months to complete, while Alternatives 5 through 10 will each require approximately 4 months to complete. For Alternatives 3, 5, 7, and 9, the estimated time to complete does not include the amount of time necessary to complete remedial activities at an in-town consolidation location.

4.3.7.2.6 Implementability

Alternatives 3 and 4 (low-permeability cap), Alternatives 5 and 6 (excavation to water table), and Alternatives 7 through 10 (2 to 4-foot excavation) all require excavation, which can be implemented through standard construction and environmental remediation methods. Alternatives 3 and 4 and 7 through 10 require specific site grading, placement of cap/cover materials based on design specifications, and O&M in the future. Alternatives 5 and 6 will involve excavation of the largest volume of Raymark waste (2,706 CY), and any expansions of the Raymark waste area due to confirmatory sampling will lead to a larger volume of excavated Raymark waste compared to Alternative 7 through 10 due to the excavation depth to the seasonal high water table.

Additional remedial actions will be more difficult to implement for Alternatives 3 and 4 due to the presence of a RCRA cap. Alternatives 7 through 10 are equally amenable to additional remedial actions at the property group, should they be deemed necessary. Alternatives 5 and 6 will be the most amenable to additional actions should they be necessary as all Raymark waste will be removed from the property group.

Alternatives 3 and 4 and Alternatives 7 through 10 will each require long-term groundwater monitoring. Alternatives 5 and 6 will require quarterly groundwater monitoring for only 2 years, after which groundwater monitoring may no longer be required. Alternatives 3 and 4 and 7 through 10 will also require long-term operation and maintenance of the cap or soil cover.

Long-term operation and maintenance requirements would not be required for Alternatives 5 and 6 as all Raymark waste will be removed from the property group.

Alternatives 3 through 10 will be similar in terms of the ability to coordinate with other agencies.

For Alternatives 3 through 10, each involves conventional construction methods for which the required equipment and technical specialists will be readily available.

4.3.7.2.7 Cost

A comparison of costs for each of the alternatives that were evaluated for Vacant DOT Lot Abutting 1-95 is presented on Table 4-7B.

Table 4-7
Summary of Detailed Analysis for Vacant DOT Lot Abutting I-95
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4 – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8 – Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Overall Protection of Human Health and the Environment	Would not protect human health. RI did not indentify any significant habitats for ecological receptors.	Some protection of human health, but human health risks still above acceptable limits. RI did not indentify any significant habitats for ecological receptors.	Would protect human health through construction of a RCRA C-compliant cover (multi-component, drainage layer, gas vent layer, E-07 cm/s hydraulic conductivity), over Raymark waste. RI did not indentify any significant habitats for ecological receptors.	Would protect human health through the removal of Raymark waste and placement of clean soil in its place. RI did not indentify any significant habitats for ecological receptors.	Would protect human health through construction of an engineered barrier over Raymark waste. RI did not indentify any significant habitats for ecological receptors.	Would protect human health through construction of an engineered barrier over Raymark waste. RI did not indentify any significant habitats for ecological receptors.
Compliance with ARARs	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs.	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-7C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-7C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-7C.	Would comply with chemcial-specific (RSRs) and action-specific (RCRA) ARARs with the use of waivers and/or alternate criteria. See Table 4-7C.	Would comply with chemcial-specific (RSRs) and action-specific (RCRA) ARARs with the use of waivers and/or alternate criteria. See Table 4-7C.
Long-Term Effectiveness and Permanence	Magnitude of residual risk high. No risk reduction. 5-year reviews required. No O&M or controls included for long term.	Residual human health risks above acceptable limits. No risk reduction. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would not be adequate to protect human health for the long-term.	Residual risk within acceptable limits. Raymark waste willl be left-in place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness. Capping technology reliable. Additional design analysis of cap in floodplains will be required during remedial design phase.	Residual risk within acceptable limits. Risk reduction would be permanent. Controls would be adequate to ensure long-term effectiveness.	Residual risk within acceptable limits. Raymark waste willl be left-in place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.	Residual risk within acceptable limits. Raymark waste willl be left-in place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.
Reduction of Toxicity, Mobility, or Volume Through Treatment	None.	None.	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 167 Raymark Waste treated (CY)= 112	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 487 Raymark Waste treated (CY)= 325	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 183 Raymark Waste treated (CY)= 122	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 244 Raymark Waste treated (CY)= 162
Short-Term Effectiveness	No actions, therefore no short-term impacts anticipated. Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures are applied. No adverse impacts to environment anticipated during implementation. Minimal on-site actions (well construction, signage, and fence installation, and groundwater sampling only). Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1] = 1,116 Approximate truckloads of Raymark waste 93 Approximate truckloads of clean fill 93 Assume 12 CY per truckload. Approximately months to complete remedial action. For Alternative 3, this time frame does not include duration of capping activities at consolidation location. 2 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1] = 3,247 Approximate truckloads of Raymark waste 271 Approximate truckloads of clean fill 271 Assume 12 CY per truckload. Approximately months to complete remedial action. For Alternative 5, this time frame does not include duration of capping activities at consolidation location. 4 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1] = 1,218 Approximate truckloads of Raymark waste 101 Approximate truckloads of clean fill 101 Assume 12 CY per truckload. Approximately months to complete remedial action. For Alternative 7, this time frame does not include duration of capping activities at consolidation location. 4 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1] = 1,624 Approximate truckloads of Raymark waste 135 Approximate truckloads of clean fill 135 Assume 12 CY per truckload. Approximately months to complete remedial action. For Alternative 9, this time frame does not include duration of capping activities at consolidation location. 4 Would achieve RAO.

Table 4-7
Summary of Detailed Analysis for Vacant DOT Lot Abutting I-95
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4 – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8 – Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Implementability	Not applicable.	Would be implementable, assuming cooperation by property owners. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. May be difficult to implement additional remedial actions if required, because Raymark waste would be beneath RCRA C cover. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development could be hindered by the presence of the low-permeability cap.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to performO&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by the presence of Raymark waste left in-place.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by the presence of Raymark waste left in-place.
Cost	**Alternative 1** Capital: $0 O&M (Years 1-2): $0 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: $21,578 PV of Alternative: $21,578 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 2** Capital: $67,542 O&M (Years 1-2): $95,886 O&M (Years 3-30): $43,254 Five-Year Reviews: $10,000/each PV of O&M: $653,481 PVof Alternative: $721,023 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 3** Capital: $872,908 O&M (Years 1-2): $94,578 O&M (Years 3-30): $41,946 Five-Year Reviews: $10,000/each PV of O&M: $637,248 PV of Alternative: $1,510,155 **Alternative 4** Capital: $1,484,044 O&M (Years 1-2): $94,578 O&M (Years 3-30): $41,946 Five-Year Reviews: $10,000/each PV of O&M: $637,248 PV of Alternative: $2,121,292 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 5** Capital: $726,174 O&M (Years 1-2): $70,175 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: $126,878 PV of Alternative: $853,053 **Alternative 6** Capital: $2,510,289 O&M (Years 1-2): $70,175 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: $126,878 PV of Alternative: $2,637,167 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 7** Capital: $471,652 O&M (Years 1-2): $80,989 O&M (Years 3-30): $19,586 Five-Year Reviews: $10,000/each PV of O&M: $375,636 PV of Alternative: $847,288 **Alternative 8** Capital: $1,138,993 O&M (Years 1-2): $80,989 O&M (Years 3-30): $19,586 Five-Year Reviews: $10,000/each PV of O&M: $375,636 PV of Alternative: $1,514,629 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 9** Capital: $528,091 O&M (Years 1-2): $80,989 O&M (Years 3-30): $19,586 Five-Year Reviews: $10,000/each PV of O&M: $375,636 PV of Alternative: $903,727 **Alternative 10** Capital: $1,417,846 O&M (Years 1-2): $80,989 O&M (Years 3-30): $19,586 Five-Year Reviews: $10,000/each PV of O&M: $375,636 PV of Alternative: $1,793,482 See Cost Estimate Backup Sheets in Appendix G.

[1] A bulking factor of 1.2 was used.

Table 4-7A
Comparative Analysis of Alternatives for Vacant DOT Lot Abutting I-95
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	2	3	4	5	6	7	8	9	10
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT										
Protection of Human Health	☐	☐	◘	◘	■	■	◘	◘	◘	◘
Protection of the Environment	☐	☐	◘	◘	■	■	◘	◘	◘	◘
COMPLIANCE WITH ARARs										
Chemical-Specific ARARs	☐	☐	■	■	■	■	◘	◘	◘	◘
Location-Specific ARARs	NA	■	■	■	■	■	◘	◘	◘	◘
Action-Specific ARARs	NA	■	■	■	■	■	◘	◘	◘	◘
Other Criteria, Advisories, Guidance	NA	NA	■	■	■	■	◘	◘	◘	◘
LONG-TERM EFFECTIVENESS AND PERMANENCE										
Magnitude of Residual Risk	☐	☐	◘	◘	■	■	◘	◘	◘	◘
Adequacy and Reliability of Controls	☐	☐	◘	◘	■	■	◘	◘	◘	◘
REDUCTION OF TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT										
Treatment/Recycling Processes Utilized	NA	NA	☐	☐	■	■	■	■	■	■
Amount of Hazardous Materials Destroyed or Treated	☐	☐	☐	☐	■	■	◘	◘	◘	◘
Degree of Expected Reductions in Tox, Mob, or Vol	☐	☐	☐	☐	■	■	◘	◘	◘	◘
Irreversibility	☐	☐	■	■	■	■	■	■	■	■
Type and Quantity of [Process] Residuals	☐	☐	■	■	■	■	■	■	■	■
SHORT-TERM EFFECTIVENESS										
Protection of Community During Remedial Actions	NA	■	◘	◘	◘	◘	◘	◘	◘	◘
Protection of Workers During Remedial Actions	NA	■	◘	◘	◘	◘	◘	◘	◘	◘
Environmental Impacts	■	■	◘	◘	◘	◘	◘	◘	◘	◘
Time Until Remedial Action Objectives are Achieved	☐	☐	◘	◘	◘	◘	◘	◘	◘	◘

Table 4-7A
Comparative Analysis of Alternatives for Vacant DOT Lot Abutting I-95
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	2	3	4	5	6	7	8	9	10
IMPLEMENTABILITY										
Ability to Construct and Operate the Technology	NA	■	■	■	■	■	■	■	■	■
Reliability of the Technology	NA	□	◘	◘	■	■	◘	◘	◘	◘
Ease of Undertaking Additional Remedial Actions, if Necessary	■	■	◘	◘	■	■	◘	◘	◘	◘
Ability to Monitor Effectiveness of the Remedy	NA	NA	◘	◘	◘	◘	◘	◘	◘	◘
Ability to Obtain Approvals from Other Agencies	■	■	■	■	■	■	■	■	■	■
Coordination with Other Agencies	◘	◘	■	■	■	■	■	■	■	■
Availability of Off-Site Treatment, Storage, and Disposal Services and Capacity	NA	NA	NA	NA	■	■	■	■	■	■
Availability of Necessary Equipment and Specialists	NA	■	■	■	■	■	■	■	■	■
Availability of Prospective Technologies	NA	■	■	■	■	■	■	■	■	■
COST										
Capital	$0	$67,542	$872,908	$1,484,044	$726,174	$2,510,289	$471,652	$1,138,993	$528,091	$1,417,846
Present Value of O&M (First 30 Years)	$21,578	$653,481	$637,248	$637,248	$126,878	$126,878	$375,636	$375,636	$375,636	$375,636
Present Value of the Alternative	$21,578	$721,023	$1,510,155	$2,121,292	$853,053	$2,637,167	$847,288	$1,514,629	$903,727	$1,793,482

Notes:

■ = Highest rating (most protective, most effective, most implementable)

◘ = Meets criterion, but another alternative(s) more protective/effective/implementable

□ = Does not meet criterion

Table 4-7B
Cost Estimate Summary for Vacant DOT Lot Abutting I-95
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Excavation Depth, ft	0	0	3	3	8	8	2 or 4	2 or 4	4	4
Cap/Cover	NA	NA	RCRA C	RCRA C	NA	NA	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover
Disposal Volumes (CY)										
In-Town Consolidation			1005	0	2923	0	1096	0	1461	0
Out-of-Town (not treated)			0	1005	0	2923	0	1096	0	1461
Out-of-Town (treated)			112	112	325	325	122	122	162	162
Total Disposal Vol.			**1116**	**1116**	**3247**	**3247**	**1218**	**1218**	**1624**	**1624**
Cost										
Capital	**$0**	**$67,542**	**$872,908**	**$1,484,044**	**$726,174**	**$2,510,289**	**$471,652**	**$1,138,993**	**$528,091**	**$1,417,846**
O&M (present value)	**$21,578**	**$653,481**	**$637,248**	**$637,248**	**$126,878**	**$126,878**	**$375,636**	**$375,636**	**$375,636**	**$375,636**
Present Value	**$21,578**	**$721,023**	**$1,510,155**	**$2,121,292**	**$853,053**	**$2,637,167**	**$847,288**	**$1,514,629**	**$903,727**	**$1,793,482**

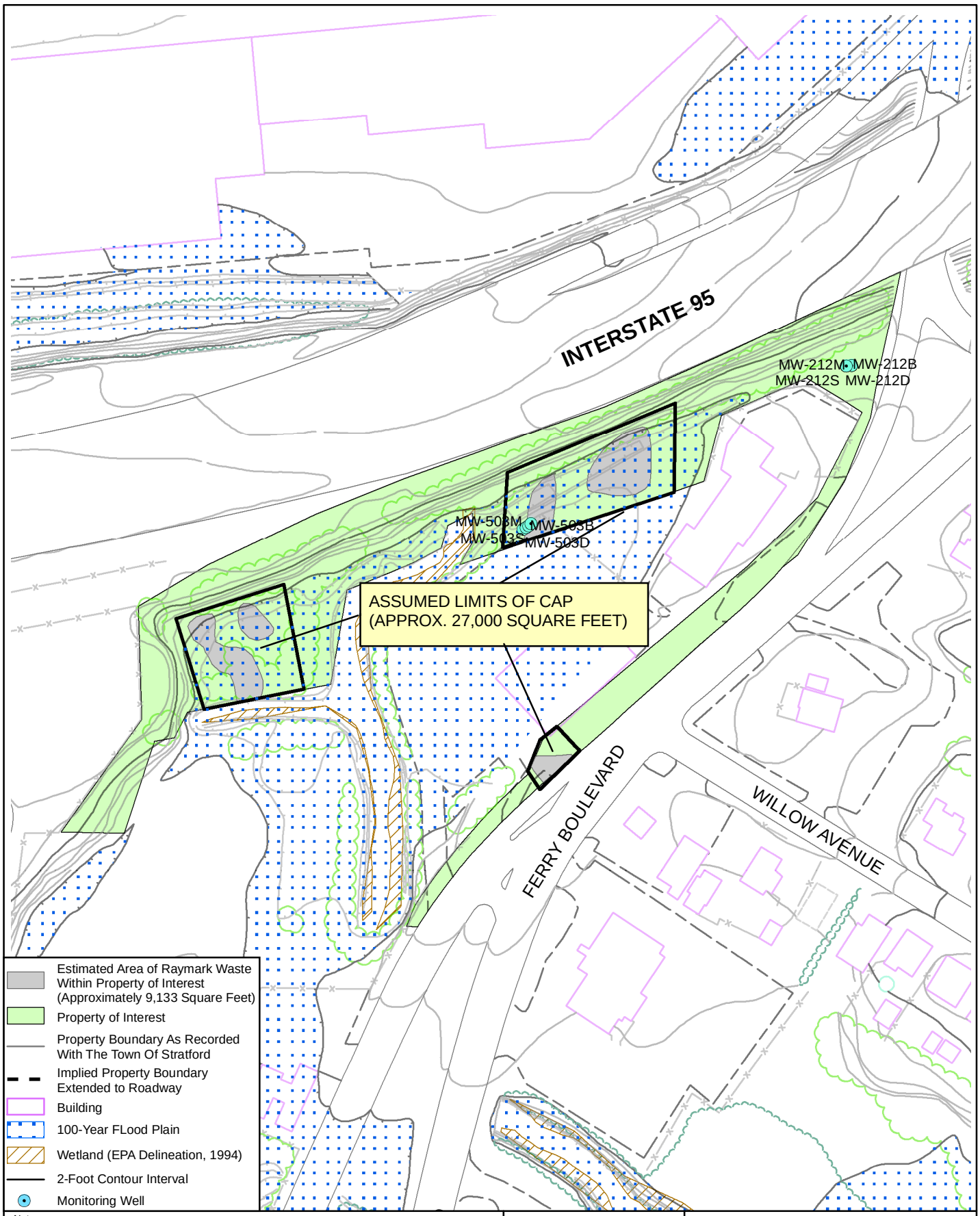
Notes:
Alternative 1 - No Action
Alternative 2 - Restrictions With Long-Term Monitoring
Alternative 3 - Low-Permeability Cap With In-Town Consolidation
Alternative 4 - Low-Permeability Cap With Out-Of-Town Disposal
Alternative 5 - Excavation To The Water Table With In-Town Consolidation
Alternative 6 - Excavation To The Water Table With Out-Of-Town Disposal
Alternative 7 - Excavation To Either 2 Or 4 Feet With In-Town Consolidation
Alternative 8 - Excavation To Either 2 Or 4 Feet With Out-Of-Town Disposal
Alternative 9 - Excavation To 4 Feet With In-Town Consolidation
Alternative 10 - Excavation To 4 Feet With Out-Of-Town Disposal

Table 4-7C
Preliminary ARAR Summary - Vacant DOT Lot Abutting I-95
Raymark OU6 - Additional Properties
Stratford, Connecticut

Property Group	ARAR Tables				
	A	B	C	D	E
Alternative 1	X				
Alternative 2	X		X		
Alternative 3	X		X	X	X
Alternative 4	X		X	X	X
Alternative 5	X		X		
Alternative 6	X		X		
Alternative 7	X		X		
Alternative 8	X		X		
Alternative 9	X		X		
Alternative 10	X		X		

A = ARARs for all Alternatives
B = ARAR add-ons for an alternative for the Raymark waste located in the wetlands
C = ARAR add-ons for an alternative for the Raymark waste located in the floodplains
D = ARAR add-ons for alternatives that include low-permeability caps
E = ARAR add-ons for alternatives that include CAMUs

Note:
ARAR tables A-E are found in Volume II, Appendix C of this Feasibility Study.



Notes:
1) Plan not to be used for design.
2) All locations to be considered approximate.
3) Property boundaries are approximate based on Town of Stratford Engineering Department plans.
4) Floodplain extent based on Federal Emergency Management Agency Q3 Flood Data, Community Panel Numbers 090016 0001-0004, Revised June 16, 1992, FEMA, Washington D.C. and modified to Town of Stratford Engineering Plan 10-foot contour.
5) Adapted from TTNUS Remedial Investigation, 2005.

150 75 0 150 Feet

N

Nobis

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
(978) 683-0891
www.nobisengineering.com

FIGURE 4-7

VACANT LOT ABUTTING I-95
FEASABILITY STUDY
RAYMARK SUPERFUND SITE
STRATFORD, CONNECTICUT

Drawn By: D. McGrath	Approved By: H. Ford
Project: 80006	Date: 9/3/09 Rev00

R:\80000 Task Orders\80006 Raymark\Technical Data\GIS_Data\Figures\OU6_FS_Figures\Figure_04-07_Lof_Abutting_95.mxd

4.3.8 Connecticut Right-of-Way Property

The Connecticut Right-of-Way (ROW) parcel was evaluated as part of the OU6 Remedial Investigation (RI) report (TtNUS, 2005). This parcel encompasses approximately 1.9 acres of commercially-zoned (light industrial) land located on the western side of Ferry Boulevard abutting several businesses, residences, and vacant parcels in Stratford, Connecticut (see Figure 4-8). The parcel is a thin strip of land, both paved and unpaved, that currently serves as a DOT easement. The easement runs north from the intersection of Broad Street and Ferry Boulevard, through the parking lot of a strip mall located at 167-189 Ferry Boulevard, over the driveway of a residential parcel at 191 Ferry Boulevard, abuts the rear of several residential parcels, crosses to vacant vegetated parcels and the paved parking lot of 273 Ferry Boulevard, and ends at the lot at the intersection of Ferry Boulevard and East Broadway.

This parcel is currently undeveloped, with ground surface varying between pavement and vegetation. The triangular-shaped portion of the property is covered with grass that the Town maintains through regular mowing. The only feature present is a small stone monument located in the center of the property. Approximately 33 percent of the total Raymark waste area lies within the 100-year floodplain.

Key factors associated with the areas and volumes to be addressed at this property group include:

- Raymark waste area: .....4,300 SF (Figure 4-8)
- Total volume of Raymark waste:.....1593 CY
- Maximum depth of Raymark waste:.....10 feet bgs
- Average depth to the seasonal high groundwater table:.....10 feet
- Raymark waste area outside of 100-year floodplain: ..... 3,000 SF
- Raymark waste area in 100-year floodplain:..... 1,300 SF
- Raymark waste in 100-year floodplain to 10 FT:.....481 CY (1,300 SF x 10 FT)
- Raymark waste area under pavement: ..... 1,000 SF
- Raymark waste in unpaved area:..... 3,300 SF
- Raymark waste located below the water table:.....0 CY
- Alternatives 3/4:
  - Raymark waste under pavement to 2.5 FT: .....93 CY (1,000 SF x 2.5 FT)

- o Raymark waste in unpaved area to 3 FT: .....367 CY (3,300 SF x 3 FT)
- Alternatives 5/6:
  - o Raymark waste located above the water table: .....1,593 CY (4,300 SF x 10 FT)
- Alternatives 7/8:
  - o Raymark waste under pavement to 2 FT: .....74 CY (1,000 SF x 2 FT)
  - o Raymark waste in unpaved area to 4 FT: .....489 CY (3,300 SF x 4 FT)
- Alternatives 9/10:
  - o Raymark waste under pavement to 4 FT: .....637 CY (4,300 SF x 4 FT)

The calculation of the average depth to the seasonal high water table of 10 feet below ground surface (bgs) is based on observations of water levels from soil borings advanced in the area. The calculation of the maximum depth of Raymark waste is based on data collected during the RI (TtNUS, 2005).

The detailed analysis of alternatives for this property group is presented below and consists of the following components:

- A list of key assumptions (Section 4.3.8.1) is used as the basis for the detailed analysis of alternatives and for the development of costs for the FS;
- Figure 4-8, which shows a map of Connecticut ROW, the delineated Raymark waste area, the 100-year floodplain, and the proposed cap footprint;
- Table 4-8, which presents the individual detailed analysis of alternatives for Connecticut ROW in tabular form;
- The comparative analysis of alternatives for Connecticut ROW, presented in text form;
- Table 4-8A, which presents a tabular summary of the comparative analysis;
- Table 4-8B, which presents a summary of cost estimates for each of the alternatives;
- Table 4-8C, which provides a summary of ARARs for each of the Connecticut ROW alternatives; and
- Cost Estimate Backup Sheets for the FS cost estimates, which are presented Appendix G.

4.3.8.1 Connecticut ROW Assumptions

Key assumptions associated with each alternative are presented in this section. Pairs of alternatives (3 and 4, 5 and 6, 7 and 8, and 9 and 10) have the same components except for the disposal of Raymark waste, which is either in-town or out-of-town. See Section 3.3 for details on the Remedial Alternatives discussed below. See Table 4-8 for a summary of the details on the analysis for the Connecticut ROW property group.

4.3.8.1.1 Alternative 1 – No Action

Detailed descriptions of the no action alternative are presented in Section 3.5.1.

4.3.8.1.2 Alternative 2 – Restrictions with Long-Term Monitoring

Detailed descriptions of Alternative 2 are presented in Section 3.5.2. Property group-specific details include the following:

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group, Alternative 2 will include placement of institutional controls on the Connecticut ROW property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

Operation and Maintenance

- Groundwater Monitoring: Eight monitoring wells will be installed to support long-term groundwater monitoring which will be complemented by one existing monitoring well (MW-520). The existing monitoring well is assumed to be functional and can be utilized for long-term groundwater monitoring. Because Raymark waste will remain above the seasonal high water table, all nine wells will be monitored quarterly for 2 years, and annually thereafter.

- Existing Surfaces: Monthly surface inspections of both pavement and vegetative covers will be required along with annual reporting to summarize inspection findings and to verify the effectiveness of institutional controls.

4.3.8.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4)

Detailed descriptions of Alternative 3 and 4 are presented in Section 3.4.3. Final contours of cap will be designed to assimilate into the existing topography so that pre-excavation will not be necessary to construct cap. Since no Raymark waste will be excavated to construct the cap, no out-of-treatment disposal is necessary. Therefore Alternative 3 and 4 will be similar and separate evaluations are not needed. Alternative 3 will be the capping alternative. In addition, treatment will not be required as all Raymark waste will remain within the property group. The property group-specific details for Alternative 3 include the following:

Excavation Volumes/Final Cover

- Three low permeable RCRA caps with a footprint of approximately 9,300 square feet (0.21 acres) will be constructed over Raymark waste areas present on the property group (Figure 4-8).
- Final property contours will be designed to meet Connecticut ROW and surrounding parcels at current elevations.
- The current ground surface within the Raymark waste area on this property group is primarily covered with grass, therefore, a vegetated RCRA cap is assumed. However, a small portion (approximately 1,000 SF) is currently paved and will be repaved as a final surface cover following cap construction, if practicable.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be capped with a low permeable RCRA cap. There will be no loss in current flood storage capacity or functionality after completion of the remedial actions.

- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain under the cap after completion of the remedial action, Alternative 3 will include placement of institutional controls on the Connecticut ROW property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Eight monitoring wells will be installed to support long-term groundwater monitoring which will be complemented by one existing monitoring well (MW-520). The existing monitoring well is assumed to be functional and can be utilized for long-term groundwater monitoring. Because Raymark waste will remain above the seasonal high water table, all nine wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: The O&M for Alternative 3 will require monthly cap inspections with annual reporting to summarize inspection findings and verify the effectiveness of institutional controls. A 30-year monitoring period is used in the present value cost analysis.

4.3.8.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6)

Detailed descriptions of Alternatives 5 and 6 are presented in Section 3.5.4. Raymark waste areas will be excavated to the seasonal high water table. Excavated material will be placed in

an in-town consolidation area (Alternative 5) or an out-of-town disposal location (Alternative 6). The property group-specific details include the following:

Excavation Volumes/Final Cover

- Approximately 1,593 CY of Raymark waste will be excavated to the seasonal high water table of approximately 10 feet from areas within the 100-year floodplain. Approximately 693 CY of non-Raymark waste soil will additionally be excavated to facilitate safety requirements such as benching/sloping of sidewalls to prevent collapse.

- Raymark waste in paved areas will be excavated to the water table and replaced with clean fill. The top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat. Raymark waste in unpaved areas will be excavated to the water table and replaced with a vegetated, permeable soil cover.

- Final property contours will be designed to meet Connecticut ROW and surrounding parcels at current elevations.

- Because all Raymark waste is located above the seasonal high water table, complete excavation of all Raymark waste will occur.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated the seasonal high water table. Once excavated, this area will be backfilled with clean fill and revegetated or repaved with current elevations and drainage patterns retained so that the current flood storage capacity will not be diminished after completion of the remedial actions.

- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- No future use restrictions are anticipated as all Raymark waste will be removed.

Operation and Maintenance

- Groundwater Monitoring: Eight monitoring wells will be installed to support long-term groundwater monitoring which will be complemented by one existing monitoring well (MW-520). The existing monitoring well is assumed to be functional and can be utilized for long-term groundwater monitoring. To verify that all Raymark waste is removed from the property group, all nine wells will be monitored quarterly for 2 years, after which groundwater monitoring may no longer be required.

4.3.8.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8)

Detailed descriptions of Alternatives 7 and 8 are presented in Section 3.5.5. Raymark waste areas will be excavated to either a depth of 2 feet (current paved areas) or a depth of 4 feet (current unpaved areas). Excavated material will be placed in an in-town consolidation area (Alternative 7) or an out-of-town disposal location (Alternative 8). The property group-specific details include the following:

Excavation Volumes/Final Covers

- Approximately 74 CY of Raymark waste will be excavated 2 feet from currently <u>paved</u> areas, while an estimated 489 CY will be excavated 4 feet from currently <u>unpaved</u> areas.

- Raymark waste in <u>paved</u> areas will be excavated to a 2-foot depth and replaced with clean fill. The top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat. Raymark waste in <u>unpaved</u> areas will be excavated to a 4-foot depth and replaced with a vegetated, permeable soil cover.

- Final property contours will be designed to meet Connecticut ROW and surrounding parcels at current elevations.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated 2 or 4 feet. Once excavated, this area will be backfilled with clean fill and revegetated or repaved with current elevations and drainage patterns retained so that the current flood storage capacity will not be diminished after completion of the remedial actions.

- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 7 and 8 will include placement of institutional controls on the Connecticut ROW property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Eight monitoring wells will be installed to support long-term groundwater monitoring, which will be complemented by one existing monitoring well (MW-520). The existing monitoring well is assumed to be functional and can be utilized for long-term groundwater monitoring. Because Raymark waste will remain above the seasonal high water table, all nine wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: Paved areas and vegetative covers must be inspected monthly and maintained in good condition. A 30-year monitoring period is used in the present value cost analysis.

4.3.8.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10)

Detailed descriptions of Alternatives 9 and 10 are presented in Section 3.4.18. Raymark waste areas will be excavated to a 4-foot depth. Excavated material will be placed in an in-town consolidation area (Alternative 9) or an out-of-town disposal location (Alternative 10). The property group-specific details include the following:

Excavation and Final Cover

- Approximately 637 CY of Raymark waste will be excavated to a 4-foot depth.
- Raymark waste in paved areas will be excavated to a 4-foot depth and replaced with clean fill. The top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat. Raymark waste in unpaved areas will be excavated to a 4-foot depth and replaced with a vegetated, permeable soil cover.
- Final property contours will be designed to meet Connecticut ROW and surrounding parcels at current elevations.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated to 4 feet. Once excavated, this area will be backfilled with clean fill and revegetated or repaved with current elevations and drainage patterns retained so that the current flood storage capacity will not be diminished after completion of the remedial actions.

- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 9 and 10 will include placement of institutional controls on the Connecticut ROW property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Eight monitoring wells will be installed to support long-term groundwater monitoring, which will be complemented by one existing monitoring well (MW-520). The existing monitoring wells are assumed to be functional and can be utilized for long-term groundwater monitoring. Because Raymark waste will remain above the seasonal high water table, all nine wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: Paved areas and vegetative covers must be inspected monthly and maintained in good condition. A 30-year monitoring period is used in the present value cost analysis.

4.3.8.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10)

Raymark waste treatment is presented in Section 3.1.3 for all property groups.

- Based on an evaluation of historical sampling data from <u>all</u> OU6 properties, it is assumed that approximately 10% of excavated Raymark waste will require treatment prior to disposal. Treatment will be required only when excavated materials exhibit

concentrations of contaminants in excess of disposal requirements. All treatment will occur at an out-of-town facility.

- For alternatives featuring out-of-town disposal of Raymark waste (Alternatives 6, 8, and 10), the concentration thresholds for treatment will be 10 times UTS thresholds.

- For alternatives featuring in-town consolidation (Alternatives 5, 7, and 9), the concentration thresholds for treatment will be the PHC levels.

- Treatment volume estimates for Connecticut ROW are based on the assumed quantity of excavation required to implement each alternative. Note that the waste volumes are rounded up or down as appropriate.

- A 1.5 conversion factor from tons to cubic yards is used.

  - <u>Alternatives 3/4</u>
    - Not applicable.

  - <u>Alternatives 5/6</u>
    - 1,593 CY RW excavated * 1.2 bulking factor = 1,911 CY
    - 1,911 CY * 1.5 TON/CY = 2,866 TON
    - 2,866 TON * 10% = **287 TONS to be treated (191 CY)**

  - <u>Alternatives 7/8</u>
    - 563 CY RW excavated * 1.2 bulking factor= 676 CY
    - 676 CY * 1.5 TON/CY = 1,013 TON
    - 1,013 TON * 10% = **101 TONS to be treated (68 CY)**

  - <u>Alternatives 9/10</u>
    - 637 CY RW excavated * 1.2 bulking factor = 764 CY
    - 764 CY * 1.5 TON/CY = 1146 TON
    - 1146 TON * 10% = **115 TONS to be treated (76 CY)**

4.3.8.2 Comparative Analysis of Alternatives for Connecticut ROW

This section presents the comparative analysis of alternatives for the Connecticut ROW using the criteria described in Section 4.2. The comparative analysis of alternatives for this property is summarized in a comparison table on Table 4-8A.

4.3.8.2.1 Overall Protection of Human Health and the Environment

Alternative 1 (No Action) will not protect human health or the environment. Alternative 2 (Restrictions with Long-Term Monitoring) can provide limited protection of human health and the environment, if restrictions are monitored and enforced. Alternatives 3 and 7 through 10 will achieve protection of human health and the environment through the excavation of varying amounts of Raymark waste (low-permeability cap for Alternative 3) and the use of institutional controls, rendering the contaminated waste inaccessible. Alternatives 5 and 6 will protect human health and the environment through the removal of all Raymark waste located on the property group.

4.3.8.2.2 Compliance with ARARs

Alternative 1 (No Action) and Alternative 2 (Restrictions with Long-Term Monitoring) will not comply with ARARs because contaminants in Raymark waste will remain accessible in soils in excess of CT RSRs and federal risk criteria.

The ARARs associated with the implementation of Alternatives 3 and 5 through 10 are presented in Section 4.0 of this FS and on Table 4-8C. Alternatives 3 and 5 and 6 could be designed to comply with all chemical-specific, action-specific, and location-specific ARARs. Through excavation of Raymark waste to 2 feet (paved areas) or 4 feet (unpaved areas), Alternatives 7 through 10 will render the remaining contaminated soil inaccessible and will be compliant with the action-specific CT RSR Direct Exposure Criteria. Alternatives 7 through 10 may not comply with the numeric standards of CTDEP's Pollutant Mobility Criteria, however, the RSRs allow for variances and alternate criteria. Alternatives 7 through 10 will comply with all other chemical, action, and location-specific ARARs.

4.3.8.2.3 Long-Term Effectiveness and Permanence

The magnitude of residual human health risk associated with Raymark waste will be highest for Alternative 1 (No Action), since no actions will be taken to mitigate human health risks. Residual human health risks for Alternative 2 (Restrictions with Long-Term Monitoring) will be lower than Alternative 1, but still above acceptable human health risk levels.

Residual human health risks after implementation of Alternatives 3 and Alternatives 7 through 10 will be slightly higher than for Alternatives 5 and 6 because Raymark waste will be left in-place above the water table. Alternative 5 and 6 may be more reliable than Alternatives 3 and 7 through 10 because all Raymark waste will be excavated and protection of human health through direct contact or mobilization of contaminants by rainwater infiltration will not be dependent on maintenance of a low-permeable RCRA cap or soil or paved cover.

Alternatives 3 and 7 through 10 can provide protection in the long-term if the cover systems are maintained. Alternatives 5 and 6 will provide the greatest protection to human health and will be the most permanent. Alternatives 3 and 5 through 10 could each be designed to allow for redevelopment potential on the property group.

4.3.8.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment

No treatment will be required for Alternative 1 (No Action), Alternative 2 (Restriction with Long-Term Monitoring), or Alternative 3 (Low-Perm Cap). Alternatives 5 through 10 will require treatment prior to land disposal to address the assumed 10 percent fraction that exceeds the UTS or PHC levels. This treatment will result in the reduction of toxicity, mobility, and volume of Raymark waste. Although the estimated volumes that will require treatment are similar (ranging from 68 to 191 CY), Alternatives 5 and 6 will result in the greatest amount of reduction because a larger quantity of materials will be shipped offsite and is expected to require treatment prior to disposal.

4.3.8.2.5 Short-Term Effectiveness

No on-site actions will be taken under Alternative 1 (No Action) and minimal on-site actions will be taken under Alternative 2 (Restrictions with Long-Term Monitoring); therefore, there will be no short-term impacts to the community, workers, or the environment. Short-term impacts to

the community, workers, and the environment from the implementation of Alternatives 3 and 5 through 10 will be similar and can be mitigated using engineering controls.

Alternatives 5 and 6 will involve a higher volume of truck traffic to transport Raymark waste and backfill and will require a greater Raymark waste handling than Alternatives 7 through 10.

Alternative 3 and Alternatives 7 through 10 will take approximately 2 months to complete, while Alternatives 5 and 6 will each require approximately 4 months to complete. For Alternatives 5, 7, and 9, the estimated time to complete does not include the amount of time necessary to complete remedial activities at an in-town consolidation location.

4.3.8.2.6 Implementability

Alternative 3 (low-permeability cap), Alternatives 5 and 6 (excavation to water table), and Alternatives 7 through 10 (2 to 4-foot excavation) all require excavation, which can be implemented through standard construction and environmental remediation methods. Alternatives 3 and 7 through 10 require specific site grading, placement of cap/cover materials based on design specifications, and O&M in the future. Alternatives 5 and 6 will involve excavation of the largest volume of Raymark waste (1,593 CY), and any expansions of the Raymark waste area due to confirmatory sampling will lead to a larger volume of excavated Raymark waste compared to Alternative 7 through 10 due to the excavation depth to the seasonal high water table.

Additional remedial actions will be more difficult to implement for Alternatives 3 due to the presence of a RCRA cap. Alternatives 7 through 10 are equally amenable to additional remedial actions at the property group, should they be deemed necessary. Alternatives 5 and 6 will be the most amenable to additional actions should they be necessary as all Raymark waste will be removed from the property group.

Alternatives 3 and Alternatives 7 through 10 will each require long-term groundwater monitoring. Alternatives 5 and 6 will require quarterly groundwater monitoring for only 2 years after which groundwater monitoring may no longer be required. Alternatives 3 and 7 through 10 will also require long-term operation and maintenance of the cap or soil cover. Long-term operation and

maintenance requirements will not be required for Alternatives 5 and 6 as all Raymark waste will be removed from the property group.

Alternatives 3 and 5 through 10 will be similar in terms of the ability to coordinate with other agencies.

For Alternatives 3 and 5 through 10, each involves conventional construction methods for which the required equipment and technical specialists will be readily available.

4.3.8.2.7 Cost

A comparison of costs for each of the alternatives that were evaluated for Connecticut ROW is presented on Table 4-8B.

Table 4-8
Summary of Detailed Analysis for Connecticut Right-of-Way
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4[1] – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8 – Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Overall Protection of Human Health and the Environment	Would not protect human health. RI did not indentify any significant habitats for ecological receptors.	Some protection of human health, but human health risks still above acceptable limits. RI did not indentify any significant habitats for ecological receptors.	Would protect human health through construction of a RCRA C-compliant cover (multi-component, drainage layer, gas vent layer, E-07 cm/s hydraulic conductivity), over Raymark waste. RI did not indentify any significant habitats for ecological receptors.	Would protect human health through the removal of Raymark waste and placement of clean soil in its place. RI did not indentify any significant habitats for ecological receptors.	Would protect human health through construction of an engineered barrier over Raymark waste. RI did not indentify any significant habitats for ecological receptors.	Would protect human health through construction of an engineered barrier over Raymark waste. RI did not indentify any significant habitats for ecological receptors.
Compliance with ARARs	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs.	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-8C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-8C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-8C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs with the use of waivers and/or alternate criteria. See Table 4-8C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs with the use of waivers and/or alternate criteria. See Table 4-8C.
Long-Term Effectiveness and Permanence	Magnitude of residual risk high. No risk reduction. 5-year reviews required. No O&M or controls included for long term.	Residual human health risks above acceptable limits. No risk reduction. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would not be adequate to protect human health for the long-term.	Residual risk within acceptable limits. Raymark waste willl be left-in place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness. Capping technology reliable. Additional design analysis of cap in floodplains will be required during remedial design phase.	Residual risk within acceptable limits. Risk reduction would be permanent. Controls would be adequate to ensure long-term effectiveness.	Residual risk within acceptable limits. Raymark waste willl be left-in place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.	Residual risk within acceptable limits. Raymark waste willl be left-in place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.
Reduction of Toxicity, Mobility, or Volume Through Treatment	None.	None.	Treatment not required since all Raymark waste will remain within the property group. Raymark Waste treated (tons)= 0 Raymark Waste treated (CY)= 0	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 287 Raymark Waste treated (CY)= 191	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 101 Raymark Waste treated (CY)= 68	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 115 Raymark Waste treated (CY)= 76
Short-Term Effectiveness	No actions, therefore no short-term impacts anticipated. Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures are applied. No adverse impacts to environment anticipated during implementation. Minimal on-site actions (well construction, signage, and fence installation, and groundwater sampling only). Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[2] = 0 Approximate truckloads of Raymark waste 0 Approximate truckloads of clean fill 0 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 3, this time frame does not include duration of capping activities at consolidation location. 2 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[2] = 1,911 Approximate truckloads of Raymark waste 159 Approximate truckloads of clean fill 159 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 5, this time frame does not include duration of capping activities at consolidation location. 4 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[2] = 676 Approximate truckloads of Raymark waste 56 Approximate truckloads of clean fill 56 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 7, this time frame does not include duration of capping activities at consolidation location. 2 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[2] = 764 Approximate truckloads of Raymark waste 64 Approximate truckloads of clean fill 64 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 9, this time frame does not include duration of capping activities at consolidation location. 2 Would achieve RAO.

Table 4-8
Summary of Detailed Analysis for Connecticut Right-of-Way
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4[1] – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8 – Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Implementability	Not applicable.	Would be implementable, assuming cooperation by property owners. Would require coordination with state/town officials to perform O&M and to document compliance with institutional controls.	No excavation in floodplains anticipated. May be difficult to implement additional remedial actions if required, because Raymark waste would be beneath RCRA C cover. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Required equipment and specialists readily available. Technology available and in full-scale use. Future development could be hindered by the presence of the low-permeability cap.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future developmebnt of site could be hindered by presence of Raymark waste left in place.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future developmebnt of site could be hindered by presence of Raymark waste left in place.
Cost	**Alternative 1** Capital: $0 O&M (Years 1-2): $0 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: $21,578 PV of Alternative: $21,578 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 2** Capital: $64,811 O&M (Years 1-2): $94,808 O&M (Years 3-30): $42,176 Five-Year Reviews: $10,000/each Present Value of O&M: $640,106 Present Value of Alternative: $704,916 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 3** Capital: $375,920 O&M (Years 1-2): $86,629 O&M (Years 3-30): $40,598 Five-Year Reviews: $10,000/each PV of O&M: $608,585 PV of Alternative: $984,505 **Alternative 4** Capital: NA O&M (Years 1-2): NA O&M (Years 3-30): NA Five-Year Reviews: NA PV of O&M: NA PV of Alternative: NA See Cost Estimate Backup Sheets in Appendix G.	**Alternative 5** Capital: $513,804 O&M (Years 1-2): $70,175 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: $126,878 PV of Alternative: $640,682 **Alternative 6** Capital: $1,562,721 O&M (Years 1-2): $70,175 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: $126,878 PV of Alternative: $1,689,599 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 7** Capital: $342,876 O&M (Years 1-2): $93,153 O&M (Years 3-30): $40,522 Five-Year Reviews: $10,000/each PV of O&M: $619,573 PV of Alternative: $962,449 **Alternative 8** Capital: $712,306 O&M (Years 1-2): $93,153 O&M (Years 3-30): $40,522 Five-Year Reviews: $10,000/each PV of O&M: $619,573 PV of Alternative: $1,331,879 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 9** Capital: $354,727 O&M (Years 1-2): $93,153 O&M (Years 3-30): $40,522 Five-Year Reviews: $10,000/each PV of O&M: $619,573 PV of Alternative: $974,300 **Alternative 10** Capital: $773,372 O&M (Years 1-2): $93,153 O&M (Years 3-30): $40,522 Five-Year Reviews: $10,000/each PV of O&M: $619,573 PV of Alternative: $1,392,945 See Cost Estimate Backup Sheets in Appendix G.

[1]Alternative 4 was not evaluated.
[2]A bulking factor of 1.2 was used.

Table 4-8A
Comparative Analysis of Alternatives for Connecticut Right-of-Way
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE[1]									
	1	2	3	4	5	6	7	8	9	10
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT										
Protection of Human Health	☐	☐	◘	NA	■	■	◘	◘	◘	◘
Protection of the Environment	☐	☐	◘	NA	■	■	◘	◘	◘	◘
COMPLIANCE WITH ARARs										
Chemical-Specific ARARs	☐	☐	■	NA	■	■	◘	◘	◘	◘
Location-Specific ARARs	NA	■	■	NA	■	■	◘	◘	◘	◘
Action-Specific ARARs	NA	■	■	NA	■	■	◘	◘	◘	◘
Other Criteria, Advisories, Guidance	NA	NA	■	NA	■	■	◘	◘	◘	◘
LONG-TERM EFFECTIVENESS AND PERMANENCE										
Magnitude of Residual Risk	☐	☐	◘	NA	■	■	◘	◘	◘	◘
Adequacy and Reliability of Controls	☐	☐	◘	NA	■	■	◘	◘	◘	◘
REDUCTION OF TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT										
Treatment/Recycling Processes Utilized	NA	NA	☐	NA	■	■	■	■	■	■
Amount of Hazardous Materials Destroyed or Treated	☐	☐	☐	NA	■	■	◘	◘	◘	◘
Degree of Expected Reductions in Tox, Mob, or Vol	☐	☐	☐	NA	■	■	◘	◘	◘	◘
Irreversibility	☐	☐	■	NA	■	■	■	■	■	■
Type and Quantity of [Process] Residuals	☐	☐	■	NA	■	■	■	■	■	■
SHORT-TERM EFFECTIVENESS										
Protection of Community During Remedial Actions	NA	■	◘	NA	◘	◘	◘	◘	◘	◘
Protection of Workers During Remedial Actions	NA	■	◘	NA	◘	◘	◘	◘	◘	◘
Environmental Impacts	■	■	◘	NA	◘	◘	◘	◘	◘	◘
Time Until Remedial Action Objectives are Achieved	☐	☐	◘	NA	◘	◘	◘	◘	◘	◘

Table 4-8A
Comparative Analysis of Alternatives for Connecticut Right-of-Way
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE[1]									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
IMPLEMENTABILITY										
Ability to Construct and Operate the Technology	NA	■	■	NA	■	■	■	■	■	■
Reliability of the Technology	NA	□	◘	NA	■	■	◘	◘	◘	◘
Ease of Undertaking Additional Remedial Actions, if Necessary	■	■	◘	NA	■	■	◘	◘	◘	◘
Ability to Monitor Effectiveness of the Remedy	NA	NA	◘	NA	◘	◘	◘	◘	◘	◘
Ability to Obtain Approvals from Other Agencies	■	■	■	NA	■	■	■	■	■	■
Coordination with Other Agencies	◘	◘	■	NA	■	■	■	■	■	■
Availability of Off-Site Treatment, Storage, and Disposal Services and Capacity	NA	NA	NA	NA	■	■	■	■	■	■
Availability of Necessary Equipment and Specialists	NA	■	■	NA	■	■	■	■	■	■
Availability of Prospective Technologies	NA	■	■	NA	■	■	■	■	■	■
COST										
Capital	$0	$64,811	$375,920	NA	$513,804	$1,562,721	$342,876	$712,306	$354,727	$773,372
Present Value of O&M (First 30 Years)	$21,578	$640,106	$608,585	NA	$126,878	$126,878	$619,573	$619,573	$619,573	$619,573
Present Value of the Alternative	$21,578	$704,916	$984,505	NA	$640,682	$1,689,599	$962,449	$1,331,879	$974,300	$1,392,945

[1] Alternative 4 was not evaluated.

Notes:

■ = Highest rating (most protective, most effective, most implementable)

◘ = Meets criterion, but another alternative(s) more protective/effective/implementable

□ = Does not meet criterion

Table 4-8B
Cost Estimate Summary for Connecticut Right-of-Way
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Excavation Depth, ft	0	0	0	0	10	10	2 or 4	2 or 4	4	4
Cap/Cover	NA	NA	RCRA C	RCRA C	NA	NA	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover
Disposal Volumes (CY)										
In-Town Consolidation			0	0	1720	0	608	0	688	0
Out-of-Town (not treated)			0	0	0	1,720	0	608	0	688
Out-of-Town (treated)			0	0	191	191	68	68	76	76
Total Disposal Vol.			**0**	**0**	**1911**	**1911**	**676**	**676**	**764**	**764**
Cost										
Capital	**$0**	**$64,811**	**$375,920**	**NA**	**$513,804**	**$1,562,721**	**$342,876**	**$712,306**	**$354,727**	**$773,372**
O&M (present value)	**$21,578**	**$640,106**	**$608,585**	**NA**	**$126,878**	**$126,878**	**$619,573**	**$619,573**	**$619,573**	**$619,573**
Present Value	**$21,578**	**$704,916**	**$984,505**	**NA**	**$640,682**	**$1,689,599**	**$962,449**	**$1,331,879**	**$974,300**	**$1,392,945**

Notes:
Alternative 1 - No Action
Alternative 2 - Restrictions With Long-Term Monitoring
Alternative 3 - Low-Permeability Cap With In-Town Consolidation
Alternative 4 - Low-Permeability Cap With Out-Of-Town Disposal (Not applicable)
Alternative 5 - Excavation To The Water Table With In-Town Consolidation
Alternative 6 - Excavation To The Water Table With Out-Of-Town Disposal
Alternative 7 - Excavation To Either 2 Or 4 Feet With In-Town Consolidation
Alternative 8 - Excavation To Either 2 Or 4 Feet With Out-Of-Town Disposal
Alternative 9 - Excavation To 4 Feet With In-Town Consolidation
Alternative 10 - Excavation To 4 Feet With Out-Of-Town Disposal

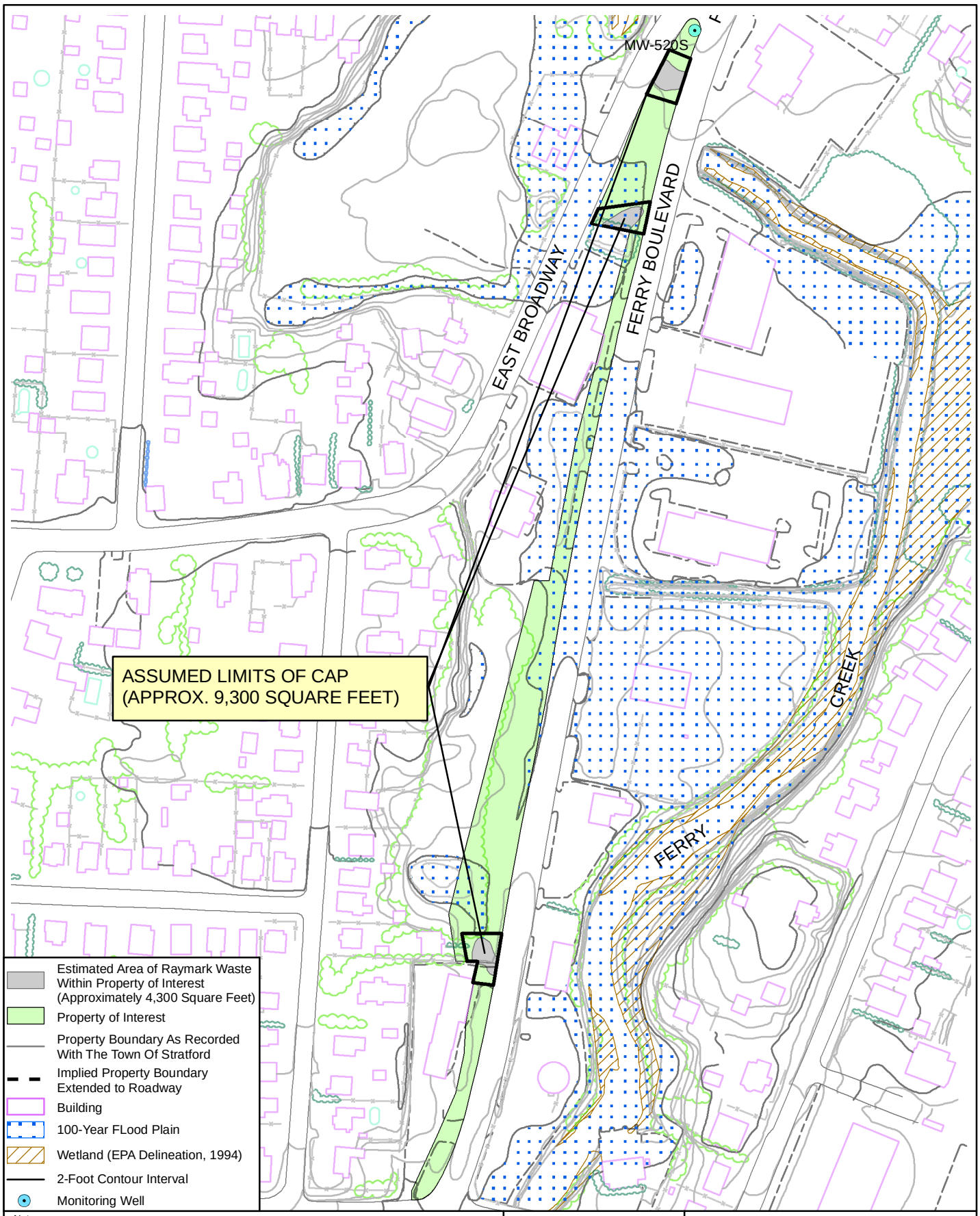
Table 4-8C
Preliminary ARAR Summary - Connecticut Right-of-Way
Raymark OU6 - Additional Properties
Stratford, Connecticut

Property Group	ARAR Tables				
	A	B	C	D	E
Alternative 1	X				
Alternative 2	X		X		
Alternative 3	X		X	X	X
Alternative 4[1]					
Alternative 5	X		X		
Alternative 6	X		X		
Alternative 7	X		X		
Alternative 8	X		X		
Alternative 9	X		X		
Alternative 10	X		X		

[1] Alternative 4 was not evaluated.

A = ARARs for all Alternatives
B = ARAR add-ons for an alternative for the Raymark waste located in the wetlands
C = ARAR add-ons for an alternative for the Raymark waste located in the floodplains
D = ARAR add-ons for alternatives that include low-permeability caps
E = ARAR add-ons for alternatives that include CAMUs

Note:
ARAR tables A-E are found in Volume II, Appendix C of this Feasibility Study.



Notes:
1) Plan not to be used for design.
2) All locations to be considered approximate.
3) Property boundaries are approximate based on Town of Stratford Engineering Department plans.
4) Floodplain extent based on Federal Emergency Management Agency Q3 Flood Data, Community Panel Numbers 090016 0001-0004, Revised June 16, 1992, FEMA, Washington D.C. and modified to Town of Stratford Engineering Plan 10-foot contour.
5) Adapted from TTNUS Remedial Investigation, 2005.

200 100 0 200 Feet

N

Nobis

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
(978) 683-0891
www.nobisengineering.com

FIGURE 4-8

CONNECTICUT RIGHT-OF-WAY
FEASABILITY STUDY
RAYMARK SUPERFUND SITE
STRATFORD, CONNECTICUT

Drawn By: D. McGrath	Approved By: H. Ford
Project: 80006	Date: 9/3/09 Rev00

R:\80000 Task Orders\80006 Raymark\Technical Data\GIS_Data\Figures\OU6_FS_Figures\Figure_04-08_CT_ROW.mxd

4.3.9 250, 304, and 340 East Main Street Properties

The 250, 304, and 340 East Main Street parcels were each evaluated separately as part of the OU6 Remedial Investigation (RI) report (TtNUS, 2005). These three parcels are being evaluated as a group for the FS due to their geographical proximity and that the delineated Raymark waste area is one continuous footprint that spans the boundary of these three parcels. In total, these properties occupy approximately 17.3 acres of commercially-zoned (retail/light industrial) land. The portion of the property group that contains Raymark waste is bounded by commercial properties to the north; a large, active manufacturing building to the east; residential properties to the south; and East Main Street to the west. A large portion of the property group lies within the 100-year floodplain. A short description of the individual parcels that make up this property group is provided below:

250 East Main Street

This parcel is approximately 16.7 acres in size. It is currently occupied by an operating manufacturing business. The western portion of the property is almost entirely paved and contains one large building. There are a few landscaped areas along East Main Street, near the main entrance to the property. The delineated Raymark waste area on this property is approximately 4,300 square feet located adjacent to the northwest corner of the on-site building.

304 East Main Street

This parcel is approximately 0.3 acres in size. It is currently occupied by a one-story stucco building located along the western edge of the property. Roughly half of the property is paved. The delineated Raymark waste area on this parcel occupies approximately 4,800 square feet in the vegetated portion of the property.

340 East Main Street

This parcel is approximately 0.3 acres in size. It is currently occupied by a small one-story commercial business constructed of brick and wood. Roughly half of the property is paved. The delineated Raymark waste area on this parcel occupies approximately 8,500 square feet, most of which is within the vegetated portion of the property.

Key factors associated with the areas and volumes to be addressed at this property group include:

- Raymark waste area: .....18,000 SF (Figure 4-9)
- Total volume of Raymark waste:.....6,667 CY
- Maximum depth of Raymark waste:..... 10 feet bgs
- Average depth to the seasonal high groundwater table:.....5 feet
- Raymark waste area outside of 100-year floodplain:..... 3,000 SF
- Raymark waste area in 100-year floodplain:..... 15,000 SF
- Raymark waste in 100-year floodplain to 5 FT:.....2,778 CY (15,000 SF x 5 FT)
- Raymark waste area under pavement: ..... 2,000 SF
- Raymark waste in unpaved area:..... 16,000 SF
- Raymark waste located below the water table:.....3,334 CY (18,000 SF x 5 FT)
- Alternatives 3/4:
  - Raymark waste under pavement to 2.5 FT: .....185 CY (2,000 SF x 2.5 FT)
  - Raymark waste in unpaved area to 3 FT: .....1778 CY (16,000 SF x 3 FT)
- Alternatives 5/6:
  - Raymark waste located above the water table: .....3,333 CY (18,000 SF x 5 FT)
- Alternatives 7/8:
  - Raymark waste under pavement to 2 FT: .....148 CY (2,000 SF x 2 FT)
  - Raymark waste in unpaved area to 4 FT: .....2,371 CY (16,000 SF x 4 FT)
- Alternatives 9/10:
  - Raymark waste to 4 FT:.....2,667 CY (18,000 SF x 4 FT)

The calculation of the average depth to the seasonal high water table of 5 feet below ground surface (bgs) is based on observations of water levels from soil borings advanced in the area. The calculation of the maximum depth of Raymark waste is based on data collected during the RI (TtNUS, 2005).

The detailed analysis of alternatives for this property group is presented below and consists of the following components:

- A list of key assumptions (Section 4.3.9.1) is used as the basis for the detailed analysis of alternatives and for the development of costs for the FS;

- Figure 4-9, which shows a map of 250, 304, and 340 East Main Street, the delineated Raymark waste area, the 100-year floodplain, and the proposed cap footprint;
- Table 4-9, which presents the individual detailed analysis of alternatives for 250, 304, and 340 East Main Street in tabular form;
- The comparative analysis of alternatives for 250, 304, and 340 East Main Street, presented in text form;
- Table 4-9A, which presents a tabular summary of the comparative analysis;
- Table 4-9B, which presents a summary of cost estimates for each of the alternatives;
- Table 4-9C, which provides a summary of ARARs for each of the 250, 304, and 340 East Main Street alternatives; and
- Cost Estimate Backup Sheets for the FS cost estimates, which are presented in Appendix G.

4.3.9.1 250, 304, and 340 East Main Street Assumptions

Key assumptions associated with each alternative are presented in this section. Pairs of alternatives (3 and 4, 5 and 6, 7 and 8, and 9 and 10) have the same components except for the disposal of Raymark waste, which is either in-town or out-of-town. See Section 3.3 for details on the Remedial Alternatives discussed below. See Table 4-9 for a summary of the details on the analysis for the 250, 304, and 340 East Main Street property group.

4.3.9.1.1 Alternative 1 – No Action

Detailed descriptions of the no action alternative are presented in Section 3.5.1.

4.3.9.1.2 Alternative 2 – Restrictions with Long-Term Monitoring

Detailed descriptions of Alternative 2 are presented in Section 3.5.2. Property group-specific details include the following:

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group, Alternative 2 will include placement of institutional controls on the 250, 304, and 340 East Main Street

property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

Operation and Maintenance

- Groundwater Monitoring: Five monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above the seasonal high water table, all five wells will be monitored quarterly for 2 years, and annually thereafter.

- Existing Surfaces: Monthly surface inspections of both pavement and vegetative covers will be required along with annual reporting to summarize inspection findings and to verify the effectiveness of institutional controls.

4.3.9.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4)

Detailed descriptions of Alternatives 3 and 4 are presented in Section 3.4.3. Raymark waste areas will be excavated 2.5 feet in paved areas and 3 feet in unpaved areas. Raymark waste within the property group will be consolidated under a RCRA cap with existing grades maintained after remedial action implementation. The clean, uncontaminated excavated soil will be staged for future use during cap construction. Excavated materials will be placed at an in-town consolidation area (Alternative 3) or an out-of-town disposal location (Alternative 4). The property group-specific details for Alternative 3 and 4 include the following:

Excavation Volumes/Final Cover

- Approximately 1,963 CY of Raymark waste and 556 CY of non-Raymark waste soil will be excavated 2.5 or 3 feet.
- A low permeable RCRA cap with a footprint of approximately 23,000 square feet (0.53 acres) will be constructed over Raymark waste present on the property group (Figure 4-9).
- Final property contours will be designed to meet 250, 304, and 340 East Main Street and surrounding parcels at current elevations.

- The current ground surface within the Raymark waste area on this property group is primarily covered with grass, therefore, a vegetated RCRA cap is assumed. However, a small portion (approximately 2,000 SF) is currently paved will be repaved as a final surface cover following cap construction, if practicable.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated 2.5 or 3 feet. Once excavated, this area will be backfilled with clean fill and revegetated or repaved to reflect existing conditions, as practicable. There will be no loss in current flood storage capacity or functionality after completion of the remedial actions.

- No wetlands are present in the area of Raymark waste on this parcel,

Future Use Restrictions

- Due to the Raymark waste that will remain under the cap after completion of the excavation, Alternatives 3 and 4 will include placement of institutional controls on the 250, 304, and 340 East Main Street property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Five monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above the seasonal high water table, all five wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: The O&M for Alternatives 3 and 4 will require monthly cap inspections with annual reporting to summarize inspection findings and verify the effectiveness of institutional controls. A 30-year monitoring period is used in the present value cost analysis.

4.3.9.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6)

Detailed descriptions of Alternatives 5 and 6 are presented in Section 3.5.4. Raymark waste areas will be excavated to the seasonal high water table. Excavated material will be placed in an in-town consolidation area (Alternative 5) or an out-of-town disposal location (Alternative 6). The property group-specific details include the following:

Excavation Volumes/Final Cover

- Approximately 3,333 CY of Raymark waste will be excavated to the average seasonal high water table of approximately 5 feet. Approximately 222 CY of non-Raymark waste soil will additionally be excavated to facilitate safety requirements such as benching/sloping of sidewalls to prevent collapse.

- Raymark waste in <u>paved</u> areas will be excavated to the water table and replaced with clean fill. The top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat. Raymark waste in <u>unpaved</u> areas will be excavated to the water table and replaced with a vegetated, permeable soil cover.

- Final property contours will be designed to meet 250, 304, and 340 East Main Street and surrounding parcels at current elevations.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated the seasonal high water table. Once excavated, this area

will be backfilled with clean fill and revegetated or repaved with current elevations and drainage patterns retained so that the current flood storage capacity will not be diminished after completion of the remedial actions.

- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 5 and 6 will include placement of institutional controls on the 250, 304, and 340 East Main Street property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Five monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because all Raymark waste above the seasonal high water table will be removed, all five wells will be monitored quarterly for 2 years, after which groundwater monitoring may no longer be required.

- Cap/Final Cover: Paved and vegetative covers must be inspected annually and maintained in good condition.

4.3.9.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8)

Detailed descriptions of Alternatives 7 and 8 are presented in Section 3.5.5. Raymark waste areas will be excavated to either a depth of 2 feet (current paved areas) or a depth of 4 feet

(current unpaved areas). Excavated material will be placed in an in-town consolidation area (Alternative 7) or an out-of-town disposal location (Alternative 8). The property group-specific details include the following:

Excavation Volumes/Final Covers

- Approximately 148 CY of Raymark waste will be excavated 2 feet from currently paved areas, while an estimated 2,371 CY will be excavated 4 feet from currently unpaved areas.

- Raymark waste in paved areas will be excavated to a 2-foot depth and replaced with clean fill. The top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat. Raymark waste in unpaved areas will be excavated to a 4-foot depth and replaced with a vegetated, permeable soil cover.

- Final property contours will be designed to meet 250, 304, and 340 East Main Street and surrounding parcels at current elevations.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated 2 or 4 feet. Once excavated, this area will be backfilled with clean fill and revegetated or repaved with current elevations and drainage patterns retained so that the current flood storage capacity will not be diminished after completion of the remedial actions.

- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 7 and 8 will include placement of institutional controls on the 250, 304, and 340 East Main Street property group to prohibit certain types of activities

such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Five monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above the seasonal high water table, all five wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: Paved areas and vegetative covers must be inspected monthly and maintained in good condition. A 30-year monitoring period is used in the present value cost analysis.

4.3.9.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10)

Detailed descriptions of Alternatives 9 and 10 are presented in Section 3.5.6. Raymark waste areas will be excavated to a 4-foot depth. Excavated material will be placed in an in-town consolidation area (Alternative 9) or an out-of-town disposal location (Alternative 10). The property group-specific details include the following:

Excavation and Final Cover

- Approximately 2,667 CY of Raymark waste will be excavated to a 4-foot depth.
- Raymark waste in <u>paved</u> areas will be excavated to a 4-foot depth and replaced with clean fill. The top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top

coat. Raymark waste in unpaved areas will be excavated to a 4-foot depth and replaced with a vegetated, permeable soil cover.

- Final property contours will be designed to meet 250, 304, and 340 East Main Street and surrounding parcels at current elevations.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated to 4 feet. Once excavated, this area will be backfilled with clean fill and revegetated or repaved with current elevations and drainage patterns retained so that the current flood storage capacity will not be diminished after completion of the remedial actions.

- No wetlands are present in the area of Raymark waste on this parcel

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 9 and 10 will include placement of institutional controls on the 250, 304, and 340 East Main Street property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Five monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above the seasonal high water table, all five wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: Paved areas and vegetative covers must be inspected monthly and maintained in good condition. A 30-year monitoring period is used in the present value cost analysis.

4.3.9.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10)

Raymark waste treatment is presented in Section 3.1.3 for all property groups.

- Based on an evaluation of historical sampling data from <u>all</u> OU6 properties, it is assumed that approximately 10% of excavated Raymark waste will require treatment prior to disposal. Treatment will be required only when excavated materials exhibit concentrations of contaminants in excess of disposal requirements. All treatment will occur at an out-of-town facility.

- For alternatives featuring out-of-town disposal of Raymark waste (Alternatives 4, 6, 8, and 10), the concentration thresholds for treatment will be 10 times UTS thresholds.

- For alternatives featuring in-town consolidation (Alternatives 3, 5, 7, and 9), the concentration thresholds for treatment will be the PHC levels.

- Treatment volume estimates for 250, 304, and 340 East Main Street are based on the assumed quantity of excavation required to implement each alternative. Note that the waste volumes are rounded up or down as appropriate.

- A 1.5 conversion factor from tons to cubic yards is used.

  - <u>Alternatives 3/4</u>
    - 1,963 CY RW excavated * 1.2 bulking factor = 2,356 CY
    - 2,356 CY X 1.5 TON/CY = 3,534 TON
    - 3,534TON * 10% = **353 TONS to be treated (236 CY)**

- Alternatives 5/6
  - 3,333 CY RW excavated * 1.2 bulking factor = 4,000 CY
  - 4,000 CY * 1.5 TON/CY = 6,000 TON
  - 6,000 TON * 10% = **600 TONS to be treated (400 CY)**

- Alternatives 7/8
  - 2,519 CY RW excavated * 1.2 bulking factor = 3,022 CY
  - 3,022 CY * 1.5 TON/CY = 4,533 TON
  - 4,533 TON * 10% = **453 TONS to be treated (302 CY)**

- Alternatives 9/10
  - 2,667 CY RW excavated * 1.2 bulking factor= 3,200 CY
  - 3,200 CY * 1.5 TON/CY = 4,800 TON
  - 4,800 TON * 10% = **480 TONS to be treated (320 CY)**

4.3.9.2 Comparative Analysis of Alternatives for 250, 304, and 340 East Main Street

This section presents the comparative analysis of alternatives for the 250, 304, and 340 East Main Street using the criteria described in Section 4.2. The comparative analysis of alternatives for this property is summarized in a comparison format on Table 4-9A.

4.3.9.2.1 Overall Protection of Human Health and the Environment

Alternative 1 (No Action) will not protect human health or the environment. Alternative 2 (Restrictions with Long-Term Monitoring) can provide limited protection of human health and the environment, if restrictions are monitored and enforced. Alternatives 3 and 4 and 7 through 10 will achieve protection of human health and the environment through the excavation of varying amounts of Raymark waste (low-permeability cap for Alternative 3 and 4) and the use of institutional controls, rendering the contaminated waste inaccessible. Alternatives 5 and 6 will also protect human health and the environment through the removal of all Raymark waste located above the seasonal high water table and the use of institutional controls.

4.3.9.2.2 Compliance with ARARs

Alternative 1 (No Action) and Alternative 2 (Restrictions with Long-Term Monitoring) will not comply with ARARs because contaminants in Raymark waste will remain accessible in soils in excess of CT RSRs and federal risk criteria.

The ARARs associated with the implementation of Alternatives 3 through 10 are presented in Section 4.0 of this FS and on Table 4-9C. Alternatives 3 through 6 could be designed to comply with all chemical-specific, action-specific, and location-specific ARARs. Through excavation of Raymark waste to 2 feet (paved areas) or 4 feet (unpaved areas), Alternatives 7 through 10 will render the remaining contaminated soil inaccessible and will be compliant with the action-specific CT RSR Direct Exposure Criteria. Alternatives 7 through 10 may not comply with the numeric standards of CTDEP's Pollutant Mobility Criteria, however, the RSRs allow for variances and alternate criteria. Alternatives 7 through 10 will comply with all other chemical, action, and location-specific ARARs.

4.3.9.2.3 Long-Term Effectiveness and Permanence

The magnitude of residual human health risk associated with Raymark waste will be highest for Alternative 1 (No Action), since no actions will be taken to mitigate human health risks. Residual human health risks for Alternative 2 (Restrictions with Long-Term Monitoring) will be lower than Alternative 1, but still above acceptable human health risk levels.

Residual human health risks after implementation of Alternatives 3 and 4 and Alternatives 7 through 10 will be slightly higher than for Alternatives 5 and 6 because Raymark waste will be left in-place above the seasonal high water table. Alternatives 5 and 6 will be more reliable than Alternatives 3 and 4 and 7 through 10 because there will be no Raymark waste in place above the seasonal high water table and protection of human health through direct contact or mobilization of contaminants by rainwater infiltration will not be dependent on maintenance of a low-permeable RCRA cap or a soil or paved cover.

Alternatives 3 and 4, and 7 through 10 can provide protection in the long-term if the cover systems are maintained. Alternatives 5 and 6 will provide the greatest protection to human health and will be the most permanent. Alternative 3 through 10 could each be designed to allow for redevelopment potential on the property group.

4.3.9.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment

No treatment will be required for Alternative 1 (No Action) or Alternative 2 (Restrictions with Long-Term Monitoring). Alternatives 3 through 10 will require treatment prior to land disposal to address the assumed 10 percent fraction that exceeds the UTS or PHC levels. This treatment will result in the reduction of toxicity, mobility, and volume of Raymark waste. Although, the estimated volumes that will require treatment are similar (ranging from 236 to 400 CY), Alternatives 5 and 6 will result in the greatest amount of reduction because a larger quantity of materials will be shipped offsite and is expected to require treatment prior to disposal.

4.3.9.2.5 Short-Term Effectiveness

No on-site actions will be taken under Alternative 1 (No Action) and minimal on-site actions will be taken under Alternative 2 (Restrictions with Long-Term Monitoring); therefore, there will be no short-term impacts to the community, workers, or the environment. Short-term impacts to the community, workers, and the environment from the implementation of Alternatives 3 through 10 will be similar and can be mitigated using engineering controls.

Alternatives 5 and 6 will involve a higher volume of truck traffic to transport Raymark waste and backfill and will require a greater volume of Raymark waste handling than Alternatives 3 and 4 and 7 through 10.

Alternatives 3 through 10 will take approximately 4 months to complete. For Alternatives 3, 5, 7, and 9, the estimated time to complete does not include the amount of time necessary to complete remedial activities at an in-town consolidation location.

4.3.9.2.6 Implementability

Alternatives 3 and 4 (low-permeability cap), Alternatives 5 and 6 (excavation to the water table), and Alternatives 7 through 10 (2 to 4-foot excavation) all require excavation, which can be implemented through standard construction and environmental remediation methods. Alternatives 3 and 4 and 7 through 10 require specific site grading, placement of cap/cover materials based on design specifications, and O&M in the future. Alternatives 5 and 6 will involve excavation of the largest volume of Raymark waste (3,333 CY), and any expansions of

the Raymark waste area due to confirmatory sampling will lead to a larger volume of excavated Raymark waste compared to Alternative 7 through 10 due to the excavation depth to the seasonal high water table.

Additional remedial actions will be more difficult to implement for Alternatives 3 and 4 due to the presence of a RCRA cap. Alternatives 7 through 10 are equally amenable to additional remedial actions at the property group, should they be deemed necessary. Alternatives 5 and 6 will be the most amenable to additional actions should they be necessary as all Raymark waste will be removed to the seasonal high water table.

Alternatives 3 and 4 and 7 through 10 will each require long-term groundwater monitoring. Alternatives 5 and 6 will require quarterly groundwater monitoring for only 2 years after which groundwater monitoring may no longer be required. Alternatives 3 and 4 and 7 though 10 will also require long-term operation and maintenance of the cap or soil cover.

Alternatives 3 through 10 will be similar in terms of the ability to coordinate with other agencies.

For Alternatives 3 through 10, each involves conventional construction methods for which the required equipment and technical specialists will be readily available.

4.3.9.2.7 Cost

A comparison of costs for each of the alternatives that were evaluated for 250, 304, and 340 East Main Street is presented on Table 4-9.

Table 4-9
Summary of Detailed Analysis for 250, 304, and 340 East Main Street
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4 – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8 – Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Overall Protection of Human Health and the Environment	Would not protect human health. RI did not identify any significant habitats for ecological receptors.	Some protection of human health, but human health risks still above acceptable limits. RI did not identify any significant habitats for ecological receptors.	Would protect human health through construction of a RCRA C-compliant cover (multi-component, drainage layer, gas vent layer, E-07 cm/s hydraulic conductivity) over Raymark waste. RI did not identify any significant habitats for ecological receptors.	Would protect human health through the removal of Raymark waste and placement of clean soil in its place. RI did not identify any significant habitats for ecological receptors.	Would protect human health through construction of an engineered barrier over Raymark waste. RI did not identify any significant habitats for ecological receptors.	Would protect human health through construction of an engineered barrier over Raymark waste. RI did not identify any significant habitats for ecological receptors.
Compliance with ARARs	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs.	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-9C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-9C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-9C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs with the use of alternate criteria. See Table 4-9C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs with the use of alternate criteria. See Table 4-9C.
Long-Term Effectiveness and Permanence	Magnitude of residual risk high. No risk reduction. 5-year reviews required. No O&M or controls included for long term.	Residual human health risks above acceptable limits. No risk reduction. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would not be adequate to protect human health for the long-term.	Residual risk within acceptable limits. Raymark waste will be left in-place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness. Capping technology reliable. Additional design analysis of cap in floodplains will be required during remedial design phase.	Residual risk within acceptable limits. Risk reduction would be permanent. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.	Residual risk within acceptable limits. Raymark waste will be left in-place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.	Residual risk within acceptable limits. Raymark waste will be left in-place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.
Reduction of Toxicity, Mobility, or Volume Through Treatment	None.	None.	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark waste treated (tons)= 353 Raymark waste treated (CY)= 236	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark waste treated (tons)= 600 Raymark waste treated (CY)= 400	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark waste treated (tons)= 453 Raymark waste treated (CY)= 302	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark waste treated (tons)= 480 Raymark waste treated (CY)= 320
Short-Term Effectiveness	No actions, therefore no short-term impacts anticipated. Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures are applied. No adverse impacts to environment anticipated during implementation. Minimal on-site actions (well construction, signage, and fence installation, and groundwater sampling only). Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1] = 2,356 Approximate truckloads of Raymark waste 196 Approximate truckloads of clean fill 196 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 3, this time frame does not include duration of capping activtites at consolidation location. 4 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1] = 4,000 Approximate truckloads of Raymark waste 333 Approximate truckloads of clean fill 333 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 5, this time frame does not include duration of capping activtites at consolidation location. 4 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1] = 3,022 Approximate truckloads of Raymark waste 252 Approximate truckloads of clean fill 252 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 7, this time frame does not include duration of capping activtites at consolidation location. 4 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1] = 3,200 Approximate truckloads of Raymark waste 267 Approximate truckloads of clean fill 267 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 9, this time frame does not include duration of capping activtites at consolidation location. 4 Would achieve RAO.

Table 4-9
Summary of Detailed Analysis for 250, 304, and 340 East Main Street
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4 – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8 – Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Implementability	Not applicable.	Would be implementable, assuming cooperation by property owners. Would require coordination with state/town officials to perform O&M and to document compliance with institutional controls.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. May be difficult to implement additional remedial actions if required, because Raymark waste would be beneath RCRA C cover. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or buildings on the 250, 304 and 340 East Main Street property group will need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development could be hindered by the presence of the low-permeability cap.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or buildings on the 250, 304 and 340 East Main Street property group will need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by presence of Raymark waste left in-place.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or buildings on the 250, 304 and 340 East Main Street property group will need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by presence of Raymark waste left in-place.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or buildings on the 250, 304 and 340 East Main Street property group will need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by presence of Raymark waste left in-place.
Cost	**Alternative 1** Capital: $0 O&M (Years 1-2): $0 O&M (Years 3-30): $0 Five-Year Reviews: $20,000/each PV of O&M: $43,156 PV of Alternative: $43,156 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 2** Capital: $107,278 O&M (Years 1-2): $82,826 O&M (Years 3-30): $47,320 Five-Year Reviews: $20,000/each PVof O&M: $694,544 PV of Alternative: $801,823 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 3** Capital: $972,302 O&M (Years 1-2): $80,679 O&M (Years 3-30): $45,174 Five-Year Reviews: $20,000/each PV of O&M: $667,912 PV of Alternative: $1,640,214 **Alternative 4** Capital: $2,264,992 O&M (Years 1-2): $80,679 O&M (Years 3-30): $45,174 Five-Year Reviews: $20,000/each PV of O&M: $667,912 PV of Alternative: $2,932,904 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 5** Capital: $944,165 O&M (Years 1-2): $67,629 O&M (Years 3-30): $20,288 Five-Year Reviews: $20,000/each PV of O&M: $380,508 PV of Alternative: $1,324,674 **Alternative 6** Capital: $3,140,429 O&M (Years 1-2): $67,629 O&M (Years 3-30): $20,288 Five-Year Reviews: $20,000/each PV of O&M: $380,508 PV of Alternative: $3,520,937 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 7** Capital: $797,146 O&M (Years 1-2): $80,603 O&M (Years 3-30): $45,097 Five-Year Reviews: $20,000/each PV of O&M: $666,966 PV of Alternative: $1,464,113 **Alternative 8** Capital: $2,454,345 O&M (Years 1-2): $80,603 O&M (Years 3-30): $45,097 Five-Year Reviews: $10,000/each PV of O&M: $666,966 PV of Alternative: $3,121,312 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 9** Capital: $820,848 O&M (Years 1-2): $80,603 O&M (Years 3-30): $45,097 Five-Year Reviews: $10,000/each PV of O&M: $666,966 PV of Alternative: $1,487,815 **Alternative 10** Capital: $2,576,478 O&M (Years 1-2): $80,603 O&M (Years 3-30): $45,097 Five-Year Reviews: $20,000/each PV of O&M: $666,966 PV of Alternative: $3,243,444 See Cost Estimate Backup Sheets in Appendix G.

[1] A bulking factor of 1.2 was used.

Table 4-9A
Comparative Analysis of Alternatives for 250, 304, 340 East Main Street
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	2	3	4	5	6	7	8	9	10
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT										
Protection of Human Health	☐	☐	◘	◘	■	■	◘	◘	◘	◘
Protection of the Environment	☐	☐	◘	◘	■	■	◘	◘	◘	◘
COMPLIANCE WITH ARARs										
Chemical-Specific ARARs	☐	☐	■	■	■	■	◘	◘	◘	◘
Location-Specific ARARs	NA	■	■	■	■	■	◘	◘	◘	◘
Action-Specific ARARs	NA	■	■	■	■	■	◘	◘	◘	◘
Other Criteria, Advisories, Guidance	NA	NA	■	■	■	■	◘	◘	◘	◘
LONG-TERM EFFECTIVENESS AND PERMANENCE										
Magnitude of Residual Risk	☐	☐	◘	◘	■	■	◘	◘	◘	◘
Adequacy and Reliability of Controls	☐	☐	◘	◘	■	■	◘	◘	◘	◘
REDUCTION OF TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT										
Treatment/Recycling Processes Utilized	NA	NA	☐	☐	■	■	■	■	■	■
Amount of Hazardous Materials Destroyed or Treated	☐	☐	☐	☐	■	■	◘	◘	◘	◘
Degree of Expected Reductions in Tox, Mob, or Vol	☐	☐	☐	☐	■	■	◘	◘	◘	◘
Irreversibility	☐	☐	■	■	■	■	■	■	■	■
Type and Quantity of [Process] Residuals	☐	☐	■	■	■	■	■	■	■	■
SHORT-TERM EFFECTIVENESS										
Protection of Community During Remedial Actions	NA	■	◘	◘	◘	◘	◘	◘	◘	◘
Protection of Workers During Remedial Actions	NA	■	◘	◘	◘	◘	◘	◘	◘	◘
Environmental Impacts	■	■	◘	◘	◘	◘	◘	◘	◘	◘
Time Until Remedial Action Objectives are Achieved	☐	☐	◘	◘	◘	◘	◘	◘	◘	◘

Table 4-9A
Comparative Analysis of Alternatives for 250, 304, 340 East Main Street
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	2	3	4	5	6	7	8	9	10
IMPLEMENTABILITY										
Ability to Construct and Operate the Technology	NA	■	■	■	■	■	■	■	■	■
Reliability of the Technology	NA	□	◘	◘	■	■	◘	◘	◘	◘
Ease of Undertaking Additional Remedial Actions, if Necessary	■	■	◘	◘	■	■	◘	◘	◘	◘
Ability to Monitor Effectiveness of the Remedy	NA	NA	◘	◘	◘	◘	◘	◘	◘	◘
Ability to Obtain Approvals from Other Agencies	■	■	■	■	■	■	■	■	■	■
Coordination with Other Agencies	◘	◘	■	■	■	■	■	■	■	■
Availability of Off-Site Treatment, Storage, and Disposal Services and Capacity	NA	NA	NA	NA	■	■	■	■	■	■
Availability of Necessary Equipment and Specialists	NA	■	■	■	■	■	■	■	■	■
Availability of Prospective Technologies	NA	■	■	■	■	■	■	■	■	■
COST										
Capital	$0	$107,278	$972,302	$2,264,992	$944,165	$3,140,429	$797,146	$2,454,345	$820,848	$2,576,478
Present Value of O&M (First 30 Years)	$43,156	$694,544	$667,912	$667,912	$380,508	$380,508	$666,966	$666,966	$666,966	$666,966
Present Value of the Alternative	$43,156	$801,823	$1,640,214	$2,932,904	$1,324,674	$3,520,937	$1,464,113	$3,121,312	$1,487,815	$3,243,444

Notes:

■ = Highest rating (most protective, most effective, most implementable)

◘ = Meets criterion, but another alternative(s) more protective/effective/implementable

□ = Does not meet criterion

Table 4-9B
Cost Estimate Summary for 250, 304, 340 East Main Street
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Excavation Depth, ft	0	0	3	3	5	5	2 r	2o 4	o 44	4
Cap/Cover	NA	NA	RCRA C	RCRA C	NA	NA	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover
Disposal Volumes (CY)										
In-Town Consolidation			2120	0	3600	0	2720	0	2880	0
Out-of-Town (not treated)			0	2,120	0	3,600	0	2,720	0	2,880
Out-of-Town (treated)			236	236	400	400	302	302	320	320
Total Disposal Vol.			**2356**	**2356**	**4000**	**4000**	**3022**	**3022**	**3200**	**3200**
Cost										
Capital	**$0**	**$107,278**	**$972,302**	**$2,264,992**	**$944,165**	**$3,140,429**	**$797,146**	**$2,454,345**	**$820,848**	**$2,576,478**
O&M (present value)	**$43,156**	**$694,544**	**$667,912**	**$667,912**	**$380,508**	**$380,508**	**$666,966**	**$666,966**	**$666,966**	**$666,966**
Present Value	**$43,156**	**$801,823**	**$1,640,214**	**$2,932,904**	**$1,324,674**	**$3,520,937**	**$1,464,113**	**$3,121,312**	**$1,487,815**	**$3,243,444**

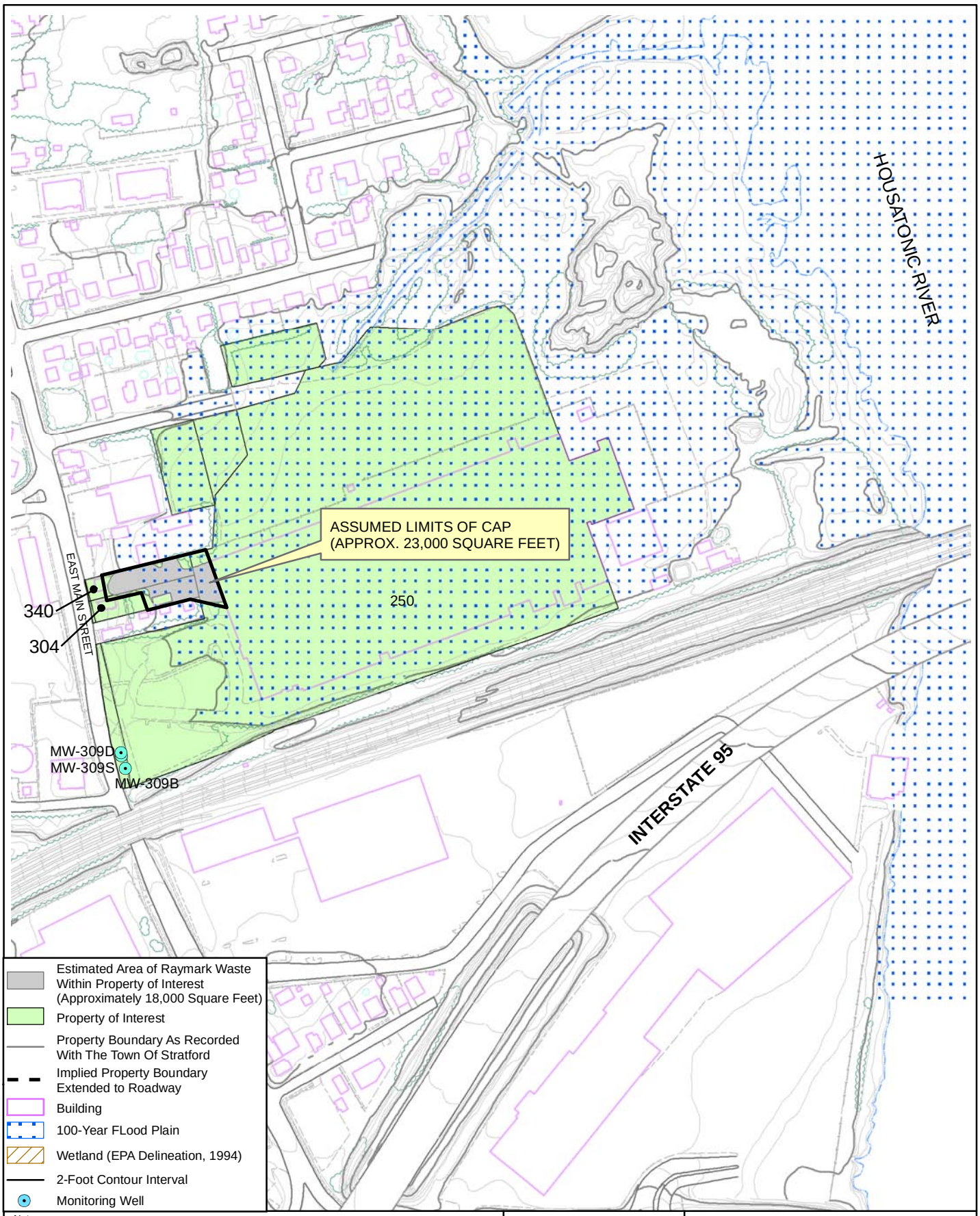
Notes:
Alternative 1 - No Action
Alternative 2 - Restrictions with Long-Term Monitoring
Alternative 3 - Low-Permeability Cap with In-Town Consolidation
Alternative 4 - Low-Permeability Cap with Out-Of-Town Disposal
Alternative 5 - Excavation to the Water Table with In-Town Consolidation
Alternative 6 - Excavation to the Water Table with Out-Of-Town Disposal
Alternative 7 - Excavation to either 2 or 4 Feet with In-Town Consolidation
Alternative 8 - Excavation to either 2 or 4 Feet with Out-Of-Town Disposal
Alternative 9 - Excavation to 4 Feet with In-Town Consolidation
Alternative 10 - Excavation to 4 Feet with Out-Of-Town Disposal
NA = not applicable
FT = foot
CY = cubic yard
O&M = operations and maintenance

Table 4-9C
Preliminary ARAR Summary - 250, 304, 340 East Main Street
Raymark OU6 - Additional Properties
Stratford, Connecticut

Property Group	ARAR Tables				
	A	B	C	D	E
Alternative 1	X				
Alternative 2	X		X		
Alternative 3	X		X	X	X
Alternative 4	X		X	X	X
Alternative 5	X		X		
Alternative 6	X		X		
Alternative 7	X		X		
Alternative 8	X		X		
Alternative 9	X		X		
Alternative 10	X		X		

A = ARARs for all Alternatives
B = ARAR add-ons for an alternative for the Raymark waste located in the wetlands
C = ARAR add-ons for an alternative for the Raymark waste located in the floodplains
D = ARAR add-ons for alternatives that include low-permeability caps
E = ARAR add-ons for alternatives that include CAMUs

Note:
ARAR tables A-E are found in Volume II, Appendix C of this Feasibility Study.



Notes:
1) Plan not to be used for design.
2) All locations to be considered approximate.
3) Property boundaries are approximate based on Town of Stratford Engineering Department plans.
4) Floodplain extent based on Federal Emergency Management Agency Q3 Flood Data, Community Panel Numbers 090016 0001-0004, Revised June 16, 1992, FEMA, Washington D.C. and modified to Town of Stratford Engineering Plan 10-foot contour.
5) Adapted from TTNUS Remedial Investigation, 2005.

300 150 0 300 Feet

N

Nobis

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
(978) 683-0891
www.nobisengineering.com

FIGURE 4-9

250, 304, 340 EAST MAIN STREET
FEASABILITY STUDY
RAYMARK SUPERFUND SITE
STRATFORD, CONNECTICUT

Drawn By: D. McGrath	Approved By: H. Ford
Project: 80006	Date: 9/4/09 Rev00

R:\80000 Task Orders\80006 Raymark\Technical Data\GIS_Data\Figures\OU6_FS_Figures\250_304_340_East_Main.mxd

4.3.10 380 East Main Street Property

The 380 East Main Street parcel was evaluated as part of the OU6 Remedial Investigation (RI) report (TtNUS, 2005). This parcel encompasses approximately 0.5 acres of commercially-zoned land (retail/light industrial) located on the eastern side of East Main Street in Stratford, Connecticut (see Figure 4-10). The property is bordered by the parking lot for 250 East Main Street to the east, mixed residential and commercial properties to the north and south, and the town DPW Lot (see Sections 4.4.11 and 4.4.12) located across East Main Street to the west. Three other OU6 properties, 250, 304, and 340 East Main Street (see Section 4.3.9) are located to the east and south of this parcel. The front (western) half of the property is paved while the rear (eastern) half of the property is occupied by a one-story building. There is a small unpaved area to the rear of the building that is only accessible from the interior of the building as there is a fence and retaining wall directly abutting either side of the building. This small area is overgrown with vegetation, and scattered with debris. About 10 feet from the back of the building, there is an approximately 6-foot sharp decline to the 250 East Main Street parking lot. There is a short retaining fence at the foot of this decline, through which several layers of non-native materials are visible. This area is where Raymark waste is located and lies within the vegetated portion of the property group. Surface water drains toward storm drains near the property. Raymark waste on the property group does not lie within the 100-year floodplain.

Key factors associated with the areas and volumes to be addressed at this property group include:

- Raymark waste area: .....130 SF (Figure 4-10)
- Total volume of Raymark waste:.....24 CY
- Maximum depth of Raymark waste:.....5 feet bgs
- Average depth to the seasonal high groundwater table:.....5 feet
- Raymark waste area outside of 100-year floodplain:..... 130 SF
- Raymark waste area in 100-year floodplain:..... 0 SF
- Raymark waste in 100-year floodplain to 5 FT:.....0 CY
- Raymark waste area under pavement: ..... 0 SF
- Raymark waste in unpaved area:..... 130 SF
- Raymark waste located below the water table:.....0 CY

- Alternatives 3/4:
  - Raymark waste under pavement to 2.5 FT: ..... 0 CY
  - Raymark waste in unpaved area to 3 FT: ..... 14 CY (130 SF x 3 FT)
- Alternatives 5/6:
  - Raymark waste located above the water table: ..... 24 CY (130 SF x 5 FT)
- Alternatives 7/8:
  - Raymark waste under pavement to 2 FT: ..... 0 CY
  - Raymark waste in unpaved area to 4 FT: ..... 19 CY (130 SF x 4 FT)
- Alternatives 9/10:
  - Raymark waste to 4 FT: ..... 19 CY (130 SF x 4 FT)

The calculation of the average depth to the seasonal high water table of 5 feet below ground surface (bgs) is based on observations of water levels from soil borings advanced in the area. The calculation of the maximum depth of Raymark waste is based on data collected during the RI (TtNUS, 2005).

The detailed analysis of alternatives for this property group is presented below and consists of the following components:

- A list of key assumptions (Section 4.3.10.1) is used as the basis for the detailed analysis of alternatives and for the development of costs for the FS;
- Figure 4-10, which shows a map of 380 East Main Street, the delineated Raymark waste area, the 100-year floodplain, and the proposed cap footprint;
- Table 4-10, which presents the individual detailed analysis of alternatives for 380 East Main Street in tabular form;
- The comparative analysis of alternatives for 380 East Main Street, presented in text form;
- Table 4-10A, which presents a tabular summary of the comparative analysis;
- Table 4-10B, which presents a summary of cost estimates for each of the alternatives;
- Table 4-10C, which provides a summary of ARARs for each of the 380 East Main Street alternatives; and
- Cost Estimate Backup Sheets for the FS cost estimates, which are presented in Appendix G.

4.3.10.1 380 East Main Street Assumptions

Key assumptions associated with each alternative are presented in this section. Pairs of alternatives (3 and 4, 5 and 6, 7 and 8, and 9 and 10) have the same components except for the disposal of Raymark waste, which is either in-town or out-of-town. See Section 3.3 for details on the Remedial Alternatives discussed below. See Table 4-10 for a summary of the details on the analysis for the 380 Main Street property group.

4.3.10.1.1 Alternative 1 – No Action

Detailed descriptions of the no action alternative are presented in Section 3.5.1.

4.3.10.1.2 Alternative 2 – Restrictions with Long-Term Monitoring

Detailed descriptions of Alternative 2 are presented in Section 3.5.2. Property group-specific details include the following:

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group, Alternative 2 will include placement of institutional controls on the 380 Main Street property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above the seasonal high water table, all three wells will be monitored quarterly for 2 years, and annually thereafter.

- Existing Surfaces: Monthly surface inspections of vegetative covers will be required along with annual reporting to summarize inspection findings and to verify the effectiveness of institutional controls.

4.3.10.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4)

Detailed descriptions of Alternative 3 and 4 are presented in Section 3.5.3. Final contours of the cap will be designed to assimilate into the existing topography on this parcel so that pre-excavation will not be necessary for cap construction. Since no Raymark waste will be excavated to construct the cap, no out-of-treatment disposal is necessary. Therefore, Alternative 3 and 4 will be similar and separate evaluations are not needed. Alternative 3 will be the capping alternative. In addition, treatment will not be required as all Raymark waste will remain within the property group. The property group-specific details for Alternative 3 include the following:

Excavation Volumes/Final Cover

- A low permeable RCRA cap with a footprint of approximately 400 square feet (0.01 acres) will be constructed over Raymark waste present on the property group (Figure 4-10).
- Final property contours will be designed to meet 380 Main Street and surrounding parcels at current elevations.
- The current ground surface within the Raymark waste area on this property group is primarily covered with grass, therefore, a vegetated RCRA cap is assumed.

Floodplain and Wetlands

- No floodplain impacts are anticipated as Raymark waste on this parcel is not within 100-year floodplain.
- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain under the cap after completion of the remedial actions, Alternative 3will include placement of institutional controls on the 380 Main Street property group to prohibit certain types of activities such as excavations

without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above the seasonal high water table, all three wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: The O&M for Alternatives 3 and 4 will require monthly cap inspections with annual reporting to summarize inspection findings and verify the effectiveness of institutional controls. A 30-year monitoring period is used in the present value cost analysis.

4.3.10.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6)

Detailed descriptions of Alternatives 5 and 6 are presented in Section 3.5.4. Raymark waste areas will be excavated to the seasonal high water table. Excavated material will be placed in an in-town consolidation area (Alternative 5) or an out-of-town disposal location (Alternative 6). The property group-specific details include the following:

Excavation Volumes/Final Cover

- Approximately 24 CY of Raymark waste will be excavated to the average seasonal high water table of 5 feet. Approximately 36 CY of non-Raymark waste soil will additionally be excavated to facilitate safety requirements such as benching/sloping of sidewalls to prevent collapse.

- Raymark waste will be excavated to the water table and replaced with a vegetated, permeable soil cover.
- Final property contours will be designed to meet 380 East Main Street and surrounding parcels at current elevations, as practicable.
- Because all Raymark waste is located above the seasonal high water table, complete excavation of all Raymark waste will occur.

Floodplain and Wetlands

- No floodplain impacts are anticipated as Raymark waste on this parcel is not within 100-year floodplain.
- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- No future use restrictions are anticipated as all Raymark waste will be removed.

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. To verify that all Raymark waste is removed from the property group, all three wells will be monitored quarterly for 2 years, after which groundwater monitoring may no longer be required.

4.3.10.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8)

Detailed descriptions of Alternatives 7 and 8 are presented in Section 3.5.5. As all of the Raymark waste is within unpaved areas, the excavation depth will be 4 feet; which is the same as Alternatives 9 and 10. Because of this, Alternatives 7 and 8 are not evaluated.

4.3.10.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10)

Detailed descriptions of Alternatives 9 and 10 are presented in Section 3.5.6. Raymark waste areas will be excavated to a 4-foot depth. Excavated material will be placed in an in-town consolidation area (Alternative 9) or an out-of-town disposal location (Alternative 10). The property group-specific details include the following:

Excavation and Final Cover

- Approximately 19 CY of Raymark waste will be excavated to a 4–foot depth.
- Raymark waste areas will be excavated to a 4-foot depth and replaced with a vegetated, permeable soil cover.
- Final property contours will be designed to meet 380 East Main Street and surrounding parcels at current elevations.

Floodplain and Wetlands

- No floodplain impacts are anticipated as Raymark waste on this parcel is not within 100-year floodplain.
- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 9 and 10 will include placement of institutional controls on the 380 Main Street property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above the seasonal high water table, all three wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: Vegetative covers must be inspected monthly and maintained in good condition. A 30-year monitoring period is used in the present value cost analysis.

4.3.10.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10)

Raymark waste treatment is presented in Section 3.1.3 for all property groups.

- Based on an evaluation of historical sampling data from <u>all</u> OU6 properties, it is assumed that approximately 10% of excavated Raymark waste will require treatment prior to disposal. Treatment will be required only when excavated materials exhibit concentrations of contaminants in excess of disposal requirements. All treatment will occur at an out-of-town facility.

- For alternatives featuring out-of-town disposal of Raymark waste (Alternatives 6 and 10), the concentration thresholds for treatment will be 10 times UTS thresholds.

- For alternatives featuring in-town consolidation (Alternatives 5 and 9), the concentration thresholds for treatment will be the PHC levels.

- Treatment volume estimates for 380 Main Street property group are based on the assumed quantity of excavation required to implement each alternative. Note that the waste volumes are rounded up or down as appropriate.

- A 1.5 conversion factor from tons to cubic yards is used.

- Alternatives 3/4
  - Not applicable.

- Alternatives 5/6
  - 24 CY RW excavated * 1.2 bulking factor = 29 CY
  - 29 CY * 1.5 TON/CY = 44 TON
  - 44 TON * 10% = **4 TONS to be treated (3 CY)**

- Alternatives 7/8
  - Not applicable.

- Alternatives 9/10
  - 19 CY RW excavated * 1.2 bulking factor = 23 CY
  - 23 CY * 1.5 TON/CY = 35 TON
  - 35 TON * 10% = **3 TONS to be treated (2 CY)**

4.3.10.2 Comparative Analysis of Alternatives for 380 East Main Street

This section presents the comparative analysis of alternatives for the 380 East Main Street using the criteria described in Section 4.2. The comparative analysis of alternatives for this property is summarized in comparison format on Table 4-10A.

4.3.10.2.1 Overall Protection of Human Health and the Environment

Alternative 1 (No Action) will not protect human health or the environment. Alternative 2 (Restrictions with Long-Term Monitoring) can provide limited protection of human health and the environment, if restrictions are monitored and enforced. Alternatives 3 and 9 and 10 will achieve protection of human health and the environment through the excavation of varying amounts of Raymark waste (low-permeability cap for Alternative 3) and the use of institutional controls, rendering the contaminated waste inaccessible. Alternatives 5 and 6 will protect human health and the environment through the removal of all Raymark waste located above the seasonal high water table.

4.3.10.2.2 Compliance with ARARs

Alternative 1 (No Action) and Alternative 2 (Restrictions with Long-Term Monitoring) will not comply with chemical-specific ARARs because contaminants in Raymark waste will remain accessible in soils in excess of CT RSRs and federal risk criteria.

The ARARs associated with the implementation of Alternatives 3, 5 and 6, and 9 and 10 are presented in Section 4.0 of this FS and on Table 4-10C. Alternatives 3 and 5 and 6 could be designed to comply with all chemical-specific, action-specific, and location-specific ARARs. Through excavation of Raymark waste to 4 feet (unpaved areas), Alternatives 9 and 10 will render the remaining contaminated soil inaccessible, and will be compliant with the action-specific CT RSR Direct Exposure Criteria. Alternatives 9 and 10 may not comply with the numeric standards of CTDEP's Pollutant Mobility Criteria, however RSRs allow for variances and alternate criteria. Alternatives 9 and 10 will comply with all other chemical, action, and location-specific ARARs.

4.3.10.2.3 Long-Term Effectiveness and Permanence

The magnitude of residual human health risk associated with Raymark waste will be highest for Alternative 1 (No Action), since no actions will be taken to mitigate human health risks. Residual human health risks for Alternative 2 (Restrictions with Long-Term Monitoring) will be lower than Alternative 1, but still above acceptable human health risk levels.

Residual human health risks after implementation of Alternatives 3 and Alternatives 9 and 10 will be slightly higher than for Alternatives 5 and 6 because Raymark waste will be left in-place above the seasonal high water table. Alternatives 5 and 6 will be more reliable than Alternatives 3 and 9 and 10 because there will be no Raymark waste remaining on the property and protection of human health through direct contact or mobilization of contaminants by rainwater infiltration will not be dependent on maintenance of a low-permeable RCRA cap or a soil cover.

Alternatives 3 and 9 and 10 can provide protection in the long-term if the cover systems are maintained. Alternatives 5 and 6 will provide the greatest protection to human health and will be the most permanent. Alternatives 3, 5 and 6, and 9 and 10 could each be designed to allow for redevelopment potential on the property group.

4.3.10.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment

No treatment will be required for Alternative 1 (No Action) or Alternative 2 (Restrictions with Long-Term Monitoring). Alternatives 5 and 6 and 9 and 10 will require treatment prior to land disposal to address the assumed 10 percent fraction that exceeds the UTS or PHC levels. This treatment will result in reduction of toxicity, mobility, and volume of Raymark waste. Although, the estimated volumes that will require treatment are similar (ranging from 2 to 3 CY), Alternatives 5 and 6 will result in the greatest amount of reduction because a larger quantity of materials will be shipped offsite and is expected to require treatment prior to disposal.

4.3.10.2.5 Short-Term Effectiveness

No on-site actions will be taken under Alternative 1 (No Action) and minimal on-site actions will be taken under Alternative 2 (Restrictions with Long-Term Monitoring); therefore, there will be no short-term impacts to the community, workers, or the environment. Short-term impacts to the community, workers, and the environment from the implementation of Alternatives 3, 5 and 6, and 9 and 10 will be similar and can be mitigated using engineering controls.

Alternatives 5 and 6 will involve a higher volume of truck traffic to transport Raymark waste and backfill and will require greater Raymark waste handling than Alternatives 3 and 9 and 10.

Alternatives 3, 5 and 6, and 9 and 10 will take approximately 1 month to complete. For Alternatives 5 and 9, the estimated time to complete does not include the amount of time necessary to complete remedial activities at an in-town consolidation location.

4.3.10.2.6 Implementability

Alternative 3 (low-permeability cap), Alternatives 5 and 6 (excavation to water table), and Alternatives 9 and 10 (4-foot excavation) all require excavation, which can be implemented through standard construction and environmental remediation methods. Alternatives 3 and 9 and 10 require specific site grading, placement of cap/cover materials based on design specifications, and O&M in the future. Alternatives 5 and 6 will involve excavation of the largest volume of Raymark waste (24 CY), and any expansions of the Raymark waste area due to confirmatory sampling will lead to a larger volume of excavated Raymark waste compared to Alternative 9 and 10 due to the excavation depth to the seasonal high water table.

Additional remedial actions will be more difficult to implement for Alternatives 3 due to the presence of a RCRA cap. Alternatives 9 and 10 are equally amenable to additional remedial actions at the property group, should they be deemed necessary. Alternatives 5 and 6 will be the most amenable to additional actions should they be necessary as all Raymark waste will be removed from the property group.

Alternatives 3 and 9 and 10 will each require long-term groundwater monitoring. Alternatives 5 and 6 will require quarterly groundwater monitoring for only 2 years after which groundwater monitoring may no longer be required. Alternatives 3 and 9 and 10 will also require long-term operation and maintenance of the cap or soil cover. Long-term operation and maintenance requirements will not be required for Alternatives 5 and 6 as all Raymark waste will be removed from the property group.

Alternatives 3, 5 and 6, and 9 and 10 will be similar in terms of the ability to coordinate with other agencies.

For Alternatives 3, 5 and 6, and 9 and 10, each involves conventional construction methods for which the required equipment and technical specialists will be readily available.

4.3.10.2.7 Cost

A comparison of costs for each of the alternatives that were evaluated for 380 East Main Street is presented on Table 4-10B.

Table 4-10
Summary of Detailed Analysis for 380 East Main Street
Raymark OU6 - Additional Properties

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4[1] – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8[2] – Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Overall Protection of Human Health and the Environment	Would not protect human health. RI did not identify any significant habitats for ecological receptors.	Some protection of human health, but human health risks still above acceptable limits. RI did not identify any significant habitats for ecological receptors.	Would protect human health through construction of a RCRA C-compliant cover (multi-component, drainage layer, gas vent layer, E-07 cm/s hydraulic conductivity) over Raymark waste. RI did not identify any significant habitats for ecological receptors.	Would protect human health through the removal of Raymark waste from these properties and placement of clean soil in its place. RI did not identify any significant habitats for ecological receptors.	NA	Would protect human health through construction of an engineered barrier over Raymark waste area to prevent direct contact. RI did not identify any significant habitats for ecological receptors.
Compliance with ARARs	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs.	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-10C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-10C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-10C.	NA	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs with the use of alternate criteria. See Table 4-10C.
Long-Term Effectiveness and Permanence	Magnitude of residual risk high. No risk reduction. 5-year reviews required. No O&M or controls included for long term.	Residual human health risks above acceptable limits. No risk reduction. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would not be adequate to protect human health for the long-term.	Residual risk within acceptable limits. Raymark waste will be left in-place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness. Capping technology reliable.	Residual risk within acceptable limits. Risk reduction would be permanent. Controls would be adequate to ensure long-term effectiveness.	NA	Residual risk within acceptable limits. Raymark waste will be left in-place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.
Reduction of Toxicity, Mobility, or Volume Through Treatment	None.	None.	Treatment not required since all Raymark waste will remain within the property group. Raymark waste treated (tons)= 0 Raymark waste treated (CY)= 0	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark waste treated (tons)= 4 Raymark waste treated (CY)= 3	NA	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark waste treated (tons)= 3 Raymark waste treated (CY)= 2
Short-Term Effectiveness	No actions, therefore no short-term impacts anticipated. Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures are applied. No adverse impacts to environment anticipated during implementation. Minimal on-site actions (well construction, signage, and fence installation, and groundwater sampling only). Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW $(CY)^3$ = 0 Approximate truckloads of Raymark waste 0 Approximate truckloads of clean fill 0 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 3, this time frame does not include duration of capping activities at consolidation location. 1 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW $(CY)^3$ = 29 Approximate truckloads of Raymark waste 2 Approximate truckloads of clean fill 2 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 5, this time frame does not include duration of capping activities at consolidation location. 1 Would achieve RAO.	NA	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW $(CY)^3$ = 23 Approximate truckloads of Raymark waste 2 Approximate truckloads of clean fill 2 Assume 12 CY per truckload. Approximately months to complete remedial action. 1 Would achieve RAO.

Table 4-10
Summary of Detailed Analysis for 380 East Main Street
Raymark OU6 - Additional Properties

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4[1] – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8[2] – Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Implementability	Not applicable.	Would be implementable, assuming cooperation by property owners. Would require coordination with state/town officials to perform O&M and to document compliance with institutional controls.	Excavation in floodplains not anticipated. May be difficult to implement additional remedial actions if required, because Raymark waste would be beneath RCRA C cover. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Required equipment and specialists readily available. Technology available and in full-scale use. Future development could be hindered by the presence of the low-permeability cap.	Excavation in floodplains not anticipated. Additional remedial actions can be implemented, will only require removal of backfill. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or building on 380 East Main Street would will to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use.	NA	Excavation in floodplains not anticipated. Additional remedial actions can be implemented, will only require removal of backfill. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or building on 380 East Main Street would will to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by presence of Raymark waste left in-place.
Cost	**Alternative 1** Capital: $0 O&M (Years 1-2): $0 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: $21,578 PV of Alternative: $21,578 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 2** Capital: $37,229 O&M (Years 1-2): $58,498 O&M (Years 3-30): $31,555 Five-Year Reviews: $10,000/each PVof O&M: $461,856 PV of Alternative: $499,085 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 3** Capital: $164,888 O&M (Years 1-2): $58,446 O&M (Years 3-30): $31,502 Five-Year Reviews: $10,000/each PV of O&M: $461,206 PV of Alternative: $626,095 **Alternative 4** Capital: NA O&M (Years 1-2): NA O&M (Years 3-30): NA Five-Year Reviews: NA PV of O&M: NA PV of Alternative: NA See Cost Estimate Backup Sheets in Appendix G.	**Alternative 5** Capital: $152,544 O&M (Years 1-2): $35,924 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: $86,530 PV of Alternative: $239,074 **Alternative 6** Capital: $168,372 O&M (Years 1-2): $35,924 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: $86,530 PV of Alternative: $254,902 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 7** Capital: NA O&M (Years 1-2): NA O&M (Years 3-30): NA Five-Year Reviews: NA PV of O&M: NA PV of Alternative: NA **Alternative 8** Capital: NA O&M (Years 1-2): NA O&M (Years 3-30): NA Five-Year Reviews: NA PV of O&M: NA PV of Alternative: NA See Cost Estimate Backup Sheets in Appendix G.	**Alternative 9** Capital: $145,485 O&M (Years 1-2): $51,841 O&M (Years 3-30): $27,008 Five-Year Reviews: $10,000/each PV of O&M: $401,618 PV of Alternative: $547,103 **Alternative 10** Capital: $155,979 O&M (Years 1-2): $51,841 O&M (Years 3-30): $27,008 Five-Year Reviews: $10,000/each PV of O&M: $401,618 PV of Alternative: $557,597 See Cost Estimate Backup Sheets in Appendix G.

[1] Alternative 4 was not evaluated.
[2] Alternatives 7 and 8 were not evaluated.
[3] A bulking factor of 1.5 was used.

Table 4-10A
Comparative Analysis of Alternatives for 380 East Main Street
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	2	3	4	5	6	7	8	9	10
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT										
Protection of Human Health	☐	☐	◘	NA	■	■	NA	NA	◘	◘
Protection of the Environment	☐	☐	◘	NA	■	■	NA	NA	◘	◘
COMPLIANCE WITH ARARs										
Chemical-Specific ARARs	☐	☐	■	NA	■	■	NA	NA	◘	◘
Location-Specific ARARs	NA	■	■	NA	■	■	NA	NA	◘	◘
Action-Specific ARARs	NA	■	■	NA	■	■	NA	NA	◘	◘
Other Criteria, Advisories, Guidance	NA	NA	■	NA	■	■	NA	NA	◘	◘
LONG-TERM EFFECTIVENESS AND PERMANENCE										
Magnitude of Residual Risk	☐	☐	◘	NA	■	■	NA	NA	◘	◘
Adequacy and Reliability of Controls	☐	☐	◘	NA	■	■	NA	NA	◘	◘
REDUCTION OF TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT										
Treatment/Recycling Processes Utilized	NA	NA	☐	NA	■	■	NA	NA	■	■
Amount of Hazardous Materials Destroyed or Treated	☐	☐	☐	NA	■	■	NA	NA	◘	◘
Degree of Expected Reductions in Tox, Mob, or Vol	☐	☐	☐	NA	■	■	NA	NA	◘	◘
Irreversibility	☐	☐	■	NA	■	■	NA	NA	■	■
Type and Quantity of [Process] Residuals	☐	☐	■	NA	■	■	NA	NA	■	■
SHORT-TERM EFFECTIVENESS										
Protection of Community During Remedial Actions	NA	■	◘	NA	◘	◘	NA	NA	◘	◘
Protection of Workers During Remedial Actions	NA	■	◘	NA	◘	◘	NA	NA	◘	◘
Environmental Impacts	■	■	◘	NA	◘	◘	NA	NA	◘	◘
Time Until Remedial Action Objectives are Achieved	☐	☐	◘	NA	◘	◘	NA	NA	◘	◘

Table 4-10A
Comparative Analysis of Alternatives for 380 East Main Street
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	2	3	4	5	6	7	8	9	10
IMPLEMENTABILITY										
Ability to Construct and Operate the Technology	NA	■	■	NA	■	■	NA	NA	■	■
Reliability of the Technology	NA	□	◘	NA	■	■	NA	NA	◘	◘
Ease of Undertaking Additional Remedial Actions, if Necessary	■	■	◘	NA	■	■	NA	NA	◘	◘
Ability to Monitor Effectiveness of the Remedy	NA	NA	◘	NA	◘	◘	NA	NA	◘	◘
Ability to Obtain Approvals from Other Agencies	■	■	■	NA	■	■	NA	NA	■	■
Coordination with Other Agencies	◘	◘	■	NA	■	■	NA	NA	■	■
Availability of Off-Site Treatment, Storage, and Disposal Services and Capacity	NA	NA	NA	NA	■	■	NA	NA	■	■
Availability of Necessary Equipment and Specialists	NA	■	■	NA	■	■	NA	NA	■	■
Availability of Prospective Technologies	NA	■	■	NA	■	■	NA	NA	■	■
COST										
Capital	$0	$37,229	$164,888	NA	$152,544	$168,372	NA	NA	$145,485	$155,979
Present Value of O&M (First 30 Years)	$21,578	$461,856	$461,206	NA	$86,530	$86,530	NA	NA	$401,618	$401,618
Present Value of the Alternative	$21,578	$499,085	$626,095	NA	$239,074	$254,902	NA	NA	$547,103	$557,597

Notes:

■ = Highest rating (most protective, most effective, most implementable)

◘ = Meets criterion, but another alternative(s) more protective/effective/implementable

□ = Does not meet criterion

Table 4-10B
Cost Estimate Summary for 380 East Main Street
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Excavation Depth, ft	0	0	0	0	5	5	2 or 4	2 or 4	4	4
Cap/Cover	NA	NA	RCRA C	RCRA C	NA	NA	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover
Disposal Volumes (CY)										
In-Town Consolidation			0	0	26	0	0	0	21	0
Out-of-Town (not treated)			0	0	0	26	0	0	0	21
Out-of-Town (treated)			0	0	3	3	0	0	2	2
Total Disposal Vol.			**0**	**0**	**29**	**29**	**0**	**0**	**23**	**23**
Cost										
Capital	**$0**	**$37,229**	**$164,888**	**NA**	**$152,544**	**$168,372**	**NA**	**NA**	**$145,485**	**$155,979**
O&M (present value)	**$21,578**	**$461,856**	**$461,206**	**NA**	**$86,530**	**$86,530**	**NA**	**NA**	**$401,618**	**$401,618**
Present Value	**$21,578**	**$499,085**	**$626,095**	**NA**	**$239,074**	**$254,902**	**NA**	**NA**	**$547,103**	**$557,597**

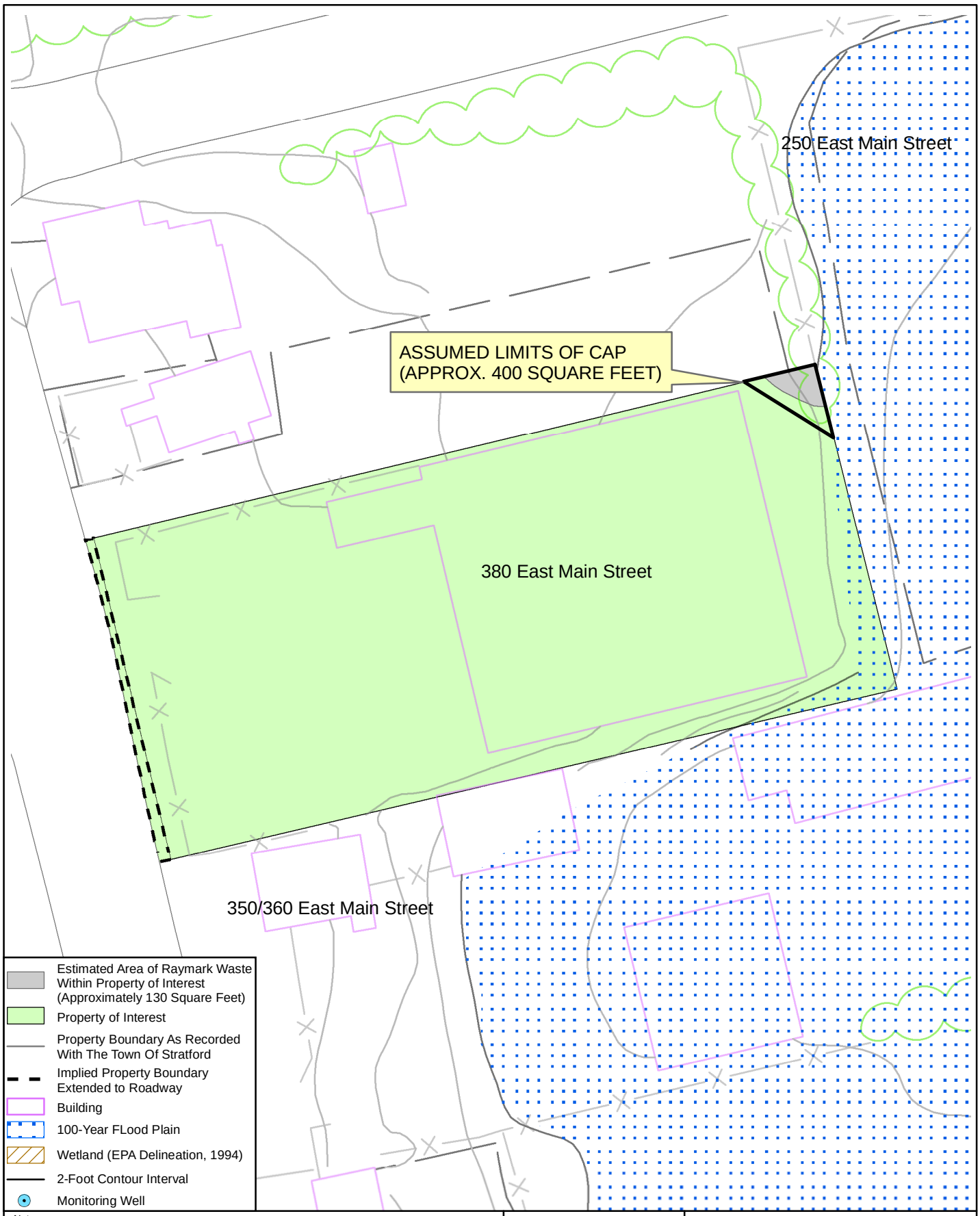
Notes:
Alternative 1 - No Action
Alternative 2 - Restrictions with Long-Term Monitoring
Alternative 3 - Low-Permeability Cap with In-Town Consolidation
Alternative 4 - Low-Permeability Cap with Out-Of-Town Disposal (Not applicable)
Alternative 5 - Excavation to the Water Table with In-Town Consolidation
Alternative 6 - Excavation to the Water Table with Out-Of-Town Disposal
Alternative 7 - Excavation to either 2 or 4 Feet with In-Town Consolidation (Not applicable)
Alternative 8 - Excavation to either 2 or 4 Feet with Out-Of-Town Disposal (Not applicable)
Alternative 9 - Excavation to 4 Feet with In-Town Consolidation
Alternative 10 - Excavation to 4 Feet with Out-Of-Town Disposal
NA = not applicable
FT = foot
CY = cubic yard
O&M = operations and maintenance

Table 4-10C
Preliminary ARAR Summary - 380 East Main Street
Raymark OU6 - Additional Properties
Stratford, Connecticut

Property Group	ARAR Tables				
	A	B	C	D	E
Alternative 1	X				
Alternative 2	X				
Alternative 3	X			X	X
Alternative 4[1]					
Alternative 5	X				
Alternative 6	X				
Alternative 7[1]					
Alternative 8[1]					
Alternative 9	X				
Alternative 10	X				

A = ARARs for all Alternatives
B = ARAR add-ons for an alternative for the Raymark waste located in the wetlands
C = ARAR add-ons for an alternative for the Raymark waste located in the floodplains
D = ARAR add-ons for alternatives that include low-permeability caps
E = ARAR add-ons for alternatives that include CAMUs

Note:
ARAR tables A-E are found in Volume II, Appendix C of this Feasibility Study.



Notes:
1) Plan not to be used for design.
2) All locations to be considered approximate.
3) Property boundaries are approximate based on Town of Stratford Engineering Department plans.
4) Floodplain extent based on Federal Emergency Management Agency Q3 Flood Data, Community Panel Numbers 090016 0001-0004, Revised June 16, 1992, FEMA, Washington D.C. and modified to Town of Stratford Engineering Plan 10-foot contour.
5) Adapted from TTNUS Remedial Investigation, 2005.

40 20 0 40 Feet

N

Nobis

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
(978) 683-0891
www.nobisengineering.com

FIGURE 4-10

380 EAST MAIN STREET
FEASABILITY STUDY
RAYMARK SUPERFUND SITE
STRATFORD, CONNECTICUT

Drawn By: D. McGrath	Approved By: H. Ford
Project: 80006	Date: 07/08/10 Rev00

R:\80000 Task Orders\80006 Raymark\Technical Data\GIS_Data\Figures\OU6_FS_Figures\Figure_04-10_380_East_Main_Street.mxd

4.3.11 Department of Public Works (DPW) Lot – Area of Concern (AOC) 1 Property

The DPW Lot parcel encompasses approximately 6.4 acres of commercially-zoned land (town-owned) located in the Town of Stratford, Connecticut. It is bordered by East Main Street to the east, Patterson Avenue to the north, and Frog Pond Lane to the west and south. There are 2 area of concern (AOCs) where Raymark waste was found.

AOC 1 on the DPW Lot consists of the northern Raymark waste area which is being evaluated separately from a second, non-contiguous, Raymark waste area located in the southern portion of the property (see Section 4.3.12). AOC 1 includes a Raymark waste area that is approximately 21,000 square feet in size, surrounding a large building that is located in the northeastern portion of the property. The entire DPW Lot was evaluated as one of the 24 properties in the OU6 Remedial Investigation (RI) report (TtNUS, 2005). The property group does not lie within the 100-year floodplain.

Key factors associated with the areas and volumes to be addressed at this property group include:

- Raymark waste area: .....21,000 SF (Figure 4-11)
- Total volume of Raymark waste:.....6,222 CY
- Maximum depth of Raymark waste:..... 8 feet bgs
- Average depth to the seasonal high groundwater table:.....8 feet
- Raymark waste area outside of 100-year floodplain:..... 21,000 SF
- Raymark waste area in 100-year floodplain:..... 0 SF
- Raymark waste in 100-year floodplain to 8 FT:.....0 CY
- Raymark waste area under pavement: ..... 21,000 SF
- Raymark waste in unpaved area:..... 0 SF
- Raymark waste located below the water table:.....0 CY
- Alternatives 3/4:
  - Raymark waste under pavement to 2.5 FT: .....1,944 CY (21,000 SF x 2.5 FT)
  - Raymark waste in unpaved area to 3 FT: .....0 CY
- Alternatives 5/6:
  - Raymark waste located above the water table: .....6,222 CY (21,000 FT x 8 FT)

- Alternatives 7/8:
  - Raymark waste under pavement to 2 FT: .....1,556 CY (21,000 SF x 2 FT)
  - Raymark waste in unpaved area to 4 FT: .....0 CY
- Alternatives 9/10:
  - Raymark waste to 4 FT: .....3,111 CY (21,000 SF x 4 FT)

The calculation of the average depth to the seasonal high water table of 8 feet below ground surface (bgs) is based on observations of water levels from soil borings advanced in the area. The calculation of the maximum depth of Raymark waste is based on data collected during the RI (TtNUS, 2005).

The detailed analysis of alternatives for this property group is presented below and consists of the following components:

- A list of key assumptions (Section 4.3.11.1) is used as the basis for the detailed analysis of alternatives and for the development of costs for the FS;
- Figure 4-11, which shows a map of DPW Lot AOC 1, the delineated Raymark waste area, the 100-year floodplain, and the proposed cap footprint;
- Table 4-11, which presents the individual detailed analysis of alternatives for DPW Lot AOC 1 in tabular form;
- The comparative analysis of alternatives for DPW Lot AOC 1, presented in text form;
- Table 4-11A, which presents a tabular summary of the comparative analysis;
- Table 4-11B, which presents a summary of cost estimates for each of the alternatives;
- Table 4-11C, which provides a summary of ARARs for each of the DPW Lot AOC 1 alternatives; and
- Cost Estimate Backup Sheets for the FS cost estimates, which are presented Appendix G.

4.3.11.1 DPW Lot AOC 1 Assumptions

Key assumptions associated with each alternative are presented in this section. Pairs of alternatives (3 and 4, 5 and 6, 7 and 8, and 9 and 10) have the same components except for the disposal of Raymark waste, which is either in-town or out-of-town. See Section 3.3 for details

on the Remedial Alternatives discussed below. See Table 4-11 for a summary of the details on the analysis for the DWP Lot AOC 1 property group.

4.3.11.1.1 Alternative 1 – No Action

Detailed descriptions of the no action alternative are presented in Section 3.5.1.

4.3.11.1.2 Alternative 2 – Restrictions with Long-Term Monitoring

Detailed descriptions of Alternative 2 are presented in Section 3.5.2. Property group-specific details include the following:

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group, Alternative 2 will include placement of institutional controls on the DPW Lot AOC 1 property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above the seasonal high water table, all three wells will be monitored quarterly for 2 years, and annually thereafter.

- Existing Surfaces: Monthly surface inspections of pavement will be required along with annual reporting to summarize inspection findings and to verify the effectiveness of institutional controls.

4.3.11.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4)

Detailed descriptions of Alternatives 3 and 4 are presented in Section 3.5.3. Raymark waste areas will be excavated 2.5 feet in paved areas Raymark waste within the property group will be consolidated under a RCRA cap with existing grades maintained after remedial action implementation. The clean, uncontaminated excavated soil will be staged for future use during cap construction. Excavated materials will be placed at an in-town consolidation area (Alternative 3) or an out-of-town disposal location (Alternative 4). The property group-specific details for Alternative 3 and 4 include the following:

Excavation Volumes/Final Cover

- Approximately 1,944 CY of Raymark waste and 370 CY of non-Raymark waste soil will be excavated 2.5 feet.
- A low permeable RCRA cap with a footprint of approximately 25,000 square feet (0.64 acres) will be constructed over non-contiguous Raymark waste present on the property group (Figure 4-11).
- Final property contours will be designed to meet DPW Lot AOC1 and surrounding parcels at current elevations.
- The current ground surface within the Raymark waste area on this property group is paved and will be repaved as a final surface cover following cap construction, if practicable.

Floodplain and Wetlands

- No floodplains impacts are anticipated as Raymark waste on this parcel is not within 100-year floodplain.
- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain under the cap after completion of the excavation, Alternatives 3 and 4 will include placement of institutional controls on the

DPW Lot AOC1 property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above the seasonal high water table, all three wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: The O&M for Alternatives 3 and 4 will require monthly cap inspections with annual reporting to summarize inspection findings and verify the effectiveness of institutional controls. A 30-year monitoring period is used in the present value cost analysis.

4.3.11.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6)

Detailed descriptions of Alternatives 5 and 6 are presented in Section 3.4.4. Raymark waste areas will be excavated to the seasonal high water table. Excavated material will be placed in an in-town consolidation area (Alternative 5) or an out-of-town disposal location (Alternative 6). The property group-specific details include the following:

Excavation Volumes/Final Cover

- Approximately 6,222 CY of Raymark waste will be excavated to the average seasonal high water table of 8 feet. Approximately 978 CY of non-Raymark waste soil will

additionally be excavated to facilitate safety requirements such as benching/sloping of sidewalls to prevent collapse.

- Raymark waste areas will be excavated to the water table and replaced with clean fill. Because the Raymark waste area is currently paved, the top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat.

- Final property contours will be designed to meet DPW Lot AOC1 and surrounding parcels at current elevations.

- Because all Raymark waste is located above the seasonal high water table, complete excavation of all Raymark waste will occur.

Floodplain and Wetlands

- No floodplains impacts are anticipated as Raymark waste on this parcel is not within 100-year floodplain.
- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- No future use restrictions are anticipated as all Raymark waste will be removed.

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. To verify that all Raymark waste is removed from the property group, all three wells will be monitored quarterly for 2 years, after which groundwater monitoring may no longer be required.

4.3.11.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8)

Detailed descriptions of Alternatives 7 and 8 are presented in Section 3.5.5. All of of the Raymark waste is within paved areas, the excavation depth will be 2 feet. Excavated material will be placed in an in-town consolidation area (Alternative 7) or an out-of-town disposal location (Alternative 8). The property group-specific details include the following:

Excavation Volumes/Final Covers

- Approximately 1,556 CY of Raymark waste will be excavated 2 feet.
- Raymark waste excavated to a 2-foot depth will be and replaced with clean fill. Because all of the Raymark waste area is currently paved, the top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat.
- Final property contours will be designed to meet DPW Lot AOC1 and surrounding parcels at current elevations.

Floodplain and Wetlands

- No floodplains impacts are anticipated as Raymark waste on this parcel is not within 100-year floodplain.
- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 7 and 8 will include placement of institutional controls on the DPW Lot AOC1 property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above the seasonal high water table, all three wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: Paved areas must be inspected monthly and maintained in good condition. A 30-year monitoring period is used in the present value cost analysis.

4.3.11.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10)

Detailed descriptions of Alternatives 9 and 10 are presented in Section 3.5.6. Raymark waste areas will be excavated to a 4-foot depth. Excavated material will be placed in an in-town consolidation area (Alternative 9) or an out-of-town disposal location (Alternative 10). The property group-specific details include the following:

Excavation and Final Cover

- Approximately 3,111 CY of Raymark waste will be excavated to a 4-foot depth.
- Raymark waste areas will be excavated to a 4-foot depth and replaced with clean fill. The top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat.
- Final property contours will be designed to meet DPW Lot AOC1 and surrounding parcels at current elevations.

Floodplain and Wetlands

- No floodplains impacts are anticipated as Raymark waste on this parcel is not within 100-year floodplain.

- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 9 and 10 will include placement of institutional controls on the DPW Lot AOC1 property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above seasonal high water table, all three wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: Paved areas must be inspected monthly and maintained in good condition. A 30-year monitoring period is used in the present value cost analysis.

4.3.11.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10)

Raymark waste treatment is presented in Section 3.1.3 for all property groups.

- Based on an evaluation of historical sampling data from <u>all</u> OU6 properties, it is assumed that approximately 10% of excavated Raymark waste will require out treatment prior to disposal. Treatment will be required only when excavated materials exhibit

concentrations of contaminants in excess of disposal requirements. All treatment will occur at an out-of-town facility.

- For alternatives featuring out-of-town disposal of Raymark waste (Alternatives 4, 6, 8, and 10), the concentration thresholds for treatment will be 10 times UTS thresholds.

- For alternatives featuring in-town consolidation (Alternatives 3, 5, 7, and 9), the concentration thresholds for treatment will be the PHC levels.

- Treatment volume estimates for DPW Lot AOC 1 are based on the assumed quantity of excavation required to implement each alternative. Note that the waste volumes are rounded up or down as appropriate.

- A 1.5 conversion factor from tons to cubic yards is used.

  - <u>Alternatives 3/4</u>
    - 1,944 CY RW excavated * 1.2 bulking factor = 2,333 CY
    - 2,333 CY X 1.5 TON/CY = 3,499 TON
    - 3,499 TON * 10% = **350 TONS to be treated (233 CY)**

  - <u>Alternatives 5/6</u>
    - 6,222 CY RW excavated * 1.2 bulking factor = 7,467 CY
    - 7,467CY * 1.5 TON/CY = 11,200 TON
    - 11,200 TON * 10% = **1,120 TONS to be treated (747 CY)**

  - <u>Alternatives 7/8</u>
    - 1,556 CY RW excavated * 1.2 bulking factor = 1,867 CY
    - 1,867 CY X 1.5 TON/CY = 2,800 TON
    - 2,800 TON * 10% = **280 TONS to be treated (187 CY)**

  - <u>Alternatives 9/10</u>
    - 3,111 CY RW excavated * 1.2 bulking factor = 3,733 CY
    - 3,733 CY * 1.5 TON/CY = 5,600 TON
    - 5,600 TON * 10% = **560 TONS to be treated (373 CY)**

4.3.11.2 Comparative Analysis of Alternatives for DPW Lot AOC 1

This section presents the comparative analysis of alternatives for the DPW Lot AOC 1 using the criteria described in Section 4.2. The comparative analysis of alternatives for this property group is summarized in comparison format on Table 4-11A.

4.3.11.2.1 Overall Protection of Human Health and the Environment

Alternative 1 (No Action) will not protect human health or the environment. Alternative 2 (Restrictions with Long-Term Monitoring) can provide limited protection of human health and the environment, if restrictions are monitored and enforced. Alternatives 3 and 4 and 7 through 10 will achieve protection of human health and the environment through the excavation of varying amounts of Raymark waste (low-permeability cap for Alternatives 3 and 4) and the use of institutional controls, rendering the contaminated waste inaccessible. Alternatives 5 and 6 will also protect human health and the environment through the removal of all Raymark waste located on the property group and institutional controls.

4.3.11.2.2 Compliance with ARARs

Alternative 1 (No Action) and Alternative 2 (Restrictions with Long-Term Monitoring) will not comply with ARARs because contaminants in Raymark waste will remain accessible in soils in excess of CT RSRs and federal risk criteria.

The ARARs associated with the implementation of Alternatives 3 through 10 are presented in Section 4.0 of this FS and on Table 4-11C. Alternatives 3 through 6 could be designed to comply with all chemical-specific, action-specific, and location-specific ARARs. Through excavation of Raymark waste to 2 feet or 4 feet, Alternatives 7 through 10 will render the remaining contaminated soil inaccessible, and will be compliant with the action-specific CT RSR Direct Exposure Criteria. Alternatives 7 through 10 may not comply with the numeric standards of CTDEP's Pollutant Mobility Criteria, however, the RSRs allow for variances and alternate criteria. Alternatives 7 through 10 will comply with all other chemical, action, and location-specific ARARs.

4.3.11.2.3 Long-Term Effectiveness and Permanence

The magnitude of residual human health risk associated with Raymark waste will be highest for Alternative 1 (No Action), since no actions will be taken to mitigate human health risks. Residual human health risks for Alternative 2 (Restrictions with Long-Term Monitoring) will be lower than Alternative 1, but still above acceptable human health risk levels.

Residual human health risks after implementation of Alternatives 3 and 4 and Alternatives 7 through 10 will be higher than for Alternatives 5 and 6 because Raymark waste will be left in-place above the water table. Alternative 5 and 6 may be more reliable than Alternatives 3 and 4 and 7 through 10 because all Raymark waste will be excavated and protection of human health through direct contact or mobilization of contaminants by rainwater infiltration will not be dependent on maintenance of a low-permeable RCRA cap or cover.

Alternatives 3 and 4, and 7 through 10 can provide protection in the long-term if the cover systems are maintained. Alternatives 5 and 6 will provide the greatest protection to human health and will be the most permanent. Alternatives 3 through 10 could each be designed to allow for redevelopment potential on the property group.

4.3.11.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment

No treatment will be required for Alternative 1 (No Action) of Alternative 2 (Restrictions with Long-Term Monitoring). Alternatives 3 through 10 will require treatment prior to land disposal to address the assumed 10 percent fraction that exceeds the UTS or PHC levels. This treatment will result in reduction of toxicity, mobility, and volume of Raymark waste. Although the estimated volumes that will require treatment are somewhat similar (ranging from 187 to 747 CY), Alternatives 5 and 6 will result in the greatest amount of reduction because a larger quantity of materials will be shipped offsite and is expected to require treatment prior to disposal.

4.3.11.2.5 Short-Term Effectiveness

No on-site actions will be taken under Alternative 1 (No Action) and minimal on-site actions will be taken under Alternative 2 (Restrictions with Long-Term Monitoring); therefore, there will be no short-term impacts to the community, workers, or the environment. Short-term impacts to

the community, workers, and the environment from the implementation of Alternatives 3 through 10 will be similar and can be mitigated using engineering controls.

Alternatives 5 and 6 will involve a higher volume of truck traffic to transport Raymark waste and backfill and will require a greater volume of Raymark waste handling than Alternatives 3 and 4 and 7 through 10.

Alternatives 3 through 6 will take approximately 4 months to complete, while Alternatives 7 through 10 will each require approximately 3 months to complete. For Alternatives 3, 5, 7, and 9, the estimated time to complete does not include the amount of time necessary to complete remedial activities at an in-town consolidation location.

4.3.11.2.6 Implementability

Alternatives 3 and 4 (low-permeability cap), Alternatives 5 and 6 (excavation to water table), and Alternatives 7 through 10 (2 to 4-foot excavation) all require excavation, which can be implemented through standard construction and environmental remediation methods. Alternatives 3 and 4 and 7 through 10 require specific site grading, placement of cap/cover materials based on design specifications, and O&M in the future. Alternatives 5 and 6 will involve excavation of the largest volume of Raymark waste (6,222 CY), and any expansions of the Raymark waste area due to confirmatory sampling will lead to a larger volume of excavated Raymark waste compared to Alternative 7 through 10 due to the excavation depth to the seasonal high water table.

Additional remedial actions will be more difficult to implement for Alternatives 3 and 4 due to the presence of a RCRA cap. Alternatives 7 through 10 are equally amenable to additional remedial actions at the property group, should they be deemed necessary. Alternatives 5 and 6 will be the most amenable to additional actions should they be necessary as all Raymark waste will be removed from the property group. .

Alternatives 3 and 4 and Alternatives 7 through 10 will each require long-term groundwater monitoring. Alternatives 5 and 6 will require quarterly groundwater monitoring for only 2 years after which groundwater monitoring may no longer be required. Alternatives 3 and 4 and 7 through 10 will also require long-term operation and maintenance of the cap or soil cover.

Long-term operation and maintenance requirements will not be required for Alternatives 5 and 6 as all Raymark waste will be removed from the property group.

Alternatives 3 through 10 will be similar in terms of the ability to coordinate with other agencies.

For Alternatives 3 through 10, each involves conventional construction methods for which the required equipment and technical specialists will be readily available.

4.3.11.2.7 Cost

A comparison of costs for each of the alternatives that were evaluated for DPW Lot AOC 1 is presented on Table 4-11B.

Table 4-11
Summary of Detailed Analysis for DPW Lot AOC 1
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4 – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8 – Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Overall Protection of Human Health and the Environment	Would not protect human health. RI did not identify any significant habitats for ecological receptors.	Some protection of human health, but human health risks still above acceptable limits. RI did not identify any significant habitats for ecological receptors.	Would protect human health through construction of a RCRA C-compliant cover (multi-component, drainage layer, gas vent layer, E-07 cm/s hydraulic conductivity) over Raymark waste. RI did not identify any significant habitats for ecological receptors.	Would protect human health through the removal of Raymark waste and placement of clean soil in its place. RI did not identify any significant habitats for ecological receptors.	Would protect human health through construction of an engineered barrier over Raymark waste. RI did not identify any significant habitats for ecological receptors.	Would protect human health through construction of an engineered barrier over Raymark waste. RI did not identify any significant habitats for ecological receptors.
Compliance with ARARs	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs.	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-11C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-11C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-11C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs with the use of alternate criteria. See Table 4-11C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs with the use of alternate criteria. See Table 4-11C.
Long-Term Effectiveness and Permanence	Magnitude of residual risk high. No risk reduction. 5-year reviews required. No O&M or controls included for long term.	Residual human health risks above acceptable limits. No risk reduction. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would not be adequate to protect human health for the long-term.	Residual risk within acceptable limits. Raymark waste will be left in-place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness. Capping technology reliable.	Residual risk within acceptable limits. Risk reduction would be permanent. Controls would be adequate to ensure long-term effectiveness.	Residual risk within acceptable limits. Raymark waste will be left in-place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.	Residual risk within acceptable limits. Raymark waste will be left in-place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.
Reduction of Toxicity, Mobility, or Volume Through Treatment	None.	None.	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark waste treated (tons)= 350 Raymark waste treated (CY)= 233	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark waste treated (tons)= 1,120 Raymark waste treated (CY)= 747	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark waste treated (tons)= 280 Raymark waste treated (CY)= 187	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark waste treated (tons)= 560 Raymark waste treated (CY)= 373
Short-Term Effectiveness	No actions, therefore no short-term impacts anticipated. Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures are applied. No adverse impacts to environment anticipated during implementation. Minimal on-site actions (well construction, signage, and fence installation, and groundwater sampling only). Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1]= 2,333 Approximate truckloads of Raymark waste 194 Approximate truckloads of clean fill 194 Assume 12 CY per truckload. Approximately months to complete remedial action. For alternative 3, this time frame does not include duration of capping activities at consolidation location. 4 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1]= 7,467 Approximate truckloads of Raymark waste 622 Approximate truckloads of clean fill 622 Assume 12 CY per truckload. Approximately months to complete remedial action. For Alternative 5, this time frame does not include duration of capping activities at consolidation location. 4 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1]= 1,867 Approximate truckloads of Raymark waste 156 Approximate truckloads of clean fill 156 Assume 12 CY per truckload. Approximately months to complete remedial action. For Alternative 7, this time frame does not include duration of capping activities at consolidation location. 3 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1]= 3,733 Approximate truckloads of Raymark waste 311 Approximate truckloads of clean fill 311 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 9, this time frame does not include duration of capping activities at consolidation location. 3 Would achieve RAO.

Table 4-11
Summary of Detailed Analysis for DPW Lot AOC 1
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4 – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8 – Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Implementability	Not applicable.	Would be implementable, assuming cooperation by property owners. Would require coordination with state/town officials to perform O&M and to document compliance with institutional controls.	Excavation in floodplains not anticipated. May be difficult to implement additional remedial actions if required, because Raymark waste would be beneath RCRA C cover. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or building on Department of Public Works AOC 1 will need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development could be hindered by the presence of the low-permeability cap.	Excavation in floodplains not anticipated. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or building on Department of Public Works AOC 1 will need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use.	Excavation in floodplains not anticipated. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or building on Department of Public Works AOC 1 will need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by presence of Raymark waste left in-place.	Excavation in floodplains not anticipated. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or building on Department of Public Works AOC 1 will need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by presence of Raymark waste left in-place.
Cost	**Alternative 1** Capital: $0 O&M (Years 1-2): $0 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: $21,578 PV of Alternative: $21,578 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 2** Capital: $55,869 O&M (Years 1-2): $62,782 O&M (Years 3-30): $35,839 Five-Year Reviews: $10,000/each PV of O&M: $515,022 PV of Alternative: $570,890 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 3** Capital: $946,657 O&M (Years 1-2): $60,062 O&M (Years 3-30): $33,118 Five-Year Reviews: $10,000/each PV of O&M: $481,260 PV of Alternative: $1,427,917 **Alternative 4** Capital: $2,230,200 O&M (Years 1-2): $60,062 O&M (Years 3-30): $33,118 Five-Year Reviews: $10,000/each PV of O&M: $481,260 PV of Alternative: $2,711,461 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 5** Capital: $1,337,378 O&M (Years 1-2): $35,924 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: $64,952 PV of Alternative: $1,402,330 **Alternative 6** Capital: $5,436,917 O&M (Years 1-2): $35,924 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: $64,952 PV of Alternative: $5,501,868 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 7** Capital: $590,708 O&M (Years 1-2): $59,699 O&M (Years 3-30): $32,756 Five-Year Reviews: $10,000/each PV of O&M: $476,762 PV of Alternative: $1,067,470 **Alternative 8** Capital: $1,615,017 O&M (Years 1-2): $59,699 O&M (Years 3-30): $32,756 Five-Year Reviews: $10,000/each PV of O&M: $476,762 PV of Alternative: $2,091,779 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 9** Capital: $836,448 O&M (Years 1-2): $59,699 O&M (Years 3-30): $32,756 Five-Year Reviews: $10,000/each PV of O&M: $476,762 PV of Alternative: $1,313,210 **Alternative 10** Capital: $2,887,368 O&M (Years 1-2): $59,699 O&M (Years 3-30): $32,756 Five-Year Reviews: $10,000/each PV of O&M: $476,762 PV of Alternative: $3,364,130 See Cost Estimate Backup Sheets in Appendix G.

[1]A bulking factor of 1.2 was used.

Table 4-11A
Comparative Analysis of Alternatives for DPW Lot AOC 1
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	2	3	4	5	6	7	8	9	10
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT										
Protection of Human Health	☐	☐	◘	◘	■	■	◘	◘	◘	◘
Protection of the Environment	☐	☐	◘	◘	■	■	◘	◘	◘	◘
COMPLIANCE WITH ARARs										
Chemical-Specific ARARs	☐	☐	■	■	■	■	◘	◘	◘	◘
Location-Specific ARARs	NA	■	■	■	■	■	◘	◘	◘	◘
Action-Specific ARARs	NA	■	■	■	■	■	◘	◘	◘	◘
Other Criteria, Advisories, Guidance	NA	NA	■	■	■	■	◘	◘	◘	◘
LONG-TERM EFFECTIVENESS AND PERMANENCE										
Magnitude of Residual Risk	☐	☐	◘	◘	■	■	◘	◘	◘	◘
Adequacy and Reliability of Controls	☐	☐	◘	◘	■	■	◘	◘	◘	◘
REDUCTION OF TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT										
Treatment/Recycling Processes Utilized	NA	NA	☐	☐	■	■	■	■	■	■
Amount of Hazardous Materials Destroyed or Treated	☐	☐	☐	☐	■	■	◘	◘	◘	◘
Degree of Expected Reductions in Tox, Mob, or Vol	☐	☐	☐	☐	■	■	◘	◘	◘	◘
Irreversibility	☐	☐	■	■	■	■	■	■	■	■
Type and Quantity of [Process] Residuals	☐	☐	■	■	■	■	■	■	■	■
SHORT-TERM EFFECTIVENESS										
Protection of Community During Remedial Actions	NA	■	◘	◘	◘	◘	◘	◘	◘	◘
Protection of Workers During Remedial Actions	NA	■	◘	◘	◘	◘	◘	◘	◘	◘
Environmental Impacts	■	■	◘	◘	◘	◘	◘	◘	◘	◘
Time Until Remedial Action Objectives are Achieved	☐	☐	◘	◘	◘	◘	◘	◘	◘	◘

Table 4-11A
Comparative Analysis of Alternatives for DPW Lot AOC 1
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	2	3	4	5	6	7	8	9	10
IMPLEMENTABILITY										
Ability to Construct and Operate the Technology	NA	■	■	■	■	■	■	■	■	■
Reliability of the Technology	NA	□	◘	◘	■	■	◘	◘	◘	◘
Ease of Undertaking Additional Remedial Actions, if Necessary	■	■	◘	◘	■	■	◘	◘	◘	◘
Ability to Monitor Effectiveness of the Remedy	NA	NA	◘	◘	◘	◘	◘	◘	◘	◘
Ability to Obtain Approvals from Other Agencies	■	■	■	■	■	■	■	■	■	■
Coordination with Other Agencies	◘	◘	■	■	■	■	■	■	■	■
Availability of Off-Site Treatment, Storage, and Disposal Services and Capacity	NA	NA	NA	NA	■	■	■	■	■	■
Availability of Necessary Equipment and Specialists	NA	■	■	■	■	■	■	■	■	■
Availability of Prospective Technologies	NA	■	■	■	■	■	■	■	■	■
COST										
Capital	$0	$55,869	$946,657	$2,230,200	$1,337,378	$5,436,917	$590,708	$1,615,017	$836,448	$2,887,368
Present Value of O&M (First 30 Years)	$21,578	$515,022	$481,260	$481,260	$64,952	$64,952	$476,762	$476,762	$476,762	$476,762
Present Value of the Alternative	$21,578	$570,890	$1,427,917	$2,711,461	$1,402,330	$5,501,868	$1,067,470	$2,091,779	$1,313,210	$3,364,130

Notes:

■ = Highest rating (most protective, most effective, most implementable)

◘ = Meets criterion, but another alternative(s) more protective/effective/implementable

□ = Does not meet criterion

Table 4-11B
Cost Estimate Summary for DPW Lot AOC 1
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Excavation Depth, ft	0	0	2.5	2.5	8	8	2 or 4	2 or 4	4	4
Cap/Cover	NA	NA	RCRA C	RCRA C	NA	NA	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover
Disposal Volumes (CY)										
In-Town Consolidation			2100	0	6720	0	1680	0	3360	0
Out-of-Town			0	2,100	0	6,720	0	1,680	0	3,360
Treated			233	233	747	747	187	187	373	373
Total Disposal Vol.			**2333**	**2333**	**7467**	**7467**	**1867**	**1867**	**3733**	**3733**
Cost										
Capital	**$0**	**$55,869**	**$946,657**	**$2,230,200**	**$1,337,378**	**$5,436,917**	**$590,708**	**$1,615,017**	**$836,448**	**$2,887,368**
O&M (present value)	**$21,578**	**$515,022**	**$481,260**	**$481,260**	**$64,952**	**$64,952**	**$476,762**	**$476,762**	**$476,762**	**$476,762**
Present Value	**$21,578**	**$570,890**	**$1,427,917**	**$2,711,461**	**$1,402,330**	**$5,501,868**	**$1,067,470**	**$2,091,779**	**$1,313,210**	**$3,364,130**

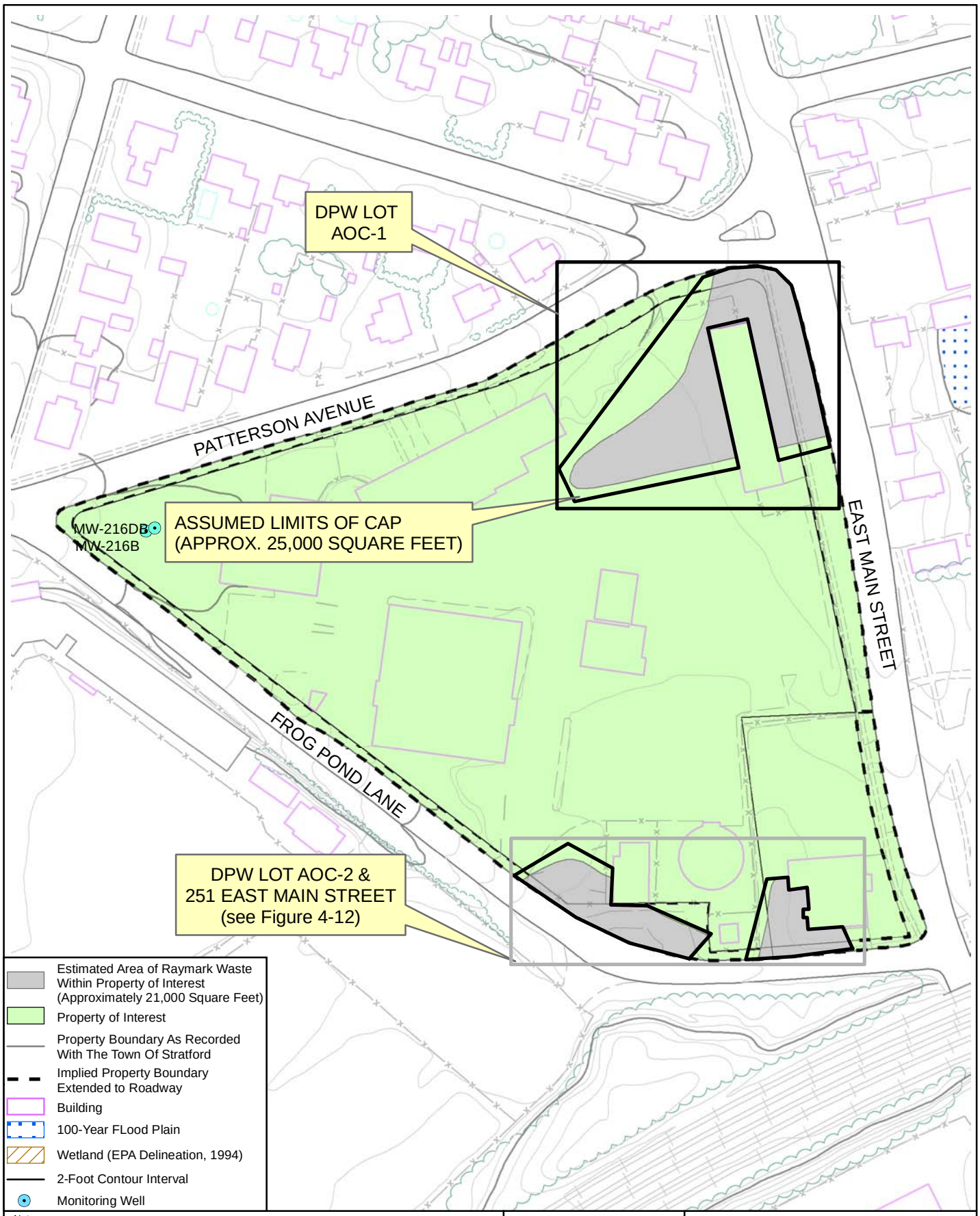
Notes:
Alternative 1 - No Action
Alternative 2 - Restrictions With Long-Term Monitoring
Alternative 3 - Low-Permeability Cap With In-Town Consolidation
Alternative 4 - Low-Permeability Cap With Out-Of-Town Disposal
Alternative 5 - Excavation To The Water Table With In-Town Consolidation
Alternative 6 - Excavation To The Water Table With Out-Of-Town Disposal
Alternative 7 - Excavation To Either 2 Or 4 Feet With In-Town Consolidation
Alternative 8 - Excavation To Either 2 Or 4 Feet With Out-Of-Town Disposal
Alternative 9 - Excavation To 4 Feet With In-Town Consolidation
Alternative 10 - Excavation To 4 Feet With Out-Of-Town Disposal
NA = not applicable
FT = foot
CY = cubic yard
O&M = operations and maintenance

Table 4-11C
Preliminary ARAR Summary - DPW Lot AOC 1
Raymark OU6 - Additional Properties
Stratford, Connecticut

Property Group	ARAR Tables				
	A	B	C	D	E
Alternative 1	X				
Alternative 2	X				
Alternative 3	X			X	X
Alternative 4	X			X	X
Alternative 5	X				
Alternative 6	X				
Alternative 7	X				
Alternative 8	X				
Alternative 9	X				
Alternative 10	X				

A = ARARs for all Alternatives
B = ARAR add-ons for an alternative for the Raymark waste located in the wetlands
C = ARAR add-ons for an alternative for the Raymark waste located in the floodplains
D = ARAR add-ons for alternatives that include low-permeability caps
E = ARAR add-ons for alternatives that include CAMUs

Note:
ARAR tables A-E are found in Volume II, Appendix C of this Feasibility Study.



Notes:
1) Plan not to be used for design.
2) All locations to be considered approximate.
3) Property boundaries are approximate based on Town of Stratford Engineering Department plans.
4) Floodplain extent based on Federal Emergency Management Agency Q3 Flood Data, Community Panel Numbers 090016 0001-0004, Revised June 16, 1992, FEMA, Washington D.C. and modified to Town of Stratford Engineering Plan 10-foot contour.
5) Adapted from TTNUS Remedial Investigation, 2005.

125 62.5 0 125 Feet

N

Nobis

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
(978) 683-0891
www.nobisengineering.com

FIGURE 4-11

DPW LOT AREA OF CONCERN (AOC)-1
FEASABILITY STUDY
RAYMARK SUPERFUND SITE
STRATFORD, CONNECTICUT

Drawn By: D. McGrath	Approved By: H. Ford
Project: 80006	Date: 07/08/10 Rev00

R:\80000 Task Orders\80006 Raymark\Technical Data\GIS_Data\Figures\OU6_FS_Figures\Figure_04-11_DPW_AOC1.mxd

4.3.12 Department of Public Works (DPW) Lot – Area of Concern (AOC) 2 and 251 East Main Street Properties

The DPW Lot encompasses approximately 6.4 acres of commercially-zoned land (town-owned) located in Stratford, Connecticut. It is bordered by East Main Street to the east, Patterson Avenue to the north, and Frog Pond Lane to the west and south. The 251 East Main Street parcel abuts the southeastern corner of the DPW property, consisting of approximately 0.7 acres of commercially-zoned (retail) land occupied by a one-story building (Figure 4-12). There are two areas of concern (AOC) on the DPW Lot where Raymark waste is found.

DPW Lot AOC 2 and 251 East Main Street consist of the southern Raymark waste area on the Stratford DPW Lot and the entire delineated Raymark waste area on the 251 East Main Street parcel, which together have a Raymark waste area of approximately 10,000 SF (AOC 1 on the DPW Lot (the northern Raymark waste area) is evaluated in Section 4.3.11 of this FS). The DPW Lot and 251 East Main Street were addressed separately in the OU6 Remedial Investigation (RI) report (TtNUS, 2005), but are evaluated together for the FS due to their proximity and the proximity of the two Raymark waste areas delineated on these properties.

Key factors associated with the areas and volumes to be addressed at this property group include:

- Raymark waste area: .....10,000 SF (Figure 4-12)
- Total volume of Raymark waste:.....2,778 CY
- Maximum depth of Raymark waste:..... 7.5 feet bgs
- Average depth to the seasonal high groundwater table:.....7.5 feet
- Raymark waste area outside of 100-year floodplain:..... 10,000 SF
- Raymark waste area in 100-year floodplain:..... 0 SF
- Raymark waste in 100-year floodplain to 7.5 FT:.....0 CY
- Raymark waste area under pavement: ..... 10,000 SF
- Raymark waste in unpaved area:..... 0 SF
- Raymark waste located below the water table:.....0 CY
- Alternative 3/4:
  - Raymark waste under pavement to 2.5 FT: .....926 CY (10,000 SF x 2.5 FT)
  - Raymark waste in unpaved area to 3 FT: .....0 CY

- Alternatives 5/6:
  - Raymark waste located above the water table: .....2,778 CY (10,000 SF x 7.5 FT)
- Alternatives 7/8:
  - Raymark waste under pavement to 2 FT: .....741 CY (10,000 SF x 2 FT)
  - Raymark waste in unpaved area to 4 FT: .....0 CY
- Alternatives 9/10:
  - Raymark waste to 4 FT: .....1,481 CY (10,000 SF x 4 FT)

The calculation of the average depth to the seasonal high water table of 7.5 feet below ground surface (bgs) is based on observations of water levels from soil borings advanced in the area. The calculation of the maximum depth of Raymark waste is based on data collected during the RI (TtNUS, 2005).

The detailed analysis of alternatives for this property group is presented below and consists of the following components:

- A list of key assumptions (Section 4.3.12.1) is used as the basis for the detailed analysis of alternatives and for the development of costs for the FS;
- Figure 4-12, which shows a map of DPW Lot AOC 2 and 251 East Main Street, the delineated Raymark waste area, the 100-year floodplain, and the proposed cap footprint;
- Table 4-12, which presents the individual detailed analysis of alternatives for DPW Lot AOC 2 and 251 East Main Street in tabular form;
- The comparative analysis of alternatives for DPW Lot AOC 2 and 251 East Main Street, presented in text form;
- Table 4-12A, which presents a tabular summary of the comparative analysis;
- Table 4-12B, which presents a summary of cost estimates for each of the alternatives;
- Table 4-12C, which provides a summary of ARARs for each of the DPW Lot AOC 2 and 251 East Main Street alternatives; and
- Cost Estimate Backup Sheets for the FS cost estimates, which are presented in Appendix G.

4.3.12.1 DPW Lot AOC 2 and 251 East Main Street Assumptions

Key assumptions associated with each alternative are presented in this section. Pairs of alternatives (3 and 4, 5 and 6, 7 and 8, and 9 and 10) have the same components except for the disposal of Raymark waste which is either in-town or out-of-town. See Section 3.3 for details on the Remedial Alternatives discussed below. See Table 4-12 for a summary of the details on the analysis for the DPW Lot AOC 2 and 251 East Main Street property group.

4.3.12.1.1 Alternative 1 – No Action

Detailed descriptions of the no action alternative are presented in Section 35.1.

4.3.12.1.2 Alternative 2 – Restrictions with Long-Term Monitoring

Detailed descriptions of Alternative 2 are presented in Section 3.5.2. Property group-specific details include the following:

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group, Alternative 2 will include placement of institutional controls on the DPW Lot AOC 2 and 251 East Main Street property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring, which will be complemented by one existing monitoring well (MW-216). The existing monitoring well is assumed to be functional and can be utilized for long-term groundwater monitoring. Because Raymark waste will remain above the seasonal high water table, all four wells will be monitored quarterly for 2 years, and annually thereafter.

- Existing Surfaces: Monthly surface inspections of pavement will be required along with annual reporting to summarize inspection findings and to verify the effectiveness of institutional controls.

4.3.12.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4)

Detailed descriptions of Alternatives 3 and 4 are presented in Section 3.5.3. Raymark waste areas will be excavated 2.5 feet. Raymark waste within the property group will be consolidated under two RCRA caps with existing grades maintained after remedial action implementation. The clean, uncontaminated excavated soil will be staged for future use during cap construction. Raymark waste within the property group will be consolidated under two RCRA caps. Excavated materials will be placed at an in-town consolidation area (Alternative 3) or an out-of-town disposal location (Alternative 4). The property group-specific details for Alternative 3 and 4 include the following:

Excavation Volumes/Final Cover

- Approximately 926 CY of Raymark waste and 185 CY of non-Raymark waste soil will be excavated 2.5 feet.
- Two low-permeable RCRA caps with a total footprint of approximately 12,000 square feet (0.28 acres) will be constructed over Raymark waste present on the property group (Figure 4-12).
- Final property contours will be designed to meet DPW Lot AOC 2 and 251 East Main Street and surrounding parcels at current elevations.
- The current ground surface within the Raymark waste area on this property group is primarily paved and will be repaved as a final surface cover following cap construction, if practicable.

Floodplain and Wetlands

- No floodplains impacts are anticipated as Raymark waste on this parcel is not within 100-year floodplain.
- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain under the caps after completion of the excavation, Alternatives 3 and 4 will include placement of institutional controls on the DPW Lot AOC 2 and 251 East Main Street property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring, which will be complemented by one existing monitoring well (MW–216). The existing monitoring well is assumed to be functional and can be utilized for long-term groundwater monitoring. Because Raymark waste will remain above the seasonal high water table, all four wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in present value cost analysis.

- Cap/Final Cover: The O&M for Alternatives 3 and 4 will require monthly cap inspections with annual reporting to summarize inspection findings and verify the effectiveness of institutional controls. A 30-year monitoring period is used in present value cost analysis.

4.3.12.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6)

Detailed descriptions of Alternatives 5 and 6 are presented in Section 3.5.4. Raymark waste areas will be excavated to the seasonal high water table. Excavated material will be placed in an in-town consolidation area (Alternative 5) or an out-of-town disposal location (Alternative 6). The property group-specific details include the following:

Excavation Volumes/Final Cover

- Approximately 2,778 CY of Raymark waste will be excavated to the average seasonal high water table of 7.5 feet. Approximately 570 CY of non-Raymark waste soil will additionally be excavated to facilitate safety requirements such as benching/sloping of sidewalls to prevent collapse.

- Raymark waste will be excavated to the water table and replaced with clean fill. Because the Raymark waste area is currently paved, the top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat.

- Final property contours will be designed to meet DWP Lot AOC 2 and 251 East Main Street and surrounding parcels at current elevations.

- Because all Raymark waste is located above the seasonal high water table, complete excavation of all Raymark waste will occur.

Floodplain and Wetlands

- No floodplains impacts are anticipated as Raymark waste on this parcel is not within 100-year floodplain.
- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- No future use restrictions are anticipated as all Raymark waste will be removed.

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring, which will be complemented by one existing monitoring well (MW–216). The existing monitoring well is assumed to be functional and can be utilized

for long-term groundwater monitoring. To verify that all Raymark waste is removed from the property group, all three wells will be monitored quarterly for 2 years, after which groundwater monitoring may no longer be required.

4.3.12.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8)

Detailed descriptions of Alternatives 7 and 8 are presented in Section 3.5.5. As all of the Raymark waste is within paved areas, the excavation depth will be 2 feet. Excavated material will be placed in an in-town consolidation area (Alternative 7) or an out-of-town disposal location (Alternative 8). The property group-specific details include the following:

Excavation Volumes/Final Covers

- Approximately 741 CY of Raymark waste will be excavated 2 feet.
- Raymark waste excavated to a 2 foot depth will be replaced with clean fill. Because all of the Raymark waste area is currently paved, the top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat.
- Final property contours will be designed to meet DPW Lot AOC 2 and 251 East Main Street and surrounding parcels at current elevations.

Floodplain and Wetlands

- No floodplains impacts are anticipated as Raymark waste on this parcel is not within 100-year floodplain.
- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 7 and 8 will include placement of institutional controls on the DPW Lot AOC 2 and 251 East Main Street property group to prohibit certain types of

activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring, which will be complemented by 1 existing monitoring well (MW-216). The existing monitoring well is assumed to be functional and can be utilized for long-term groundwater monitoring. Because Raymark waste will remain above the seasonal high water table, all four wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in present value cost analysis.

- Cap/Final Cover: Paved areas must be inspected monthly and maintained in good condition. A 30-year monitoring period is used in the present value cost analysis.

4.3.12.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10)

Detailed descriptions of Alternatives 9 and 10 are presented in Section 3.5.6. Raymark waste areas will be excavated to a 4-foot depth. Excavated material will be placed in an in-town consolidation area (Alternative 9) or an out-of-town disposal location (Alternative 10). The property group-specific details include the following:

Excavation and Final Cover

- Approximately 1,481 CY of Raymark waste will be excavated to a 4-foot depth.
- Raymark waste will be excavated to a 4-foot depth and replaced with clean fill. The top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat.

- Final property contours will be designed to meet DPW Lot AOC 2 and 251 East Main Street and surrounding parcels at current elevations.

Floodplain and Wetlands

- No floodplains impacts are anticipated as Raymark waste on this parcel is not within 100-year floodplain.
- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 9 and 10 will include placement of institutional controls on the DPW Lot AOC 2 and 251 East Main Street property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring, which will be complemented by one existing monitoring well (MW-216). The existing monitoring well is assumed to be functional and can be utilized for long-term groundwater monitoring. Because Raymark waste will remain above seasonal high water table, all three wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in present value cost analysis.

- Cap/Final Cover: Paved areas must be inspected monthly and maintained in good condition. A 30-year monitoring period is used in present value cost analysis.

4.3.12.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10)

Raymark waste treatment is presented in Section 3.1.3 for all property groups.

- Based on an evaluation of historical sampling data from <u>all</u> OU6 properties, it is assumed that approximately 10% of excavated Raymark waste will require treatment prior to disposal. Treatment will be required only when excavated materials exhibit concentrations of contaminants in excess of disposal requirements. All treatment will occur at an out-of-town facility.

- For alternatives featuring out-of-town disposal of Raymark waste (Alternatives 4, 6, 8, and 10), the concentration thresholds for treatment will be 10 times UTS thresholds.

- For alternatives featuring in-town consolidation (Alternatives 3, 5, 7, and 9), the concentration thresholds for treatment will be the PHC levels.

- Treatment volume estimates for DPW Lot AOC 2 and 251 East Main Street are based on the assumed quantity of excavation required to implement each alternative. Note that the waste volumes are rounded up or down as appropriate.

- A 1.5 conversion factor from tons to cubic yards is used.

  - <u>Alternatives 3/4</u>
    - 926 CY RW excavated * 1.2 bulking factor = 1,111 CY
    - 1,111 CY X 1.5 TON/CY = 1,667 TON
    - 1,667 TON * 10% = **167 TONS to be treated (111 CY)**

  - <u>Alternatives 5/6</u>
    - 2,778 CY RW excavated * 1.2 bulking factor = 3,333 CY
    - 3,333 CY * 1.5 TON/CY = 5,000 TON
    - 5,000 TON * 10% = **500 TONS to be treated (333 CY)**

- Alternatives 7/8
  - 741 CY RW excavated * 1.2 bulking factor = 889 CY
  - 889 CY X 1.5 TON/CY = 1,334 TON
  - 1,334 TON * 10% = **133 TONS to be treated (89 CY)**

- Alternatives 9/10
  - 1,481 CY RW excavated * 1.2 bulking factor = 1,778 CY
  - 1,778 CY * 1.5 TON/CY = 2,667 TON
  - 2,667 TON * 10% = **267 TONS to be treated (178 CY)**

4.3.12.2 Comparative Analysis of Alternatives for DPW Lot AOC 2 and 251 East Main Street

This section presents the comparative analysis of alternatives for the DPW Lot AOC 2 and 251 East Main Street using the criteria described in Section 4.2. The comparative analysis of alternatives for this property group is summarized in comparison format on Table 4-12A.

4.3.12.2.1 Overall Protection of Human Health and the Environment

Alternative 1 (No Action) will not protect human health or the environment. Alternative 2 (Restrictions with Long-Term Monitoring) can provide limited protection of human health and the environment, if restrictions are monitored and enforced. Alternatives 3 and 4 and 7 through 10 will achieve protection of human health and the environment through the excavation of varying amounts of Raymark waste (low-permeability cap for Alternative 3 and 4) and the use of institutional controls, rendering the contaminated waste inaccessible. Alternatives 5 and 6 will also protect human health and the environment through the removal of all Raymark waste located above the seasonal high water table and the use of institutional controls.

4.3.12.2.2 Compliance with ARARs

Alternative 1 (No Action) and Alternative 2 (Restrictions with Long-Term Monitoring) will not comply with ARARs because contaminants in Raymark waste will remain accessible in soils in excess of CT RSRs and federal risk criteria.

The ARARs associated with the implementation of Alternatives 3 through 10 are presented in Section 4.0 of this FS and on Table 4-12C. Alternatives 3 through 6 could be designed to comply with all chemical-specific, action-specific, and location-specific ARARs. Through excavation of Raymark waste to 2 feet or 4 feet, Alternatives 7 through 10 will render the remaining contaminated soil inaccessible and will be compliant with the action-specific CT RSR Direct Exposure Criteria. Alternatives 7 through 10 may not comply with the numeric standards of CTDEP's Pollutant Mobility Criteria, however, the RSRs allow for variances and alternate criteria. Alternatives 7 through 10 will comply with all other chemical, action, and location-specific ARARs.

4.3.12.2.3 Long-Term Effectiveness and Permanence

The magnitude of residual human health risk associated with Raymark waste will be highest for Alternative 1 (No Action), since no actions will be taken to mitigate human health risks. Residual human health risks for Alternative 2 (Restrictions with Long-Term Monitoring) will be lower than Alternative 1, but still above acceptable human health risk levels.

Residual human health risks after implementation of Alternatives 3 and 4 and Alternatives 7 through 10 will be slightly higher than for Alternatives 5 and 6 because Raymark waste will be left in-place above the seasonal high water table. Alternatives 5 and 6 will be more reliable than Alternatives 3 and 4 and 7 through 10 because there will be no Raymark waste in-place above the seasonal high water table and protection of human health through direct contact or mobilization of contaminants by rainwater infiltration will not be dependent on maintenance of a low-permeable RCRA cap or cover.

Alternatives 3 and 4, and 7 through 10 can provide protection in the long-term if the cover systems are maintained. Alternatives 5 and 6 will provide the greatest protection to human health and will be the most permanent. Alternative 3 through 10 could each be designed to allow for redevelopment potential on the property group.

4.3.12.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment

No treatment will be required for Alternative 1 (No Action) or Alternative 2 (Restrictions with Long-Term Monitoring). Alternatives 3 through 10 will require treatment prior to land disposal to address the assumed 10 percent fraction that exceeds the UTS or PHC levels. This treatment

will result in reduction of toxicity, mobility, and volume of Raymark waste. Although, the estimated volumes that will require treatment are somewhat similar (ranging from 89 to 333 CY), Alternatives 5 and 6 will result in the greatest amount of reduction because a larger quantity of materials will be shipped offsite and is expected to require treatment prior to disposal.

4.3.12.2.5 Short-Term Effectiveness

No on-site actions will be taken under Alternative 1 (No Action) and minimal on-site actions will be taken under Alternative 2 (Restrictions with Long-Term Monitoring); therefore, there will be no short-term impacts to the community, workers, or the environment. Short-term impacts to the community, workers, and the environment from the implementation of Alternatives 3 through 10 will be similar and can be mitigated using engineering controls.

Alternatives 5 and 6 will involve a higher volume of truck traffic to transport Raymark waste and backfill and will require a greater volume of Raymark waste handling than Alternatives 3 and 4 and 7 through 10.

Alternatives 3 and 4 and 7 through 10 will take approximately 2 months to complete, while Alternatives 5 and 6 will each require approximately 3 months to complete. For Alternatives 3, 5, 7, and 9, the estimated time to complete does not include the amount of time necessary to complete remedial activities at an in-town consolidation location.

4.3.12.2.6 Implementability

Alternatives 3 and 4 (low-permeability cap), Alternatives 5 and 6 (excavation to the water table), and Alternatives 7 through 10 (2 to 4-foot excavation) all require excavation, which can be implemented through standard construction and environmental remediation methods. Alternatives 3 and 4 and 7 through 10 require specific site grading, placement of cap/cover materials based on design specifications, and O&M in the future. Alternatives 5 and 6 will involve excavation of the largest volume of Raymark waste (2,778 CY), and any expansions of the Raymark waste area due to confirmatory sampling will lead to a larger volume of excavated Raymark waste compared to Alternative 7 through 10 due to the excavation depth to the seasonal high water table.

Additional remedial actions will be more difficult to implement for Alternatives 3 and 4 due to the presence of a RCRA cap. Alternatives 7 through 10 are equally amenable to additional remedial actions at the property group, should they be deemed necessary. Alternatives 5 and 6 will be the most amenable to additional actions should they be necessary as all Raymark waste will be removed from the property group.

Alternatives 3 and 4 and 7 through 10 will each require long-term groundwater monitoring. Alternatives 5 and 6 will require quarterly groundwater monitoring for only 2 years after which groundwater monitoring may no longer be required. Alternatives 3 and 4 and 7 though 10 will also require long-term operation and maintenance of the cap or soil cover. Long-term operation and maintenance requirements will not be required for Alternatives 5 and 6 as all Raymark waste will be removed from the property group.

Alternatives 3 through 10 will be similar in terms of the ability to coordinate with other agencies.

For Alternatives 3 through 10, each involves conventional construction methods for which the required equipment and technical specialists will be readily available.

4.3.12.2.7 Cost

A comparison of costs for each of the alternatives that were evaluated for DPW Lot AOC 2 and 251 East Main Street is presented on Table 4-12B.

Table 4-12
Summary of Detailed Analysis for DPW Lot AOC 2 and 251 East Main Street
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4 – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8 – Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Overall Protection of Human Health and the Environment	Would not protect human health. RI did not identify any significant habitats for ecological receptors.	Some protection of human health, but human health risks still above acceptable limits. RI did not identify any significant habitats for ecological receptors.	Would protect human health through construction of a RCRA C-compliant cover (multi-component, drainage layer, gas vent layer, E-07 cm/s hydraulic conductivity) over Raymark waste. RI did not identify any significant habitats for ecological receptors.	Would protect human health through the removal of Raymark waste and placement of clean soil in its place. RI did not identify any significant habitats for ecological receptors.	Would protect human health through construction of an engineered barrier over Raymark waste. RI did not identify any significant habitats for ecological receptors.	Would protect human health through construction of an engineered barrier over Raymark waste. RI did not identify any significant habitats for ecological receptors.
Compliance with ARARs	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs.	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-12C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-12C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-12C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs with the use of alternate criteria. See Table 4-12C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs with the use of alternate criteria. See Table 4-12C.
Long-Term Effectiveness and Permanence	Magnitude of residual risk high. No risk reduction. 5-year reviews required. No O&M or controls included for long term.	Residual human health risks above acceptable limits. No risk reduction. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would not be adequate to protect human health for the long-term.	Residual risk within acceptable limits. Raymark waste will be left in-place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness. Capping technology reliable.	Residual risk within acceptable limits. Risk reduction would be permanent. Controls would be adequate to ensure long-term effectiveness.	Residual risk within acceptable limits. Raymark waste will be left in-place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.	Residual risk within acceptable limits. Raymark waste will be left in-place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.
Reduction of Toxicity, Mobility, or Volume Through Treatment	None.	None.	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark waste treated (tons)= 167 Raymark waste treated (CY)= 111	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark waste treated (tons)= 500 Raymark waste treated (CY)= 333	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark waste treated (tons)= 133 Raymark waste treated (CY)= 89	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark waste treated (tons)= 267 Raymark waste treated (CY)= 178
Short-Term Effectiveness	No actions, therefore no short-term impacts anticipated. Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Minimal on-site actions (well construction, signage, and fence installation, and groundwater sampling only). Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1]= 1,111 Approximate truckloads of Raymark waste 93 Approximate truckloads of clean fill 93 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 3, this time frame does not include duration of capping activities at consolidation location. 2 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1]= 3,333 Approximate truckloads of Raymark waste 278 Approximate truckloads of clean fill 278 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 5, this time frame does not include duration of capping activities at consolidation location. 3 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1]= 889 Approximate truckloads of Raymark waste 74 Approximate truckloads of clean fill 74 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 7, this time frame does not include duration of capping activities at consolidation location. 2 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1]= 1,778 Approximate truckloads of Raymark waste 148 Approximate truckloads of clean fill 148 Assume 12 CY per truckload. Approximately months to complete remedial action. For Alternative 9, this time frame does not include duration of capping activites at consolidation location. 2 Would achieve RAO.

Table 4-12
Summary of Detailed Analysis for DPW Lot AOC 2 and 251 East Main Street
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4 – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8 – Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Implementability	Not applicable.	Would be implementable, assuming cooperation by property owners. Would require coordination with state/town officials to perform O&M and to document compliance with institutional controls.	Excavation in floodplains not anticipated. May be difficult to implement additional remedial actions if required, because Raymark waste would be beneath RCRA C cover. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or building on Department of Public Works AOC 1 will need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development could be hindered by the presence of the low-permeability cap.	Excavation in floodplains not anticipated. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or building on Department of Public Works AOC 1 will need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use.	Excavation in floodplains not anticipated. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or building on Department of Public Works AOC 1 will need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by presence of Raymark waste left in-place.	Excavation in floodplains not anticipated. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or building on Department of Public Works AOC 1 will need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by presence of Raymark waste left in-place.
Cost	**Alternative 1** Capital: $0 O&M (Years 1-2): $0 O&M (Years 3-30): $0 Five-Year Reviews: $15,000/each PV of O&M: $32,367 PV of Alternative: $32,367 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 2** Capital: $71,368 O&M (Years 1-2): $71,669 O&M (Years 3-30): $40,444 Five-Year Reviews: $15,000/each PV of O&M: $590,696 PV of Alternative: $662,063 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 3** Capital: $584,005 O&M (Years 1-2): $69,592 O&M (Years 3-30): $38,367 Five-Year Reviews: $15,000/each PV of O&M: $564,925 PV of Alternative: $1,148,931 **Alternative 4** Capital: $1,194,590 O&M (Years 1-2): $69,592 O&M (Years 3-30): $38,367 Five-Year Reviews: $15,000/each PV of O&M: $564,925 PV of Alternative: $1,759,515 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 5** Capital: $696,366 O&M (Years 1-2): $41,633 O&M (Years 3-30): $0 Five-Year Reviews: $15,000/each PV of O&M: $75,273 PV of Alternative: $771,639 **Alternative 6** Capital: $2,525,818 O&M (Years 1-2): $41,633 O&M (Years 3-30): $0 Five-Year Reviews: $15,000/each PV of O&M: $75,273 PV of Alternative: $2,601,091 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 7** Capital: $414,367 O&M (Years 1-2): $69,411 O&M (Years 3-30): $38,186 Five-Year Reviews: $15,000/each PV of O&M: $562,676 PV of Alternative: $977,043 **Alternative 8** Capital: $901,914 O&M (Years 1-2): $69,411 O&M (Years 3-30): $38,186 Five-Year Reviews: $15,000/each PV of O&M: $562,676 PV of Alternative: $1,464,590 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 9** Capital: $538,796 O&M (Years 1-2): $69,411 O&M (Years 3-30): $38,186 Five-Year Reviews: $15,000/each PV of O&M: $562,676 PV of Alternative: $1,101,472 **Alternative 10** Capital: $1,513,890 O&M (Years 1-2): $69,411 O&M (Years 3-30): $38,186 Five-Year Reviews: $15,000/each PV of O&M: $562,676 PV of Alternative: $2,076,566 See Cost Estimate Backup Sheets in Appendix G.

[1]A bulking factor of 1.2 was used.

Table 4-12A
Comparative Analysis of Alternatives for DPW Lot AOC 2 and 251 East Main Street
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	2	3	4	5	6	7	8	9	10
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT										
Protection of Human Health	☐	☐	◘	◘	■	■	◘	◘	◘	◘
Protection of the Environment	☐	☐	◘	◘	■	■	◘	◘	◘	◘
COMPLIANCE WITH ARARs										
Chemical-Specific ARARs	☐	☐	■	■	■	■	◘	◘	◘	◘
Location-Specific ARARs	NA	■	■	■	■	■	◘	◘	◘	◘
Action-Specific ARARs	NA	■	■	■	■	■	◘	◘	◘	◘
Other Criteria, Advisories, Guidance	NA	NA	■	■	■	■	◘	◘	◘	◘
LONG-TERM EFFECTIVENESS AND PERMANENCE										
Magnitude of Residual Risk	☐	☐	◘	◘	■	■	◘	◘	◘	◘
Adequacy and Reliability of Controls	☐	☐	◘	◘	■	■	◘	◘	◘	◘
REDUCTION OF TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT										
Treatment/Recycling Processes Utilized	NA	NA	☐	☐	■	■	■	■	■	■
Amount of Hazardous Materials Destroyed or Treated	☐	☐	☐	☐	■	■	◘	◘	◘	◘
Degree of Expected Reductions in Tox, Mob, or Vol	☐	☐	☐	☐	■	■	◘	◘	◘	◘
Irreversibility	☐	☐	■	■	■	■	■	■	■	■
Type and Quantity of [Process] Residuals	☐	☐	■	■	■	■	■	■	■	■
SHORT-TERM EFFECTIVENESS										
Protection of Community During Remedial Actions	NA	■	◘	◘	◘	◘	◘	◘	◘	◘
Protection of Workers During Remedial Actions	NA	■	◘	◘	◘	◘	◘	◘	◘	◘
Environmental Impacts	■	■	◘	◘	◘	◘	◘	◘	◘	◘
Time Until Remedial Action Objectives are Achieved	☐	☐	◘	◘	◘	◘	◘	◘	◘	◘

Table 4-12A
Comparative Analysis of Alternatives for DPW Lot AOC 2 and 251 East Main Street
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	2	3	4	5	6	7	8	9	10
IMPLEMENTABILITY										
Ability to Construct and Operate the Technology	NA	■	■	■	■	■	■	■	■	■
Reliability of the Technology	NA	□	◘	◘	■	■	◘	◘	◘	◘
Ease of Undertaking Additional Remedial Actions, if Necessary	■	■	◘	◘	■	■	◘	◘	◘	◘
Ability to Monitor Effectiveness of the Remedy	NA	NA	◘	◘	◘	◘	◘	◘	◘	◘
Ability to Obtain Approvals from Other Agencies	■	■	■	■	■	■	■	■	■	■
Coordination with Other Agencies	◘	◘	■	■	■	■	■	■	■	■
Availability of Off-Site Treatment, Storage, and Disposal Services and Capacity	NA	NA	NA	NA	■	■	■	■	■	■
Availability of Necessary Equipment and Specialists	NA	■	■	■	■	■	■	■	■	■
Availability of Prospective Technologies	NA	■	■	■	■	■	■	■	■	■
COST										
Capital	$0	$71,368	$584,005	$1,194,590	$696,366	$2,525,818	$414,367	$901,914	$538,796	$1,513,890
Present Value of O&M (First 30 Years)	$32,367	$590,696	$564,925	$564,925	$75,273	$75,273	$562,676	$562,676	$562,676	$562,676
Present Value of the Alternative	$32,367	$662,063	$1,148,931	$1,759,515	$771,639	$2,601,091	$977,043	$1,464,590	$1,101,472	$2,076,566

Notes:

■ = Highest rating (most protective, most effective, most implementable)

◘ = Meets criterion, but another alternative(s) more protective/effective/implementable

□ = Does not meet criterion

Table 4-12B
Cost Estimate Summary for DPW Lot AOC 2 and 251 East Main Street
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Excavation Depth, ft	0	0	2.5	2.5	7.5	7.5	2 or 4	2 or 4	4	4
Cap/Cover	NA	NA	RCRA C	RCRA C	NA	NA	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover
Disposal Volumes (CY)										
In-Town Consolidation			1000	0	3000	0	800	0	1600	0
Out-of-Town			0	1,000	0	3,000	0	800	0	1,600
Treated			111	111	333	333	89	89	178	178
Total Disposal Vol.			**1111**	**1111**	**3333**	**3333**	**889**	**889**	**1778**	**1778**
Cost										
Capital	**$0**	**$71,368**	**$584,005**	**$1,194,590**	**$696,366**	**$2,525,818**	**$414,367**	**$901,914**	**$538,796**	**$1,513,890**
O&M (present value)	**$32,367**	**$590,696**	**$564,925**	**$564,925**	**$75,273**	**$75,273**	**$562,676**	**$562,676**	**$562,676**	**$562,676**
Present Value	**$32,367**	**$662,063**	**$1,148,931**	**$1,759,515**	**$771,639**	**$2,601,091**	**$977,043**	**$1,464,590**	**$1,101,472**	**$2,076,566**

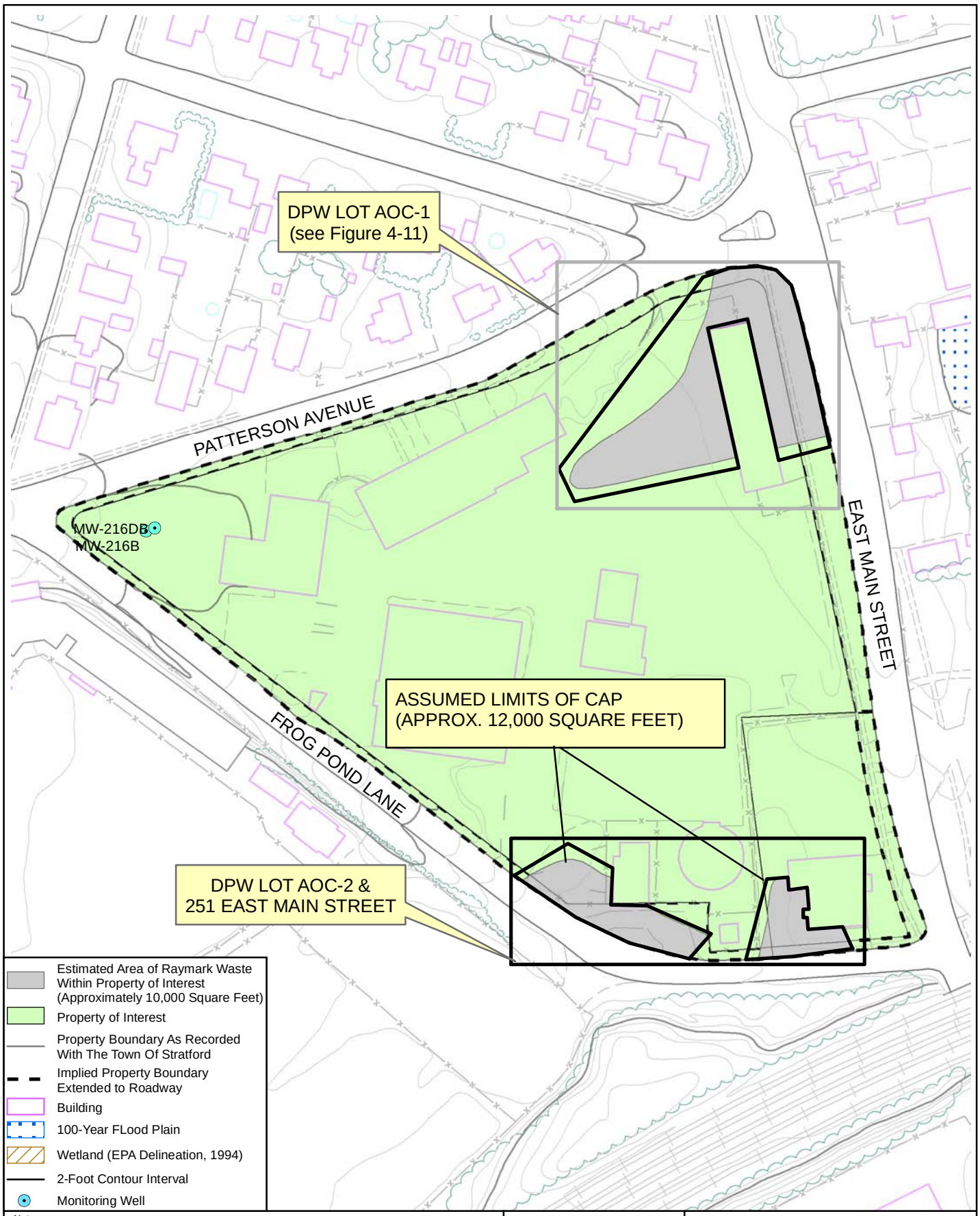
Notes:
Alternative 1 - No Action
Alternative 2 - Restrictions With Long-Term Monitoring
Alternative 3 - Low-Permeability Cap With In-Town Consolidation
Alternative 4 - Low-Permeability Cap With Out-Of-Town Disposal
Alternative 5 - Excavation To The Water Table With In-Town Consolidation
Alternative 6 - Excavation To The Water Table With Out-Of-Town Disposal
Alternative 7 - Excavation To Either 2 Or 4 Feet With In-Town Consolidation
Alternative 8 - Excavation To Either 2 Or 4 Feet With Out-Of-Town Disposal
Alternative 9 - Excavation To 4 Feet With In-Town Consolidation
Alternative 10 - Excavation To 4 Feet With Out-Of-Town Disposal
NA = not applicable
FT = foot
CY = cubic yard
O&M = operations and maintenance

Table 4-12C
Preliminary ARAR Summary - DPW Lot AOC 2 and 251 East Main Street
Raymark OU6 - Additional Properties
Stratford, Connecticut

Property Group	ARAR Tables				
	A	B	C	D	E
Alternative 1	X				
Alternative 2	X				
Alternative 3	X			X	X
Alternative 4	X			X	X
Alternative 5	X				
Alternative 6	X				
Alternative 7	X				
Alternative 8	X				
Alternative 9	X				
Alternative 10	X				

A = ARARs for all Alternatives
B = ARAR add-ons for an alternative for the Raymark waste located in the wetlands
C = ARAR add-ons for an alternative for the Raymark waste located in the floodplains
D = ARAR add-ons for alternatives that include low-permeability caps
E = ARAR add-ons for alternatives that include CAMUs

Note:
ARAR tables A-E are found in Volume II, Appendix C of this Feasibility Study.



Notes:
1) Plan not to be used for design.
2) All locations to be considered approximate.
3) Property boundaries are approximate based on Town of Stratford Engineering Department plans.
4) Floodplain extent based on Federal Emergency Management Agency Q3 Flood Data, Community Panel Numbers 090016 0001-0004, Revised June 16, 1992, FEMA, Washington D.C. and modified to Town of Stratford Engineering Plan 10-foot contour.
5) Adapted from TTNUS Remedial Investigation, 2005.

125 62.5 0 125 Feet

N

Nobis

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
(978) 683-0891
www.nobisengineering.com

FIGURE 4-12

DPW LOT AREA OF CONCERN (AOC)-2 &
215 EAST MAIN STREET
FEASABILITY STUDY
RAYMARK SUPERFUND SITE
STRATFORD, CONNECTICUT

Drawn By: D. McGrath	Approved By: H. Ford
Project: 80006	Date: 9/3/09 Rev00

R:\80000 Task Orders\80006 Raymark\Technical Data\GIS_Data\Figures\OU6_FS_Figures\Figure_04-12_DPW_AOC2.mxd

4.3.13 Beacon Point Area of Concern (AOC) 1 Property

The Beacon Point Area property consists of approximately 7.4 acres of commercially-zoned land (waterfront business) located in Stratford, Connecticut. It is bordered by the Housatonic River to the east, a vacant lot at the intersection of Birdseye Road and an access road to the Tide Harbors Condominiums to the west, wetlands to the north and Beacon Point AOC 2 to the south. Beacon Point has three areas of concern (AOC) where Raymark waste was found. Beacon Point AOC 1 is located in the northern portion of the Beacon Point Area and is being evaluated separately from two other non-contiguous Raymark waste areas that are located within the same property group (Beacon Point AOC 2 and AOC 3). Within Beacon Point AOC 1 are two Raymark waste areas located within the vegetated portion of the property, and two others located near the dock along the eastern boundary of the property adjacent to the Housatonic River, which together have a Raymark waste area of approximately 5700 SF (See Figure 4-13).

According to FEMA Flood Insurance Rate Maps for Stratford, the entire Beacon Point AOC 1 area is located within the 100-year floodplain.

Key factors associated with the areas and volumes to be addressed at this property group include:

- Raymark waste area: .....5,700 SF (Figure 4-13)
- Total volume of Raymark waste:.....1267 CY
- Maximum depth of Raymark waste:..... 6 feet bgs
- Average depth to the seasonal high groundwater table:.....6 feet
- Raymark waste area outside of 100-year floodplain:..... 0 SF
- Raymark waste area in 100-year floodplain:..... 5,700 SF
- Raymark waste in 100-year floodplain to 6 FT:.....1,267 CY (5,700 SF x 6 FT)
- Raymark waste area under pavement: ..... 2,600 SF
- Raymark waste in unpaved area:..... 3,100 SF
- Raymark waste located below the water table:.....0 CY
- Alternatives 3/4:
  - Raymark waste under pavement to 2.5 FT: .....241 CY (2,600 SF x 2.5 FT)
  - Raymark waste in unpaved area to 3 FT: .....344 CY (3,100 SF x 3 FT)

- Alternatives 5/6:
  - Raymark waste located above the water table: .....1,267 CY (5,700 SF x 6 FT)
- Alternatives 7/8:
  - Raymark waste under pavement to 2 FT: .....193 CY (2,600 SF x 2 FT)
  - Raymark waste in unpaved area to 4 FT: .....459 CY (3,100 SF x 4 FT)
- Alternatives 9/10:
  - Raymark waste to 4 FT: .....844 CY (5,700 SF x 4 FT)

The calculation of the average depth to the seasonal high water table of 6 feet below ground surface (bgs) is based on observations of water levels from soil borings advanced in the area. The calculation of the maximum depth of Raymark waste is based on data collected during the RI (TtNUS, 2005).

The detailed analysis of alternatives for this property group is presented below and consists of the following components:

- A list of key assumptions (Section 4.3.13.1) that was used as the basis for the detailed analysis of alternatives and for the development of costs for the FS;
- Figure 4-13, which shows a map of Beacon Point AOC 1, the delineated Raymark waste area, the 100-year floodplain, and the proposed cap footprint;
- Table 4-13, which presents the individual detailed analysis of alternatives for Beacon Point AOC 1 in tabular form;
- The comparative analysis of alternatives for Beacon Point AOC 1, presented in text form;
- Table 4-13A, which presents a tabular summary of the comparative analysis;
- Table 4-13B, which presents a summary of cost estimates for each of the alternatives;
- Table 4-13C, which provides a summary of ARARs for each of the Beacon Point AOC 1 alternatives; and
- Cost Estimate Backup Sheets for the FS cost estimates, which are presented Appendix G.

4.3.13.1 Beacon Point AOC 1 Assumptions

Key assumptions associated with each alternative are presented in this section. Pairs of alternatives (3 and 4, 5 and 6, 7 and 8, and 9 and 10) have the same components except for the disposal of Raymark waste, which is either in-town or out–of-town. See Section 3.3 for details on the Remedial Alternatives discussed below. See Table 4-13 for a summary of the details on the analysis for the Beacon Point AOC 1 property group.

4.3.13.1.1 Alternative 1 – No Action

Detailed descriptions of the no action alternative are presented in Section 3.5.1.

4.3.13.1.2 Alternative 2 – Restrictions with Long-Term Monitoring

Detailed descriptions of Alternative 2 are presented in Section 3.5.2. Property group-specific details include the following:

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group, Alternative 2 will include placement of institutional controls on the Beacon Point AOC 1 property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above the seasonal high water table, all three wells will be monitored quarterly for 2 years, and annually thereafter.

- Existing Surfaces: Monthly surface inspections of both pavement and vegetative covers will be required along with annual reporting to summarize inspection findings and to verify the effectiveness of institutional controls.

4.3.13.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4)

Detailed descriptions of Alternatives 3 and 4 are presented in Section 3.5.3. Raymark waste areas will be excavated 2.5 feet in paved areas and 3 feet in unpaved areas. Raymark waste within the property group will be consolidated under 3 RCRA caps. Due to the non-contiguous nature of waste delineated within the Beacon Point AOC 1 property group, additional excavation will be conducted between waste locations to facilitate construction of two RCRA caps to maintain existing grades after remedial action implementation. Additionally the clean, uncontaminated excavated soil will be staged for future use during cap construction. Excavated materials will be placed at an in-town consolidation area (Alternative 3) or an out-of-town disposal location (Alternative 4). The property group-specific details for Alternative 3 and 4 include the following:

Excavation Volumes/Final Cover

- Approximately 585 CY of Raymark waste and 1,033 CY of non-Raymark waste soil will be excavated 2.5 or 3 feet.
- Three low permeable RCRA caps with a total footprint of approximately 15,000 square feet (0.34 acres) will be constructed over non-contiguous Raymark waste present on the property group (Figure 4-13).
- Final property contours will be designed to meet Beacon Point AOC 1 and surrounding parcels at current elevations.
- The majority of ground surface within the Raymark waste area on this property group is covered with grass, therefore, a vegetated RCRA cap is assumed. However, a portion (approximately 2,600 SF) is currently paved will be repaved as a final surface cover following cap construction, if practicable.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated 2.5 or 3 feet. Once excavated, this area will be backfilled with clean fill and revegetated or repaved to reflect existing conditions, as practicable.

There will be no loss in current flood storage capacity or functionality after completion of the remedial actions.

- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain under the cap after completion of the excavation, Alternatives 3 and 4 will include placement of institutional controls on the Beacon Point AOC 1 property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above the seasonal high water table, all three wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in present value cost analysis.

- Cap/Final Cover: The O&M for Alternatives 3 and 4 will require monthly cap inspections with annual reporting to summarize inspection findings and verify the effectiveness of institutional controls. A 30-year monitoring period is used in the present value cost analysis.

4.3.13.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6)

Detailed descriptions of Alternatives 5 and 6 are presented in Section 3.5.4. Raymark waste areas will be excavated to the seasonal high water table. Excavated material will be placed in

an in-town consolidation area (Alternative 5) or an out-of-town disposal location (Alternative 6). The property group-specific details include the following:

Excavation Volumes/Final Cover

- Approximately 1,267 CY of Raymark waste will be excavated to the average seasonal high water table of 6 feet. Approximately 253 CY of non-Raymark waste soil will additionally be excavated to facilitate safety requirements such as benching/sloping of sidewalls to prevent collapse.

- Raymark waste in paved areas will be excavated to the water table and replaced with clean fill. The top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat. Raymark waste in unpaved areas will be excavated to the water table and replaced with a vegetated, permeable soil cover.

- Final property contours will be designed to meet Beacon Point AOC 1 and surrounding parcels at current elevations.

- Because all Raymark waste is located above the seasonal high water table, complete excavation of all Raymark waste will occur.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated the seasonal high water table. Once excavated, this area will be backfilled with clean fill and revegetated or repaved with current elevations and drainage patterns retained so that the current flood storage capacity will not be diminished after completion of the remedial actions.

- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- No future use restrictions are anticipated as all Raymark waste will be removed.

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. To verify that all Raymark waste is removed from the property group, all three wells will be monitored quarterly for 2 years, after which groundwater monitoring may no longer be required.

4.3.13.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8)

Detailed descriptions of Alternatives 7 and 8 are presented in Section 3.5.5. Raymark waste areas will be excavated to either a depth of 2 feet (current paved areas) or a depth of 4 feet (current unpaved areas). Excavated material will be placed in an in-town consolidation area (Alternative 7) or an out-of-town disposal location (Alternative 8). The property group-specific details include the following:

Excavation Volumes/Final Covers

- Approximately 193 CY of Raymark waste will be excavated 2 feet from currently paved areas, while an estimated 459 CY will be excavated 4 feet from currently unpaved areas.
- Raymark waste in paved areas will be excavated to a 2-foot depth and replaced with clean fill. The top of fill is assumed to include an 18- inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat. Raymark waste in unpaved areas will be excavated to a 4-foot depth and replaced with a vegetated, permeable soil cover.
- Final property contours will be designed to meet Beacon Point AOC 1 and surrounding parcels at current elevations.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated 2 or 4 feet. Once excavated, this area will be backfilled with clean fill and revegetated with current elevations and drainage patterns retained so that the current flood storage capacity will not be diminished after completion of the remedial actions.

- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 7 and 8 will include placement of institutional controls on the Beacon Point AOC 1 property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above the seasonal high water table, all three wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: Paved areas and vegetative covers must be inspected monthly and maintained in good condition. A 30-year monitoring period is used in the present value cost analysis.

4.3.13.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10)

Detailed descriptions of Alternatives 9 and 10 are presented in Section 3.5.6. Raymark waste areas will be excavated to a 4-foot depth. Excavated material will be placed in an in-town consolidation area (Alternative 9) or an out-of-town disposal location (Alternative 10). The property group-specific details include the following:

Excavation and Final Cover

- Approximately 844 CY of Raymark waste will be excavated to a 4-foot depth.
- Raymark waste in paved areas will be excavated to a 4-foot depth and replaced with clean fill. The top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat. Raymark waste in unpaved areas will be excavated to a 4-foot depth and replaced with a vegetated, permeable soil cover.
- Final property contours will be designed to meet Beacon Point AOC 1 and surrounding parcels at current elevations.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated 4 feet. Once excavated, this area will be backfilled with clean fill and revegetated with current elevations and drainage patterns retained so that the current flood storage capacity will not be diminished after completion of the remedial actions.

- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 9 and 10 will include placement of institutional controls on the Beacon Point AOC 1 property group to prohibit certain types of activities such as

excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above seasonal high water table, all three wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: Paved areas and vegetative covers must be inspected monthly and maintained in good condition. A 30-year monitoring period is used in the present value cost analysis.

4.3.13.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10)

Raymark waste treatment is presented in Section 3.1.3 for all property groups.

- Based on an evaluation of historical sampling data from <u>all</u> OU6 properties, it is assumed that approximately 10% of excavated Raymark waste will require treatment prior to disposal. Treatment will be required only when excavated materials exhibit concentrations of contaminants in excess of disposal requirements. All treatment will occur at an out-of-town facility.

- For alternatives featuring out-of-town disposal of Raymark waste (Alternatives 4, 6, 8, and 10), the concentration thresholds for treatment will be 10 times UTS thresholds.

- For alternatives featuring in-town consolidation (Alternatives 3, 5, 7, and 9), the concentration thresholds for treatment will be the PHC levels.

- Treatment volume estimates for Beacon Point AOC 1 are based on the assumed quantity of excavation required to implement each alternative. Note that the waste volumes are rounded up or down as appropriate.

- A 1.5 conversion factor from tons to cubic yards is used.

  - Alternatives 3/4
    - 585 CY RW excavated * 1.2 bulking factor = 702 CY
    - 702 CY X 1.5 TON/CY = 1053 TON
    - 1053 TON * 10% = **105 TONS to be treated (70 CY)**

  - Alternatives 5/6
    - 1,267 CY RW excavated * 1.2 bulking factor = 1,520 CY
    - 1,520 CY * 1.5 TON/CY = 2,280 TON
    - 2,280 TON * 10% = **228 TONS to be treated (152 CY)**

  - Alternatives 7/8
    - 652 CY RW excavated * 1.2 bulking factor = 782 CY
    - 782 CY * 1.5 TON/CY = 1,174 TON
    - 1,174 TON * 10% = **117 TONS to be treated (78 CY)**

  - Alternatives 9/10
    - 844 CY RW excavated * 1.2 bulking factor = 1,013 CY
    - 1,013 CY * 1.5 TON/CY = 1,520 TON
    - 1,520 TON * 10% = **152 TONS to be treated (101 CY)**

4.3.13.2 Comparative Analysis of Alternatives for Beacon Point AOC 1

This section presents the comparative analysis of alternatives for the Beacon Point AOC 1 using the criteria described in Section 4.2. The comparative analysis of alternatives for this property group is summarized in a comparison format on Table 4-13A.

4.3.13.2.1 Overall Protection of Human Health and the Environment

Alternative 1 (No Action) will not protect human health or the environment. Alternative 2 (Restrictions with Long-Term Monitoring) can provide limited protection of human health and the environment, if restrictions are monitored and enforced. Alternatives 3 and 4 and 7 through 10 will achieve protection of human health and the environment through the excavation of varying amounts of Raymark waste (low-permeability cap for Alternatives 3 and 4) and the use of institutional controls, rendering the contaminated waste inaccessible. Alternatives 5 and 6 will protect human health and the environment through the removal of all Raymark waste located on the property group.

4.3.13.2.2 Compliance with ARARs

Alternative 1 (No Action) and Alternative 2 (Restrictions with Long-Term Monitoring) will not comply with ARARs because contaminants in Raymark waste will remain accessible in soils in excess of CT RSRs and federal risk criteria.

The ARARs associated with the implementation of Alternatives 3 through 10 are presented in Section 4.0 of this FS and on Table 4-13C. Alternatives 3 through 6 could be designed to comply with all chemical-specific, action-specific, and location-specific ARARs. Through excavation of Raymark waste to 2 feet (paved areas) or 4 feet (unpaved areas), Alternatives 7 through 10 will render the remaining contaminated soil inaccessible, and will be compliant with the action-specific CT RSR Direct Exposure Criteria. Alternatives 7 through 10 may not comply with the numeric standards of CTDEP's Pollutant Mobility Criteria, however, the RSRs allow for variances and alternate criteria. Alternatives 7 through 10 will comply with all chemical, action, and location-specific ARARs.

4.3.13.2.3 Long-Term Effectiveness and Permanence

The magnitude of residual human health risk associated with Raymark waste will be highest for Alternative 1 (No Action), since no actions will be taken to mitigate human health risks. Residual human health risks for Alternative 2 (Restrictions with Long-Term Monitoring) will be lower than Alternative 1, but still above acceptable human health risk levels.

Residual human health risks after implementation of Alternatives 3 and 4 and Alternatives 7 through 10 will be slightly higher than for Alternatives 5 and 6 because Raymark waste will be left in-place above the seasonal high water table. Alternative 5 and 6 may be more reliable than Alternatives 3 and 4 and 7 through 10 because all Raymark waste will be excavated and protection of human health through direct contact or mobilization of contaminants by rainwater infiltration will not be dependent on maintenance of a low-permeable RCRA cap or a soil or paved cover.

Alternatives 3 and 4, and 7 through 10 can provide protection in the long-term if the cover systems are maintained. Alternatives 5 and 6 will provide the greatest protection to human health and will be the most permanent. Alternatives 3 through 10 could each be designed to allow for redevelopment potential on the property group.

4.3.13.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment

No treatment will be required for Alternative 1 (No Action) or Alternative 2 (Restrictions with Long-Term Monitoring). Alternatives 3 through 10 will require treatment prior to land disposal to address the assumed 10 percent fraction that exceeds the UTS or PHC levels. This treatment will result in reduction of toxicity, mobility, and volume of Raymark waste. Although the estimated volumes that will require treatment are similar (ranging from 70 to 152 CY), Alternatives 5 and 6 will result in the greatest amount of reduction because a larger quantity of materials will be shipped offsite and is expected to require treatment prior to disposal.

4.3.13.2.5 Short-Term Effectiveness

No on-site actions will be taken under Alternative 1 (No Action) and minimal on-site actions will be taken under Alternative 2 (Restrictions with Long-Term Monitoring); therefore, there will be no short-term impacts to the community, workers, or the environment. Short-term impacts to the community, workers, and the environment from the implementation of Alternatives 3 through 10 will be similar and can be mitigated using engineering controls.

Alternatives 5 and 6 will involve a higher volume of truck traffic to transport Raymark waste and backfill and will require a greater volume of Raymark waste handling than Alternatives 3 and 4 and 7 through 10.

Alternatives 3 and 4 and 7 and 8 will take approximately 2 months to complete, while Alternatives 5 and 6 and 9 and 10 will each require approximately 3 months to complete. For Alternatives 3, 5, 7, and 9, the estimated time to complete does not include the amount of time necessary to complete remedial activities at an in-town consolidation location.

4.3.13.2.6 Implementability

Alternatives 3 and 4 (low-permeability cap), Alternatives 5 and 6 (excavation to water table), and Alternatives 7 through 10 (2 to 4-foot excavation) all require excavation, which can be implemented through standard construction and environmental remediation methods. Alternatives 3 and 4 and 7 through 10 require specific site grading, placement of cap/cover materials based on design specifications, and O&M in the future. Alternatives 5 and 6 will involve excavation of the largest volume of Raymark waste (1,267 CY), and any expansions of the Raymark waste area due to confirmatory sampling will lead to a larger volume of excavated Raymark waste compared to Alternative 7 through 10 due to the excavation depth to the seasonal high water table.

Additional remedial actions will be more difficult to implement for Alternatives 3 and 4 due to the presence of a RCRA cap. Alternatives 7 through 10 are equally amenable to additional remedial actions at the property group, should they be deemed necessary. Alternatives 5 and 6 will be the most amenable to additional actions should they be necessary as all Raymark waste will be removed from the property group.

Alternatives 3 and 4 and Alternatives 7 through 10 will each require long-term groundwater monitoring. Alternatives 5 and 6 will require quarterly groundwater monitoring for only 2 years after which groundwater monitoring may no longer be required. Alternatives 3 and 4 and 7 through 10 will also require long-term operation and maintenance of the cap or soil cover. Long-term operation and maintenance requirements would not be required for Alternatives 5 and 6 as all Raymark waste will be removed from the property group.

Alternatives 3 through 10 will be similar in terms of the ability to coordinate with other agencies.

For Alternatives 3 through 10, each involves conventional construction methods for which the required equipment and technical specialists will be readily available.

4.3.13.2.7 Cost

A comparison of costs for each of the alternatives that were evaluated for Beacon Point AOC 1 is presented on Table 4-13B.

Table 4-13
Summary of Detailed Analysis for Beacon Point AOC 1
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4 – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8 – Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Overall Protection of Human Health and the Environment	Would not protect human health. RI did not identify any significant habitats for ecological receptors.	Some protection of human health, but human health risks still above acceptable limits. RI did not identify any significant habitats for ecological receptors.	Would protect human health through construction of a RCRA C-compliant cover (multi-component, drainage layer, gas vent layer, E-07 cm/s hydraulic conductivity) over Raymark waste. RI did not identify any significant habitats for ecological receptors.	Would protect human health through the removal of Raymark waste and placement of clean soil in its place. RI did not identify any significant habitats for ecological receptors.	Would protect human health through construction of an engineered barrier over Raymark waste. RI did not identify any significant habitats for ecological receptors.	Would protect human health through construction of an engineered barrier over Raymark waste. RI did not identify any significant habitats for ecological receptors.
Compliance with ARARs	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs.	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-13C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-13C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-13C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs with the use of alternate criteria. See Table 4-13C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs with the use of alternate criteria. See Table 4-13C.
Long-Term Effectiveness and Permanence	Magnitude of residual risk high. No risk reduction. 5-year reviews required. No O&M or controls included for long term.	Residual human health risks above acceptable limits. No risk reduction. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would not be adequate to protect human health for the long-term.	Residual risk within acceptable limits. Raymark waste will be left in-place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness. Capping technology reliable. Additional design analysis of cap in floodplains will be required during remedial design phase.	Residual risk within acceptable limits. Risk reduction would be permanent. Controls would be adequate to ensure long-term effectiveness.	Residual risk within acceptable limits. Raymark waste will be left in-place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.	Residual risk within acceptable limits. Raymark waste will be left in-place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.
Reduction of Toxicity, Mobility, or Volume Through Treatment	None.	None.	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark waste treated (tons)= 105 Raymark waste treated (CY)= 70	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark waste treated (tons)= 228 Raymark waste treated (CY)= 152	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark waste treated (tons)= 117 Raymark waste treated (CY)= 78	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark waste treated (tons)= 152 Raymark waste treated (CY)= 101
Short-Term Effectiveness	No actions, therefore no short-term impacts anticipated. Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures are applied. No adverse impacts to environment anticipated during implementation. Minimal on-site actions (well construction, signage, and fence installation, and groundwater sampling only). Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1] = 702 Approximate truckloads of Raymark waste 59 Approximate truckloads of clean fill 59 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 3, this time frame does not include duration of capping activities at consolidation location. 2 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1] = 1,520 Approximate truckloads of Raymark waste 127 Approximate truckloads of clean fill 127 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 5, this time frame does not include duration of capping activities at consolidation location. 3 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1] = 782 Approximate truckloads of Raymark waste 65 Approximate truckloads of clean fill 65 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 7, this time frame does not include duration of capping activities at consolidation location. 2 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1] = 1,013 Approximate truckloads of Raymark waste 84 Approximate truckloads of clean fill 84 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 9, this time frame does not include duration of capping activities at consolidation location. 3 Would achieve RAO.

Table 4-13
Summary of Detailed Analysis for Beacon Point AOC 1
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4 – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8 – Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Implementability	Not applicable.	Would be implementable, assuming cooperation by property owners. Would require coordination with state/town officials to perform O&M and to document compliance with institutional controls.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. May be difficult to implement additional remedial actions if required, because Raymark waste would be beneath RCRA C cover. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or building on Beacon Point AOC 1will need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development could be hindered by the presence of the low-permeability cap.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or building on Beacon Point AOC 1 will need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or building on Beacon Point AOC 1will need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development could be hindered by presence of Raymark wsate left in-place.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or building on Beacon Point AOC 1will need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development could be hindered by presence of Raymark wsate left in-place.
Cost	**Alternative 1** Capital: $0 O&M (Years 1-2): $0 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: $21,578 PV of Alternative: $21,578 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 2** Capital: $50,758 O&M (Years 1-2): $60,681 O&M (Years 3-30): $33,738 Five-Year Reviews: $10,000/each PV of O&M: $488,950 PV of Alternative: $539,708 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 3** Capital: $551,582 O&M (Years 1-2): $59,186 O&M (Years 3-30): $32,243 Five-Year Reviews: $10,000/each PV of O&M: $470,392 PV of Alternative: $1,021,974 **Alternative 4** Capital: $938,080 O&M (Years 1-2): $59,186 O&M (Years 3-30): $32,243 Five-Year Reviews: $10,000/each PV of O&M: $470,392 PV of Alternative: $1,408,471 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 5** Capital: $419,359 O&M (Years 1-2): $35,924 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: $64,952 PV of Alternative: $484,311 **Alternative 6** Capital: $1,254,031 O&M (Years 1-2): $35,924 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: $64,952 PV of Alternative: $1,318,983 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 7** Capital: $343,476 O&M (Years 1-2): $59,044 O&M (Years 3-30): $32,101 Five-Year Reviews: $10,000/each PV of O&M: $468,633 PV of Alternative: $812,109 **Alternative 8** Capital: $771,964 O&M (Years 1-2): $59,044 O&M (Years 3-30): $32,101 Five-Year Reviews: $10,000/each PV of O&M: $468,633 PV of Alternative: $1,240,598 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 9** Capital: $383,387 O&M (Years 1-2): $59,044 O&M (Years 3-30): $32,101 Five-Year Reviews: $10,000/each PV of O&M: $468,633 PV of Alternative: $852,020 **Alternative 10** Capital: $937,533 O&M (Years 1-2): $59,044 O&M (Years 3-30): $32,101 Five-Year Reviews: $10,000/each PV of O&M: $468,633 PV of Alternative: $1,406,166 See Cost Estimate Backup Sheets in Appendix G.

Table 4-13A
Comparative Analysis of Alternatives for Beacon Point AOC 1
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	2	3	4	5	6	7	8	9	10
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT										
Protection of Human Health	☐	☐	◘	◘	■	■	◘	◘	◘	◘
Protection of the Environment	☐	☐	◘	◘	■	■	◘	◘	◘	◘
COMPLIANCE WITH ARARs										
Chemical-Specific ARARs	☐	☐	■	■	■	■	◘	◘	◘	◘
Location-Specific ARARs	NA	■	■	■	■	■	◘	◘	◘	◘
Action-Specific ARARs	NA	■	■	■	■	■	◘	◘	◘	◘
Other Criteria, Advisories, Guidance	NA	NA	■	■	■	■	◘	◘	◘	◘
LONG-TERM EFFECTIVENESS AND PERMANENCE										
Magnitude of Residual Risk	☐	☐	◘	◘	■	■	◘	◘	◘	◘
Adequacy and Reliability of Controls	☐	☐	◘	◘	■	■	◘	◘	◘	◘
REDUCTION OF TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT										
Treatment/Recycling Processes Utilized	NA	NA	☐	☐	■	■	■	■	■	■
Amount of Hazardous Materials Destroyed or Treated	☐	☐	☐	☐	■	■	◘	◘	◘	◘
Degree of Expected Reductions in Tox, Mob, or Vol	☐	☐	☐	☐	■	■	◘	◘	◘	◘
Irreversibility	☐	☐	■	■	■	■	■	■	■	■
Type and Quantity of [Process] Residuals	☐	☐	■	■	■	■	■	■	■	■
SHORT-TERM EFFECTIVENESS										
Protection of Community During Remedial Actions	NA	■	◘	◘	◘	◘	◘	◘	◘	◘
Protection of Workers During Remedial Actions	NA	■	◘	◘	◘	◘	◘	◘	◘	◘
Environmental Impacts	■	■	◘	◘	◘	◘	◘	◘	◘	◘
Time Until Remedial Action Objectives are Achieved	☐	☐	◘	◘	◘	◘	◘	◘	◘	◘

Table 4-13A
Comparative Analysis of Alternatives for Beacon Point AOC 1
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	2	3	4	5	6	7	8	9	10
IMPLEMENTABILITY										
Ability to Construct and Operate the Technology	NA	■	■	■	■	■	■	■	■	■
Reliability of the Technology	NA	□	◘	◘	■	■	◘	◘	◘	◘
Ease of Undertaking Additional Remedial Actions, if Necessary	■	■	◘	◘	■	■	◘	◘	◘	◘
Ability to Monitor Effectiveness of the Remedy	NA	NA	◘	◘	◘	◘	◘	◘	◘	◘
Ability to Obtain Approvals from Other Agencies	■	■	■	■	■	■	■	■	■	■
Coordination with Other Agencies	◘	◘	■	■	■	■	■	■	■	■
Availability of Off-Site Treatment, Storage, and Disposal Services and Capacity	NA	NA	NA	NA	■	■	■	■	■	■
Availability of Necessary Equipment and Specialists	NA	■	■	■	■	■	■	■	■	■
Availability of Prospective Technologies	NA	■	■	■	■	■	■	■	■	■
COST										
Capital	$0	$50,758	$551,582	$938,080	$419,359	$1,254,031	$343,476	$771,964	$383,387	$937,533
Present Value of O&M (First 30 Years)	$21,578	$488,950	$470,392	$470,392	$64,952	$64,952	$468,633	$468,633	$468,633	$468,633
Present Value of the Alternative	$21,578	$539,708	$1,021,974	$1,408,471	$484,311	$1,318,983	$812,109	$1,240,598	$852,020	$1,406,166

Notes:

■ = Highest rating (most protective, most effective, most implementable)

◘ = Meets criterion, but another alternative(s) more protective/effective/implementable

□ = Does not meet criterion

Table 4-13B
Cost Estimate Summary for Beacon Point AOC 1
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Excavation Depth, ft	0	0	3	3	6	6	2 r	2o 4	o 44	4
Cap/Cover	NA	NA	RCRA C	RCRA C	NA	NA	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover
Disposal Volumes (CY)										
In-Town Consolidation			632	0	1368	0	704	0	912	0
Out-of-Town			0	632	0	1,368	0	704	0	912
Treated			70	70	152	152	78	78	101	101
Total Disposal Vol.			**702**	**702**	**1520**	**1520**	**782**	**782**	**1013**	**1013**
Cost										
Capital	**$0**	**$50,758**	**$551,582**	**$938,080**	**$419,359**	**$1,254,031**	**$343,476**	**$771,964**	**$383,387**	**$937,533**
O&M (present value)	**$21,578**	**$488,950**	**$470,392**	**$470,392**	**$64,952**	**$64,952**	**$468,633**	**$468,633**	**$468,633**	**$468,633**
Present Value	**$21,578**	**$539,708**	**$1,021,974**	**$1,408,471**	**$484,311**	**$1,318,983**	**$812,109**	**$1,240,598**	**$852,020**	**$1,406,166**

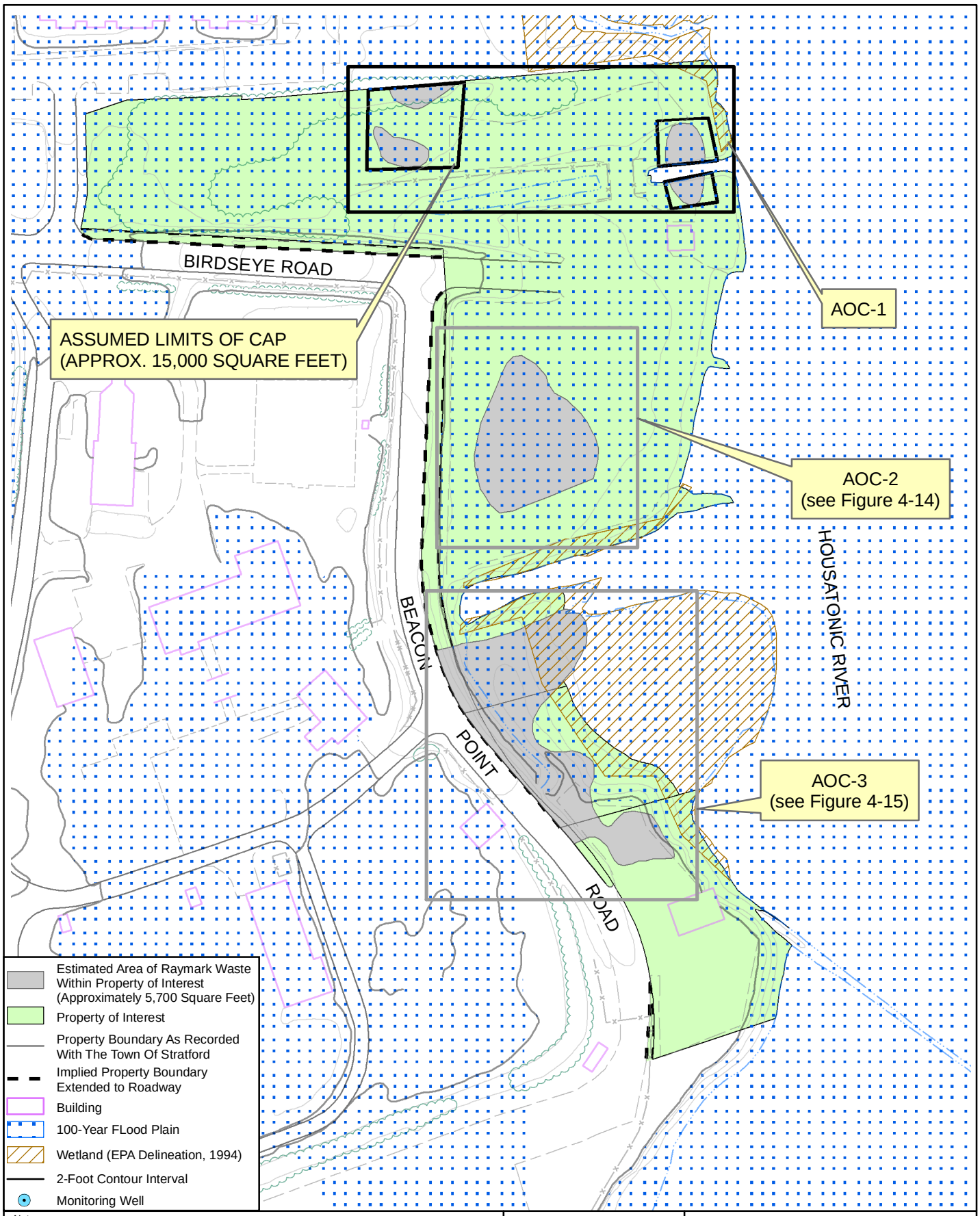
Notes:
Alternative 1 - No Action
Alternative 2 - Restrictions with Long-Term Monitoring
Alternative 3 - Low-Permeability Cap with In-Town Consolidation
Alternative 4 - Low-Permeability Cap with Out-Of-Town Disposal
Alternative 5 - Excavation to the Water Table with In-Town Consolidation
Alternative 6 - Excavation to the Water Table with Out-Of-Town Disposal
Alternative 7 - Excavation to either 2 or 4 Feet with In-Town Consolidation
Alternative 8 - Excavation to either 2 or 4 Feet with Out-Of-Town Disposal
Alternative 9 - Excavation to 4 Feet with In-Town Consolidation
Alternative 10 - Excavation to 4 Feet with Out-Of-Town Disposal

Table 4-13C
Preliminary ARAR Summary - Beacon Point AOC 1
Raymark OU6 - Additional Properties
Stratford, Connecticut

Property Group	ARAR Tables				
	A	B	C	D	E
Alternative 1	X				
Alternative 2	X		X		
Alternative 3	X		X	X	X
Alternative 4	X		X	X	X
Alternative 5	X		X		
Alternative 6	X		X		
Alternative 7	X		X		
Alternative 8	X		X		
Alternative 9	X		X		
Alternative 10	X		X		

A = ARARs for all Alternatives
B = ARAR add-ons for an alternative for the Raymark waste located in the wetlands
C = ARAR add-ons for an alternative for the Raymark waste located in the floodplains
D = ARAR add-ons for alternatives that include low-permeability caps
E = ARAR add-ons for alternatives that include CAMUs

Note:
ARAR tables A-E are found in Volume II, Appendix C of this Feasibility Study.



Notes:
1) Plan not to be used for design.
2) All locations to be considered approximate.
3) Property boundaries are approximate based on Town of Stratford Engineering Department plans.
4) Floodplain extent based on Federal Emergency Management Agency Q3 Flood Data, Community Panel Numbers 090016 0001-0004, Revised June 16, 1992, FEMA, Washington D.C. and modified to Town of Stratford Engineering Plan 10-foot contour.
5) Adapted from TTNUS Remedial Investigation, 2005.

150 75 0 150 Feet

N

Nobis

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
(978) 683-0891
www.nobisengineering.com

FIGURE 4-13

BEACON POINT
AREA OF CONCERN (AOC)-1
FEASABILITY STUDY
RAYMARK SUPERFUND SITE
STRATFORD, CONNECTICUT

Drawn By: D. McGrath	Approved By: H. Ford
Project: 80006	Date: 9/3/09 Rev00

R:\80000 Task Orders\80006 Raymark\Technical Data\GIS_Data\Figures\OU6_FS_Figures\Figure_04-14_Beacon_Point_AOC2.mxd

4.3.14 Beacon Point Area of Concern (AOC) 2 Property

The Beacon Point Area property consists of approximately 7.4 acres of commercially-zoned land (waterfront business) located in Stratford, Connecticut. It is bordered by the Housatonic River to the east, Beacon Point Road to the west, Beacon Point Area of Concern 1 to the north and Beacon Point Area of Concern 2 to the south. There are three areas of concern (AOCs) where Raymark waste was found. Beacon Point AOC 2 is located in the central paved portion of the Beacon Point Area, and is being evaluated separately from two other non-contiguous Raymark waste areas that are located within the same property group to enable flexibility in selecting final remedies. (Beacon Point AOC 1 and AOC 3 are presented in Sections 4.3.13 and 4.3.15, respectively).

The average seasonal high groundwater table is 5 feet below ground surface throughout Beacon Point AOC 2. Raymark waste was found below the water table between 8 and 10 feet below ground surface. Therefore, it is assumed that there is no Raymark waste located above the water table within Beacon Point AOC 2. The entire property group lies within the 100-year floodplain.

Key factors associated with the areas and volumes to be addressed at this property group include:

- Raymark waste area: .....17,000 SF (Figure 4-14)
- Total volume of Raymark waste:.....1259 CY
- Maximum depth of Raymark waste:..... 10 feet bgs
- Average depth to the seasonal high groundwater table:.....5 feet
- Raymark waste area outside of 100-year floodplain:..... 0 SF
- Raymark waste area in 100-year floodplain:..... 17,000 SF
- Raymark waste in 100-year floodplain to 5 FT:.....0 CY
- Raymark waste area under pavement: ..... 17,000 SF
- Raymark waste in unpaved area:..... 0 SF
- Raymark waste located below the water table:.....1259 CY (17,000 SF x 2 FT)
- Alternatives 3/4:
  - Raymark waste under pavement to 2.5 FT: .....0 CY
  - Raymark waste in unpaved areas to 3 FT: .....0 CY

- Alternatives 5/6:
  - Raymark waste located above the water table: ..... 0 CY
- Alternatives 7/8:
  - Raymark waste under pavement to 2 FT: ..... 0 CY
  - Raymark waste in unpaved area to 4 FT: ..... 0 CY
- Alternatives 9/10:
  - Raymark waste to 4 FT: ..... 0 CY

The calculation of the average depth to the seasonal high water table of 5 feet below ground surface (bgs) is based on observations of water levels from soil borings advanced in the area. The calculation of the maximum depth of Raymark waste is based on data collected during the RI (TtNUS, 2005).

The detailed analysis of alternatives for this property group is presented below and consists of the following components:

- A list of key assumptions (Section 4.3.14.1) that is used as the basis for the detailed analysis of alternatives and for the development of costs for the FS;
- Figure 4-14, which shows a map of Beacon Point AOC 2, the delineated Raymark waste area, the 100-year floodplain, and the proposed cap footprint;
- Table 4-14, which presents the individual detailed analysis of alternatives for Beacon Point AOC 2 in tabular form;
- The comparative analysis of alternatives for Beacon Point AOC 2, presented in text form;
- Table 4-14A, which presents a tabular summary of the comparative analysis;
- Table 4-14B, which presents a summary of cost estimates for each of the alternatives;
- Table 4-14C, which provides a summary of ARARs for each of the Beacon Point AOC 2 alternatives; and
- Cost Estimate Backup Sheets for the FS cost estimates, which are presented in Appendix G.

4.3.14.1 Beacon Point AOC 2 Assumptions

Key assumptions associated with each alternative are presented in this section. Pairs of alternatives (3 and 4, 5 and 6, 7 and 8, and 9 and 10) have the same components except for the disposal of Raymark waste, which is either in-town or out-of-town. See Section 3.3 for details on the Remedial Alternatives discussed below. See Table 4-14 for a summary of the details on the analysis for the Beacon Point AOC 2 property group.

4.3.14.1.1 Alternative 1 – No Action

Detailed descriptions of the no action alternative are presented in Section 3.5.1.

4.3.14.1.2 Alternative 2 – Restrictions with Long-Term Monitoring

Detailed descriptions of Alternative 2 are presented in Section 3.5.2. Property group-specific details include the following:

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group, Alternative 2 will include placement of institutional controls on the Beacon Point AOC 2 property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

Operation and Maintenance

- Groundwater Monitoring: Because no Raymark waste will remain above the seasonal high water table, long-term groundwater monitoring is not required.
- Existing Surfaces: Annual surface inspections of pavement will be required along with annual reporting to summarize inspection findings and to verify the effectiveness of institutional controls.

4.3.14.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4)

Capping is required only when Raymark waste is left above the seasonal high groundwater table. Because all of the Raymark waste at Beacon Point AOC 2 is located below the seasonal high groundwater table, Alternatives 3 and 4 were not evaluated.

4.3.14.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6)

Alternatives 5 and 6 were not evaluated since there is no Raymark waste located above the seasonal high water table within Beacon Point AOC 2.

4.3.14.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8)

Alternatives 7 and 8 were not evaluated since there is no Raymark waste located above the seasonal high water table within Beacon Point AOC 2.

4.3.14.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10)

Alternatives 9 and 10 were not evaluated since there is no Raymark waste located above the seasonal high water table within Beacon Point AOC 2.

4.3.14.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10)

No waste is being removed, and therefore there is no waste to treat.

4.3.14.2 Comparative Analysis of Alternatives for Beacon Point AOC 2 Property

This section presents the comparative analysis of alternatives for Beacon Point AOC 2 Property using the criteria described in Section 4.2. The comparative analysis of alternatives for this property is summarized on Table 4-14A.

4.3.14.2.1 Overall Protection of Human Health and the Environment

Alternative 1 (No Action) will not protect human health or the environment. Alternative 2 (Restrictions with Long-Term Monitoring) will protect human health and the environment, if restrictions are monitored and enforced. No other alternatives were evaluated.

4.3.14.2.2 Compliance with ARARs

Alternative 1 (No Action) and Alternative 2 (Restrictions with Long-Term Monitoring) will comply with ARARs, including the chemical-specific CT RSR Direct Exposure Criteria, because contaminants in Raymark waste will not remain in soils within 4 feet of the ground surface, rendering contaminated soil inaccessible.

4.3.14.2.3 Long-Term Effectiveness and Permanence

Alternatives 1 and 2 will provide similar protection to human health since there will be no Raymark waste left above ground water table. However, Alternative 2 will provide the greatest protection to human health because Alternative 2 will include placement of institutional controls on the Beacon Point AOC 2 property to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

4.3.14.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment

There will be no treatment of Raymark waste at any of the property groups. Therefore, there will be no reduction of toxicity, mobility, or volume through treatment under all alternatives.

4.3.14.2.5 Short-Term Effectiveness

No on-site actions will be taken under Alternative 1 (No Action) and minimal on-site actions will be taken under Alternative 2 (Restrictions with Long-Term Monitoring); therefore, there will be no short-term impacts to the community, workers, or the environment.

4.3.14.2.6 Implementability

Both alternatives 1 and 2 are implementable.

4.3.14.2.7 Cost

A comparison of costs for each of the alternatives that were evaluated for Beacon Point AOC 2 Property is presented on Table 4-14B.

Table 4-14
Summary of Detailed Analysis for Beacon Point AOC 2
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4 – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8 – Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Overall Protection of Human Health and the Environment	Would not protect human health. RI did not identify any significant habitats for ecological response.	Would protect human health. RI did not identify any significant habitats for ecological response.	NA	NA	NA	NA
Compliance with ARARs	Would comply with chemical-specific (RSRs).	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-14C.	NA	NA	NA	NA
Long-Term Effectiveness and Permanence	Magniture of residual risk high. No risk reduction. 5-year reviews required. No O&M or controls included for long term.	Residual human health risks are within acceptable limits, if institutional controls are adhered to. No risk reduction. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Controls would be adequate to protect human health for the long-term.	NA	NA	NA	NA
Reduction of Toxicity, Mobility, or Volume Through Treatment	None.	None.	NA	NA	NA	NA
Short-Term Effectiveness	No actions, therefore no short-term impacts anticipated. Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures are applied. No adverse impacts to environment anticipated during implementation. Would achieve RAO.	NA	NA	NA	NA
Implementability	Not applicable.	Would be implementable, assuming cooperation by property owners. Would require coordination with state/town officials to perform O&M and to document compliance with institutional controls.	NA	NA	NA NA	NA
Cost	**Alternative 1** Capital: $0 O&M (Years 1-2): $0 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: $21,578 PV of Alternative: $21,578 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 2** Capital: $22,655 O&M (Years 1-2): $11,312 O&M (Years 3-30): $11,312 Five-Year Reviews: $10,000/each Present Value of O&M: $161,954 Present Value of Alternative: $184,609 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 3** Capital: NA O&M (Years 1-2): NA O&M (Years 3-30): NA Five-Year Reviews: NA PV of O&M: NA PV of Alternative: NA **Alternative 4** Capital: NA O&M (Years 1-2): NA O&M (Years 3-30): NA Five-Year Reviews: NA PV of O&M: NA PV of Alternative: NA See Cost Estimate Backup Sheets in Appendix G.	**Alternative 5** Capital: NA O&M (Years 1-2): NA O&M (Years 3-30): NA Five-Year Reviews: NA PV of O&M: NA PV of Alternative: NA **Alternative 6** Capital: NA O&M (Years 1-2): NA O&M (Years 3-30): NA Five-Year Reviews: NA PV of O&M: NA PV of Alternative: NA See Cost Estimate Backup Sheets in Appendix G.	**Alternative 7** Capital: NA O&M (Years 1-2): NA O&M (Years 3-30): NA Five-Year Reviews: NA PV of O&M: NA PV of Alternative: NA **Alternative 8** Capital: NA O&M (Years 1-2): NA O&M (Years 3-30): NA Five-Year Reviews: NA PV of O&M: NA PV of Alternative: NA See Cost Estimate Backup Sheets in Appendix G.	**Alternative 9** Capital: NA O&M (Years 1-2): NA O&M (Years 3-30): NA Five-Year Reviews: NA PV of O&M: NA PV of Alternative: NA **Alternative 10** Capital: NA O&M (Years 1-2): NA O&M (Years 3-30): NA Five-Year Reviews: NA PV of O&M: NA PV of Alternative: NA See Cost Estimate Backup Sheets in Appendix G.

Table 4-14A
Comparative Analysis of Alternatives for Beacon Point AOC 2
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE[1]									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT										
Protection of Human Health	☐	☐	NA	NA	NA	NA	NA	NA	NA	NA
Protection of the Environment	☐	☐	NA	NA	NA	NA	NA	NA	NA	NA
COMPLIANCE WITH ARARs										
Chemical-Specific ARARs	◘	■	NA	NA	NA	NA	NA	NA	NA	NA
Location-Specific ARARs	NA	■	NA	NA	NA	NA	NA	NA	NA	NA
Action-Specific ARARs	NA	■	NA	NA	NA	NA	NA	NA	NA	NA
Other Criteria, Advisories, Guidance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LONG-TERM EFFECTIVENESS AND PERMANENCE										
Magnitude of Residual Risk	☐	■	NA	NA	NA	NA	NA	NA	NA	NA
Adequacy and Reliability of Controls	☐	■	NA	NA	NA	NA	NA	NA	NA	NA
REDUCTION OF TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT										
Treatment/Recycling Processes Utilized	☐	☐	NA	NA	NA	NA	NA	NA	NA	NA
Amount of Hazardous Materials Destroyed or Treated	☐	☐	NA	NA	NA	NA	NA	NA	NA	NA
Degree of Expected Reductions in Tox, Mob, or Vol	☐	☐	NA	NA	NA	NA	NA	NA	NA	NA
Irreversibility	☐	☐	NA	NA	NA	NA	NA	NA	NA	NA
Type and Quantity of [Process] Residuals	☐	☐	NA	NA	NA	NA	NA	NA	NA	NA
SHORT-TERM EFFECTIVENESS										
Protection of Community During Remedial Actions	NA	■	NA	NA	NA	NA	NA	NA	NA	NA
Protection of Workers During Remedial Actions	NA	■	NA	NA	NA	NA	NA	NA	NA	NA
Environmental Impacts	■	■	NA	NA	NA	NA	NA	NA	NA	NA
Time Until Remedial Action Objectives are Achieved	☐	☐	NA	NA	NA	NA	NA	NA	NA	NA

Table 4-14A
Comparative Analysis of Alternatives for Beacon Point AOC 2
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE[1]									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
IMPLEMENTABILITY										
Ability to Construct and Operate the Technology	NA	■	NA	NA	NA	NA	NA	NA	NA	NA
Reliability of the Technology	NA	■	NA	NA	NA	NA	NA	NA	NA	NA
Ease of Undertaking Additional Remedial Actions, if Necessary	■	■	NA	NA	NA	NA	NA	NA	NA	NA
Ability to Monitor Effectiveness of the Remedy	NA	■	NA	NA	NA	NA	NA	NA	NA	NA
Ability to Obtain Approvals from Other Agencies	■	■	NA	NA	NA	NA	NA	NA	NA	NA
Coordination with Other Agencies	◘	■	NA	NA	NA	NA	NA	NA	NA	NA
Availability of Off-Site Treatment, Storage, and Disposal Services and Capacity	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Availability of Necessary Equipment and Specialists	NA	■	NA	NA	NA	NA	NA	NA	NA	NA
Availability of Prospective Technologies	NA	■	NA	NA	NA	NA	NA	NA	NA	NA
COST										
Capital	$0	$22,655	NA	NA	NA	NA	NA	NA	NA	NA
Present Value of O&M (First 30 Years)	$21,578	$161,954	NA	NA	NA	NA	NA	NA	NA	NA
Present Value of the Alternative	$21,578	$184,609	NA	NA	NA	NA	NA	NA	NA	NA

[1]**Alternatives 3 through 10 were not evaluated.**

Notes:

NA = Not Applicable

■ = Highest rating (most protective, most effective, most implementable)

◘ = Meets criterion, but another alternative(s) more protective/effective/implementable

☐ = Does not meet criterion

Table 4-14B
Cost Estimate Summary for Beacon Point AOC 2
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Excavation Depth, ft	0	0	NA	NA	NA	NA	NA	NA	NA	NA
Cap/Cover	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Disposal Volumes (CY)										
In-Town Consolidation			0	0	0	0	0	0	0	0
Out-of-Town			0	0	0	0	0	0	0	0
Treated			0	0	0	0	0	0	0	0
Total Disposal Vol.			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Cost										
Capital	**$0**	**$22,655**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
O&M (present value)	**$21,578**	**$161,954**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
Present Value	**$21,578**	**$184,609**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

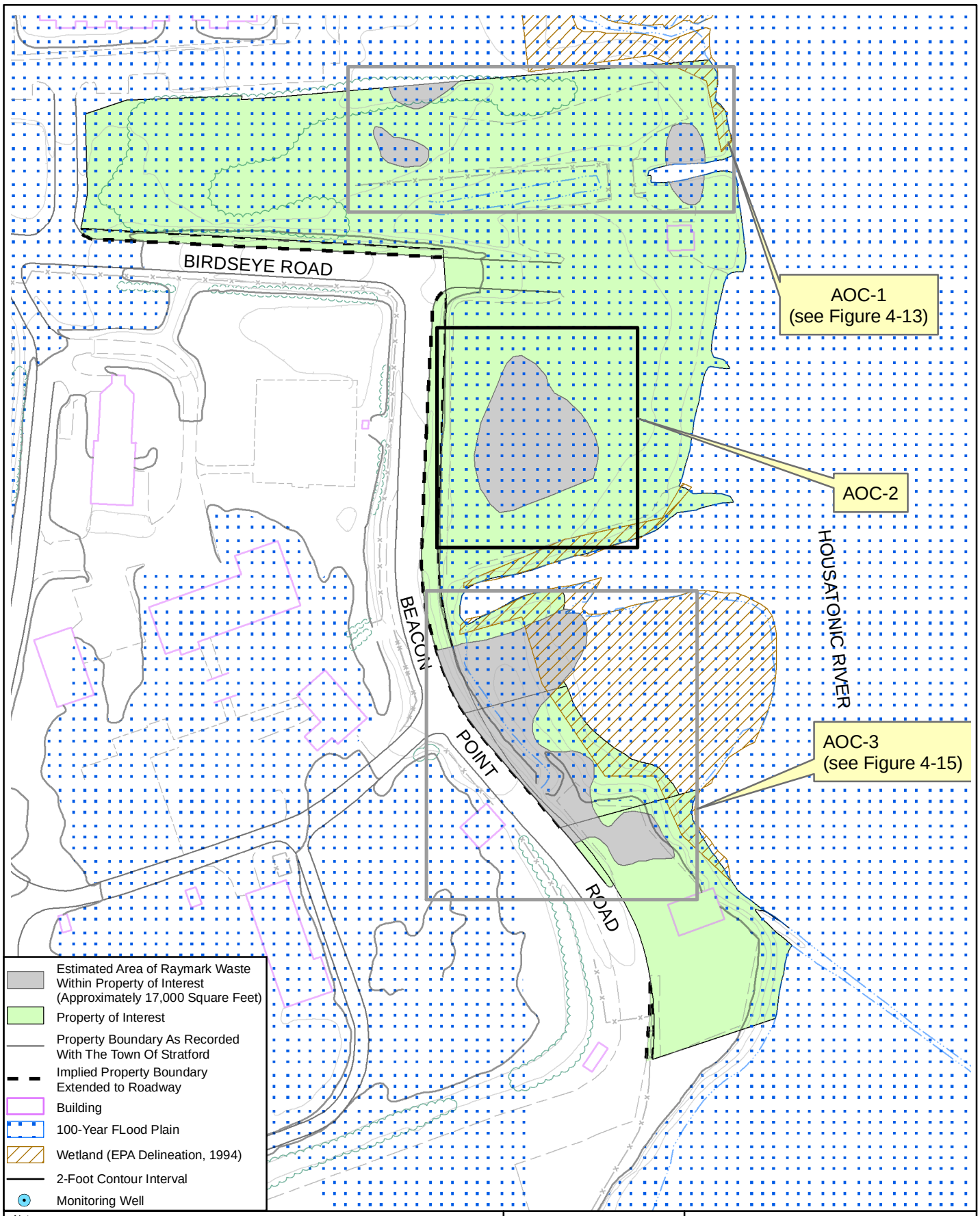
Notes:
Alternative 1 - No Action
Alternative 2 - Restrictions With Long-Term Monitoring
Alternative 3 - Low-Permeability Cap With In-Town Consolidation
Alternative 4 - Low-Permeability Cap With Out-Of-Town Disposal
Alternative 5 - Excavation To The Water Table With In-Town Consolidation
Alternative 6 - Excavation To The Water Table With Out-Of-Town Disposal
Alternative 7 - Excavation To Either 2 Or 4 Feet With In-Town Consolidation
Alternative 8 - Excavation To Either 2 Or 4 Feet With Out-Of-Town Disposal
Alternative 9 - Excavation To 4 Feet With In-Town Consolidation
Alternative 10 - Excavation To 4 Feet With Out-Of-Town Disposal
FT = foot
CY = cubic yard
O&M = operations and maintenance
NA = not applicable

Table 4-14C
Preliminary ARAR Summary - Beacon Point AOC 2
Raymark OU6 - Additional Properties
Stratford, Connecticut

Property Group	ARAR Tables				
	A	B	C	D	E
Alternative 1	X				
Alternative 2	X				
Alternative 3					
Alternative 4					
Alternative 5					
Alternative 6					
Alternative 7					
Alternative 8					
Alternative 9					
Alternative 10					

A = ARARs for all Alternatives
B = ARAR add-ons for an alternative for the Raymark waste located in the wetlands
C = ARAR add-ons for an alternative for the Raymark waste located in the floodplains
D = ARAR add-ons for alternatives that include low-permeability caps
E = ARAR add-ons for alternatives that include CAMUs

Note:
ARAR tables A-E are found in Volume II, Appendix C of this Feasibility Study.



Notes:
1) Plan not to be used for design.
2) All locations to be considered approximate.
3) Property boundaries are approximate based on Town of Stratford Engineering Department plans.
4) Floodplain extent based on Federal Emergency Management Agency Q3 Flood Data, Community Panel Numbers 090016 0001-0004, Revised June 16, 1992, FEMA, Washington D.C. and modified to Town of Stratford Engineering Plan 10-foot contour.
5) Adapted from TTNUS Remedial Investigation, 2005.

150 75 0 150 Feet

N

Nobis

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
(978) 683-0891
www.nobisengineering.com

FIGURE 4-14

BEACON POINT
AREA OF CONCERN (AOC)-2
FEASABILITY STUDY
RAYMARK SUPERFUND SITE
STRATFORD, CONNECTICUT

Drawn By: D. McGrath	Approved By: H. Ford
Project: 80006	Date: 9/24/09 Rev00

R:\80000 Task Orders\80006 Raymark\Technical Data\GIS_Data\Figures\OU6_FS_Figures\Beacon_Point_AOC_2.mxd

4.3.15 Beacon Point Area of Concern (AOC) 3 Property

The Beacon Point area property is approximately 7.4 acres of commercially-zoned land (waterfront business). It abuts 1 Beacon Point Road, a property that consists of approximately 0.9 acres of commercially-zoned land (waterfront business). Both properties are located on Beacon Point Road in Stratford, Connecticut. Beacon Point AOC2 is located to the north, the Housatonic River and associated wetlands are located to the east, and south, and the Town of Stratford's Publicly-Owned Treatment Works (POTW), a wastewater treatment plant, is located to the west (see Figure 4-15). Beacon Point AOC 3 is located on the southern portion of the Beacon Point area and the northern portion of the 1 Beacon Point Road property.

There are three areas of concern (AOCs) where Raymark waste is found. Beacon Point AOC 3 is being evaluated separately from two other non-contiguous Raymark waste areas located within the same property group to enable flexibility in selecting final remedies. The area of Raymark waste found at Beacon Point AOC 3 is approximately 27,000, consisting mostly of undeveloped tidally-influenced wetlands. (Beacon Point AOC 1 and Beacon Point AOC 2 are presented in Sections 4.4.13 and 4.4.14), respectively.

According to FEMA Flood Insurance Rate Maps for Stratford, the entire Beacon Point AOC 3 area is located within the 100-year floodplain.

Key factors associated with the areas and volumes to be addressed at this property group include:

- Raymark waste area: .....27,000 SF (Figure 4-15)
- Total volume of Raymark waste:.....10,000 CY
- Maximum depth of Raymark waste:.....10 feet bgs
- Average depth to the seasonal high groundwater table:.....5 feet
- Raymark waste area outside of 100-year floodplain:..... 11,000 SF
- Raymark waste area in 100-year floodplain:..... 16,000 SF
- Raymark waste in 100-year floodplain to 5 FT:.....2,963 CY
- Raymark waste area under pavement: ..... 0 SF
- Raymark waste in unpaved area:..... 27,000 SF
- Raymark waste located below the water table:.....5,000 CY (27,000 SF x 5 FT)

- Alternatives 3/4:
  - Raymark waste under pavement to 2.5 FT: ..... 0 CY
  - Raymark waste in unpaved area to 3 FT: ..... 3,000 CY (27,000 SF x 3 FT)
- Alternatives 5/6:
  - Raymark waste located above the water table: ..... 5,000 CY (27,000 SF x 5 FT)
- Alternatives 7/8:
  - Raymark waste under pavement to 2 FT: ..... 0 CY
  - Raymark waste in unpaved area to 4 FT: ..... 4,000 CY (27,000 SF x 4 FT)
- Alternatives 9/10:
  - Raymark waste to 4 FT: ..... 4,000 CY (27,000 SF x 4 FT)

The calculation of the average depth to the seasonal high water table of 5 feet below ground surface (bgs) is based on observations of water levels from soil borings advanced in the area. The calculation of the maximum depth of Raymark waste is based on data collected during the RI (TtNUS, 2005).

The detailed analysis of alternatives for this property group is presented below and consists of the following components:

- A list of key assumptions (Section 4.3.15.1) is used as the basis for the detailed analysis of alternatives and for the development of costs for the FS;
- Figure 4-15, which shows a map of Beacon Point AOC 3, the delineated Raymark waste area, the 100-year floodplain, and the proposed cap footprint;
- Table 4-15, which presents the individual detailed analysis of alternatives for Beacon Point AOC 3 in tabular form;
- The comparative analysis of alternatives for Beacon Point AOC 3, presented in text form;
- Table 4-15A, which presents a tabular summary of the comparative analysis;
- Table 4-15B, which presents a summary of cost estimates for each of the alternatives;
- Table 4-15C, which provides a summary of ARARs for each of the Beacon Point AOC 3 alternatives; and
- Cost Estimate Backup Sheets for the FS cost estimates, which are presented in Appendix G.

4.3.15.1 Beacon Point AOC 3 Assumptions

Key assumptions associated with each alternative are presented in this section. Pairs of alternatives (3 and 4, 5 and 6, 7 and 8, and 9 and 10) have the same components except for the disposal of Raymark waste, which is either in-town or out-of-town. See Section 3.3 for details on the Remedial Alternatives discussed below. See Table 4-15 for a summary of the details on the analysis for the Beacon Point AOC 3 property group.

4.3.15.1.1 Alternative 1 – No Action

Detailed descriptions of the no action alternative are presented in Section 3.5.1.

4.3.15.1.2 Alternative 2 – Restrictions with Long-Term Monitoring

Detailed descriptions of Alternative 2 are presented in Section 3.5.2. Property group-specific details include the following:

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group, Alternative 2 will include placement of institutional controls on the Beacon Point AOC 3 property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

Operation and Maintenance

- Groundwater Monitoring: Four monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above the seasonal high water table, all four wells will be monitored quarterly for 2 years, and annually thereafter.

- Existing Surfaces: Monthly surface inspections of vegetative covers will be required along with annual reporting to summarize inspection findings and to verify the effectiveness of institutional controls.

4.3.15.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4)

As a large portion of Raymark waste in this property group lies within or directly abuts a wetland area, low-permeability cap alternatives (Alternatives 3 and 4) are not feasible for this property group and, therefore, were not evaluated.

4.3.15.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6)

Detailed descriptions of Alternatives 5 and 6 are presented in Section 3.5.4. Raymark waste areas will be excavated to the seasonal high water table. Excavated material will be placed in an in-town consolidation area (Alternative 5) or an out-of-town disposal location (Alternative 6). The property group-specific details include the following:

Excavation Volumes/Final Cover

- Approximately 5,000 CY of Raymark waste will be excavated to the average seasonal high water table of 5 feet. Approximately 280 CY of non-Raymark waste soil will additionally be excavated to facilitate safety requirements such as benching/sloping of sidewalls to prevent collapse.
- Raymark waste will be excavated to the water table and replaced with a vegetated, permeable soil cover.
- Final property contours will be designed to meet Beacon Point AOC 3 and surrounding parcels at current elevations.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated the seasonal high water table. Once excavated, this area will be backfilled with clean fill and revegetated with current elevations and drainage patterns retained so that the current flood storage capacity will not be diminished after completion of the remedial actions.

- Temporary impacts to wetlands are anticipated as Raymark waste within the wetlands will be excavated to the seasonal high water table. Once excavated, this area will be backfilled with clean fill and revegetated with current elevations and drainage patterns retained so that the current value of the wetland will not be diminished after completion of the remedial actions.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 5 and 6 will include placement of institutional controls on the Beacon Point AOC 3 property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Four monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because all Raymark waste located above the seasonal high water table will be removed, all four wells will be monitored quarterly for 2 years, after which groundwater monitoring may no longer be required.

- Cap/Final Cover: Vegetative covers must be inspected annually and maintained in good condition as specified in the ELUR.

4.3.15.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8)

Detailed descriptions of Alternatives 7 and 8 are presented in Section 3.5.5. As all of the Raymark waste is within unpaved areas, excavation depths will be 4 feet which is the same as Alternatives 9 and 10. Because of this, Alternatives 7 and 8 are not evaluated.

4.3.15.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10)

Detailed descriptions of Alternatives 9 and 10 are presented in Section 3.5.6. Raymark waste areas will be excavated to a 4-foot depth. Excavated material will be placed in an in-town consolidation area (Alternative 9) or an out-of-town disposal location (Alternative 10). The property group-specific details include the following:

Excavation and Final Cover

- Approximately 4,000 CY of Raymark waste will be excavated to a 4-foot depth.
- Raymark waste areas excavated to a 4-foot depth will be replaced with a vegetated, permeable soil cover.
- Final property contours will be designed to meet Beacon Point AOC 3 and surrounding parcels at current elevations.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated to 4 feet. Once excavated, this area will be backfilled with clean fill and revegetated with current elevations and drainage patterns retained so that the current flood storage capacity will not be diminished after completion of the remedial actions.

- Temporary impacts to wetlands are anticipated as Raymark waste within the wetlands will be excavated to 4 feet. Once excavated, this area will be backfilled with clean fill and revegetated with current elevations and drainage patterns retained so that the

current value of the wetland will not be diminished after completion of the remedial actions.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 9 and 10 will include placement of institutional controls on the Beacon Point AOC 3 property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Four monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above the seasonal high water table, all four wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in present value cost analysis.

- Cap/Final Cover: Vegetative covers must be inspected monthly and maintained in good condition. A 30-year monitoring period is used in the present value cost analysis.

4.3.15.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10)

Raymark waste treatment is described in Section 3.1.3 for all property groups.

- Based on an evaluation of historical sampling data from <u>all</u> OU6 properties, it is assumed that approximately 10% of excavated Raymark waste will require treatment prior to disposal. Treatment will be required only when excavated materials exhibit

concentrations of contaminants in excess of disposal requirements. All treatment will occur at an out-of-town facility.

- For alternatives featuring out-of-town disposal of Raymark waste (Alternatives 6 and 10), the concentration thresholds for treatment will be 10 times UTS thresholds.

- For alternatives featuring in-town consolidation (Alternatives 5 and 9), the concentration thresholds for treatment will be the PHC levels.

- Treatment volume estimates for Beacon Point AOC 3 are based on the assumed quantity of excavation required to implement each alternative. Note that the waste volumes are rounded up or down as appropriate.

- A 1.5 conversion factor from tons to cubic yards is used.

  - <u>Alternatives 3/4</u>
    - Not applicable.

  - <u>Alternatives 5/6</u>
    - 5,000 CY RW excavated * 1.2 bulking factor = 6,000 CY
    - 6,000 CY * 1.5 TON/CY = 9,000 TON
    - 9,000 TON * 10% = **900 TONS to be treated (600 CY)**

  - <u>Alternatives 7/8</u>
    - Not applicable.

  - <u>Alternatives 9/10</u>
    - 4,000 CY RW excavated * 1.2 bulking factor = 4,800 CY
    - 4,800 CY * 1.5 TON/CY = 7,200 TON
    - 7,200 TON * 10% = **720 TONS to be treated (480 CY)**

4.3.15.2 Comparative Analysis of Alternatives for Beacon Point AOC 3

This section presents the comparative analysis of alternatives for the Beacon Point AOC 3 using the criteria described in Section 4.2. The comparative analysis of alternatives for this property is summarized in a comparison format on Table 4-15A.

4.3.15.2.1 Overall Protection of Human Health and the Environment

Alternative 1 (No Action) will not protect human health or the environment. Alternative 2 (Restrictions with Long-Term Monitoring) can provide limited protection of human health and the environment, if restrictions are monitored and enforced. Alternatives 9 and 10 will achieve protection of human health and the environment through the excavation of varying amounts of Raymark waste and the use of institutional controls, rendering the contaminated waste inaccessible. Alternatives 5 and 6 will protect human health and the environment through the removal of all Raymark waste located above the seasonal high water table and the use of institutional controls.

4.3.15.2.2 Compliance with ARARs

Alternative 1 (No Action) and Alternative 2 (Restrictions with Long-Term Monitoring) will not comply with chemical-specific ARARs because contaminants in Raymark waste will remain accessible in soils in excess of CT RSRs and federal risk criteria.

The ARARs associated with the implementation of Alternatives 5 and 6 and 9 and 10 are presented in Section 4.0 of this FS and on Table 4-15C. Alternatives 5 and 6 could be designed to comply with all chemical-specific, action-specific, and location-specific ARARs. Through excavation of Raymark waste to 4 feet, Alternatives 9 and 10 will render the remaining contaminated soil inaccessible, and will be compliant with the action-specific CT RSR Direct Exposure Criteria. Alternatives 9 and 10 may not comply with the numeric standards of CTDEP's Pollutant Mobility Criteria, however, RSRs allow for variances and alternate criteria. Alternatives 9 and 10 will comply with all other chemical, action, and location-specific ARARs.

4.3.15.2.3 Long-Term Effectiveness and Permanence

The magnitude of residual human health risk associated with Raymark waste will be highest for Alternative 1 (No Action), since no actions will be taken to mitigate human health risks. Residual human health risks for Alternative 2 (Restrictions with Long-Term Monitoring) will be lower than Alternative 1, but still above acceptable human health risk levels.

Residual human health risks after implementation of Alternatives 9 and 10 will be slightly higher than for Alternatives 5 and 6 because Raymark waste will be left in-place above the seasonal high water table. Alternatives 5 and 6 will be more reliable than Alternatives 9 and 10 because there will be no Raymark waste left in-place above the seasonal high water table and protection of human health through direct contact or mobilization of contaminants by rainwater infiltration will not be dependent on maintenance of a low-permeable RCRA cap or a soil cover.

Alternatives 9 and 10 can provide protection in the long-term if the cover systems are maintained. Alternatives 5 and 6 will provide the greatest protection to human health and will be the most permanent. Alternatives 5 and 6 and 9 and 10 could each be designed to allow for redevelopment potential on the property group.

4.3.15.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment

No treatment will be required for Alternative 1 (No Action) or Alternative 2 (Restrictions with Long-Term Monitoring). Alternatives 5 and 6 and 9 and 10 will require treatment prior to land disposal to address the assumed 10 percent fraction that exceeds the UTS or PHC levels. This treatment will result in reduction of toxicity, mobility, and volume of Raymark waste. Although, the estimated volumes that will require treatment are similar (ranging from 480 to 600 CY), Alternatives 5 and 6 will result in the greatest amount of reduction because a larger quantity of materials will be shipped offsite and is expected to require treatment prior to disposal.

4.3.15.2.5 Short-Term Effectiveness

No on-site actions will be taken under Alternative 1 (No Action) and minimal on-site actions will be taken under Alternative 2 (Restrictions with Long-Term Monitoring); therefore there will be no short-term impacts to the community, workers, or the environment. Short-term impacts to the

community, workers, and the environment from the implementation of Alternatives 5 and 6 and 9 and 10 will be similar and can be mitigated using engineering controls.

Alternatives 5 and 6 will involve a higher volume of truck traffic to transport Raymark waste and backfill and will require a greater volume of Raymark waste handling than Alternatives 9 and 10.

Alternatives 5 and 6 and 9 and 10 will take approximately 4 months to complete. For Alternatives 5 and 9, the estimated time to complete does not include the amount of time necessary to complete remedial activities at an in-town consolidation location.

4.3.15.2.6 Implementability

Alternatives 5 and 6 (excavation to water table), and Alternatives 9 and 10 (4-feet excavation) all require excavation, which can be implemented through standard construction and environmental remediation methods. Alternatives 9 and 10 require specific site grading, placement of cap/cover materials based on design specifications, and O&M in the future. Alternatives 5 and 6 will involve excavation of the largest volume of Raymark waste (5,000 CY), and any expansions of the Raymark waste area due to confirmatory sampling will lead to a larger volume of excavated Raymark waste compared to Alternatives 9 and 10 due to the excavation depth to the seasonal high water table.

Alternatives 9 and 10 are equally amenable to additional remedial actions at the property group, should they be deemed necessary. Alternatives 5 and 6 will be the most amenable to additional actions should they be necessary as all Raymark waste will be removed to the seasonal high water table.

Alternatives 9 and 10 will each require long-term groundwater monitoring. Alternatives 5 and 6 will require quarterly groundwater monitoring for only 2 years after which groundwater monitoring may no longer be required. Alternatives 9 and 10 will also require long-term operation and maintenance of the cap or soil cover.

Alternatives 5 and 6 and 9 and 10 will be similar in terms of the ability to coordinate with other agencies.

For Alternatives 5 and 6 and 9 and 10, each involves conventional construction methods for which the required equipment and technical specialists will be readily available.

4.3.15.2.7 Cost

A comparison of costs for each of the alternatives that were evaluated for Beacon Point AOC 3 is presented on Table 4-15B.

Table 4-15
Summary of Detailed Analysis for Beacon Point AOC 3
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4[1] – Low Permeability Cap with In-Town Consolidation or Out-of-Town	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8[2]– Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Overall Protection of Human Health and the Environment	Would not protect human health. RI did not identify any significant habitats for ecological receptors.	Some protection of human health, but human health risks still above acceptable limits. RI did not identify any significant habitats for ecological receptors.	NA	Would protect human health through the removal of Raymark waste and placement of clean soil in its place. RI did not identify any significant habitats for ecological receptors.	NA	Would protect human health through construction of an engineered barrier over Raymark waste area to prevent direct contact. RI did not identify any significant habitats for ecological receptors.
Compliance with ARARs	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs.	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-15C.	NA	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-15C.	NA	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs with the use of alternate criteria. See Table 4-15C.
Long-Term Effectiveness and Permanence	Magnitude of residual risk high. No risk reduction. 5-year reviews required. No O&M or controls included for long term.	Residual human health risks above acceptable limits. No risk reduction. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater and groundwater monitoring required. Controls would not be adequate to protect human health for the long-term.	NA	Residual risk within acceptable limits. Risk reduction would be permanent. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.	NA	Residual risk within acceptable limits. Raymark waste will be left in-place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.
Reduction of Toxicity, Mobility, or Volume Through Treatment	None.	None.	NA	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark waste treated (tons)= 900 Raymark waste treated (CY)= 600	NA	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark waste treated (tons)= 720 Raymark waste treated (CY)= 480
Short-Term Effectiveness	No actions, therefore no short-term impacts anticipated. Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures are applied. No adverse impacts to environment anticipated during implementation. Minimal on-site actions (well construction, signage, and fence installation, and groundwater sampling only). Would not achieve RAO.	NA	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW $(CY)^3$ = 6,000 Approximate truckloads of Raymark waste 500 Approximate truckloads of clean fill 500 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 5, this time frame does not include duration of capping activities at consolidation location. 4 Would achieve RAO.	NA	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW $(CY)^3$ = 4,800 Approximate truckloads of Raymark waste 400 Approximate truckloads of clean fill 400 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 9, this time frame does not include duration of capping activities at consolidation location. 4 Would achieve RAO.

Table 4-15
Summary of Detailed Analysis for Beacon Point AOC 3
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4[1] – Low Permeability Cap with In-Town Consolidation or Out-of-Town	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8[2]– Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Implementability	Not applicable.	Would be implementable, assuming cooperation by property owners. Would require coordination with state/town officials to perform O&M and to document compliance with institutional controls.	NA	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by presence of Raymark waste left in-place.	NA	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by presence of Raymark waste left in-place.
Cost	**Alternative 1** Capital: $0 O&M (Years 1-2): $0 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: $21,578 PV of Alternative: $21,578 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 2** Capital: $53,546 O&M (Years 1-2): $59,246 O&M (Years 3-30): $34,621 Five-Year Reviews: $10,000/each PV of O&M: $495,717 PV of Alternative: $549,264 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 3** Capital: NA O&M (Years 1-2): NA O&M (Years 3-30): NA Five-Year Reviews: NA PV of O&M: NA PV of Alternative: NA **Alternative 4** Capital: NA O&M (Years 1-2): NA O&M (Years 3-30): NA Five-Year Reviews: NA PV of O&M: NA PV of Alternative: NA See Cost Estimate Backup Sheets in Appendix G.	**Alternative 5** Capital: $1,157,506 O&M (Years 1-2): $51,424 O&M (Years 3-30): $9,791 Five-Year Reviews: $10,000/each PV of O&M: $218,350 PV of Alternative: $1,375,857 **Alternative 6** Capital: $4,451,901 O&M (Years 1-2): $51,424 O&M (Years 3-30): $9,791 Five-Year Reviews: $10,000/each PV of O&M: $218,350 PV of Alternative: $4,670,252 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 7** Capital: NA O&M (Years 1-2): NA O&M (Years 3-30): NA Five-Year Reviews: NA PV of O&M: NA PV of Alternative: NA **Alternative 8** Capital: NA O&M (Years 1-2): NA O&M (Years 3-30): NA Five-Year Reviews: NA PV of O&M: NA PV of Alternative: NA See Cost Estimate Backup Sheets in Appendix G.	**Alternative 9** Capital: $1,232,826 O&M (Years 1-2): $64,559 O&M (Years 3-30): $33,335 Five-Year Reviews: $10,000/each PV of O&M: $491,685 PV of Alternative: $1,724,512 **Alternative 10** Capital: $3,867,421 O&M (Years 1-2): $64,559 O&M (Years 3-30): $33,335 Five-Year Reviews: $10,000/each PV of O&M: $491,685 PV of Alternative: $4,359,107 See Cost Estimate Backup Sheets in Appendix G.

[1] Alternatives 3 and 4 were not evaluated.
[2] Alternatives 7 and 8 were not evaluated.
[3] A bulking factor of 1.2 was used.

Table 4-15A
Comparative Analysis of Alternatives for Beacon Point AOC 3
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE[1]									
	1	2	3	4	5	6	7	8	9	10
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT										
Protection of Human Health	☐	☐	NA	NA	■	■	NA	NA	◘	◘
Protection of the Environment	☐	☐	NA	NA	■	■	NA	NA	◘	◘
COMPLIANCE WITH ARARs										
Chemical-Specific ARARs	☐	☐	NA	NA	■	■	NA	NA	◘	◘
Location-Specific ARARs	NA	■	NA	NA	■	■	NA	NA	◘	◘
Action-Specific ARARs	NA	■	NA	NA	■	■	NA	NA	◘	◘
Other Criteria, Advisories, Guidance	NA	NA	NA	NA	■	■	NA	NA	◘	◘
LONG-TERM EFFECTIVENESS AND PERMANENCE										
Magnitude of Residual Risk	☐	☐	NA	NA	■	■	NA	NA	◘	◘
Adequacy and Reliability of Controls	☐	☐	NA	NA	■	■	NA	NA	◘	◘
REDUCTION OF TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT										
Treatment/Recycling Processes Utilized	NA	NA	NA	NA	■	■	NA	NA	■	■
Amount of Hazardous Materials Destroyed or Treated	☐	☐	NA	NA	■	■	NA	NA	◘	◘
Degree of Expected Reductions in Tox, Mob, or Vol	☐	☐	NA	NA	■	■	NA	NA	◘	◘
Irreversibility	☐	☐	NA	NA	■	■	NA	NA	■	■
Type and Quantity of [Process] Residuals	☐	☐	NA	NA	■	■	NA	NA	■	■
SHORT-TERM EFFECTIVENESS										
Protection of Community During Remedial Actions	NA	■	NA	NA	◘	◘	NA	NA	◘	◘
Protection of Workers During Remedial Actions	NA	■	NA	NA	◘	◘	NA	NA	◘	◘
Environmental Impacts	■	■	NA	NA	◘	◘	NA	NA	◘	◘
Time Until Remedial Action Objectives are Achieved	☐	☐	NA	NA	◘	◘	NA	NA	◘	◘

Table 4-15A
Comparative Analysis of Alternatives for Beacon Point AOC 3
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE[1]									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
IMPLEMENTABILITY										
Ability to Construct and Operate the Technology	NA	■	NA	NA	■	■	NA	NA	■	■
Reliability of the Technology	NA	□	NA	NA	■	■	NA	NA	◘	◘
Ease of Undertaking Additional Remedial Actions, if Necessary	■	■	NA	NA	■	■	NA	NA	◘	◘
Ability to Monitor Effectiveness of the Remedy	NA	NA	NA	NA	◘	◘	NA	NA	◘	◘
Ability to Obtain Approvals from Other Agencies	■	■	NA	NA	■	■	NA	NA	■	■
Coordination with Other Agencies	◘	◘	NA	NA	■	■	NA	NA	■	■
Availability of Off-Site Treatment, Storage, and Disposal Services and Capacity	NA	NA	NA	NA	■	■	NA	NA	■	■
Availability of Necessary Equipment and Specialists	NA	■	NA	NA	■	■	NA	NA	■	■
Availability of Prospective Technologies	NA	■	NA	NA	■	■	NA	NA	■	■
COST										
Capital	$0	$53,546	NA	NA	$1,157,506	$4,451,901	NA	NA	$1,232,826	$3,867,421
Present Value of O&M (First 30 Years)	$21,578	$495,717	NA	NA	$218,350	$218,350	NA	NA	$491,685	$491,685
Present Value of the Alternative	$21,578	$549,264	NA	NA	$1,375,857	$4,670,252	NA	NA	$1,724,512	$4,359,107

[1]Alternatives 7 and 8 were not evaluated.

Notes:

■ = Highest rating (most protective, most effective, most implementable)

◘ = Meets criterion, but another alternative(s) more protective/effective/implementable

□ = Does not meet criterion

Table 4-15B
Cost Estimate Summary for Beacon Point AOC 3
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Excavation Depth, ft	0	0	0	0	5	5	2 or 4	2 or 4	4	4
Cap/Cover	NA	NA	RCRA C	RCRA C	NA	NA	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover
Disposal Volumes (CY)										
In-Town Consolidation			0	0	5400	0	0	0	4320	0
Out-of-Town			0	0	0	5,400	0	0	0	4,320
Treated			0	0	600	600	0	0	480	480
Total Disposal Vol.			**0**	**0**	**6000**	**6000**	**0**	**0**	**4800**	**4800**
Cost										
Capital	**$0**	**$53,546**	**NA**	**NA**	**$1,157,506**	**$4,451,901**	**NA**	**NA**	**$1,232,826**	**$3,867,421**
O&M (present value)	**$21,578**	**$495,717**	**NA**	**NA**	**$218,350**	**$218,350**	**NA**	**NA**	**$491,685**	**$491,685**
Present Value	**$21,578**	**$549,264**	**NA**	**NA**	**$1,375,857**	**$4,670,252**	**NA**	**NA**	**$1,724,512**	**$4,359,107**

Notes:
Alternative 1 - No Action
Alternative 2 - Restrictions with Long-Term Monitoring
Alternative 3 - Low-Permeability Cap with In-Town Consolidation
Alternative 4 - Low-Permeability Cap with Out-Of-Town Disposal
Alternative 5 - Excavation to the Water Table with In-Town Consolidation
Alternative 6 - Excavation to the Water Table with Out-Of-Town Disposal
Alternative 7 - Excavation to either 2 or 4 Feet with In-Town Consolidation (Not applicable)
Alternative 8 - Excavation to either 2 or 4 Feet with Out-Of-Town Disposal (Not Applicable)
Alternative 9 - Excavation to 4 Feet with In-Town Consolidation
Alternative 10 - Excavation to 4 Feet with Out-Of-Town Disposal

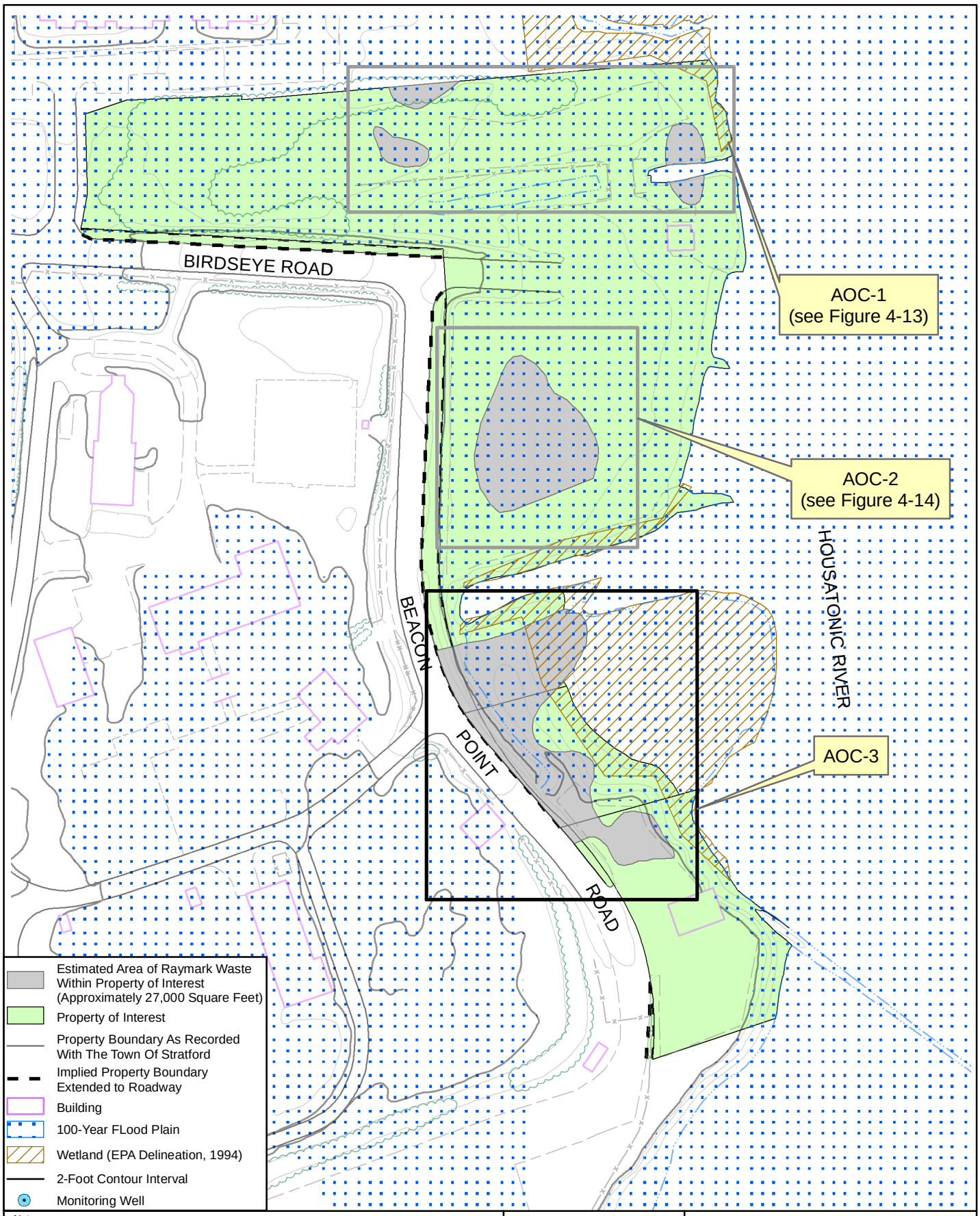
Table 4-15C
Preliminary ARAR Summary - Beacon Point AOC 3
Raymark OU6 - Additional Properties
Stratford, Connecticut

Property Group	ARAR Tables				
	A	B	C	D	E
Alternative 1	X				
Alternative 2	X	X	X		
Alternative 3[1]					
Alternative 4[1]					
Alternative 5	X	X	X		
Alternative 6	X	X	X		
Alternative 7[1]					
Alternative 8[1]					
Alternative 9	X	X	X		
Alternative 10	X	X	X		

[1] Alternatives 7 and 8 were not evaluated.

A = ARARs for all Alternatives
B = ARAR add-ons for an alternative for the Raymark waste located in the wetlands
C = ARAR add-ons for an alternative for the Raymark waste located in the floodplains
D = ARAR add-ons for alternatives that include low-permeability caps
E = ARAR add-ons for alternatives that include CAMUs

Note:
ARAR tables A-E are found in Volume II, Appendix C of this Feasibility Study.



Notes:
1) Plan not to be used for design.
2) All locations to be considered approximate.
3) Property boundaries are approximate based on Town of Stratford Engineering Department plans.
4) Floodplain extent based on Federal Emergency Management Agency Q3 Flood Data, Community Panel Numbers 090016 0001-0004, Revised June 16, 1992, FEMA, Washington D.C. and modified to Town of Stratford Engineering Plan 10-foot contour.
5) Adapted from TTNUS Remedial Investigation, 2005.

150 75 0 150 Feet

N

Nobis

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
(978) 683-0891
www.nobisengineering.com

FIGURE 4-15

BEACON POINT
AREA OF CONCERN (AOC)-3
FEASABILITY STUDY
RAYMARK SUPERFUND SITE
STRATFORD, CONNECTICUT

Drawn By: D. McGrath	Approved By: H. Ford
Project: 80006	Date: 07/08/10 Rev00

R:\80000 Task Orders\80006 Raymark\Technical Data\GIS_Data\Figures\OU6_FS_Figures\Figure_04-15_Beacon_Point_AOC3.mxd

4.3.16 Airport Property North of Marine Basin Property

This parcel consists of approximately 15.1 acres of commercially-zoned land (coastal industrial) located on Main Street in Stratford, Connecticut (Figure 4-16). It is one of the 24 properties included in the OU6 Remedial Investigation (RI) report (TtNUS, 2005). A parking lot for the former Stratford Army Engine Plant is located to the north/northwest, the Stratford/Bridgeport Landfill and a water body referred to as the Marine Basin is to the south/southeast, and Main Street is located to the south and west. The lot is flat and maintained by Sikorsky Memorial Airport as a clear zone for the airport runways on the opposite side of Main Street. There are no buildings on the property. The only feature is a dirt driveway that runs through the southern portion of the property. The property is currently owned by the Town of Stratford. The entire property group lies within the 100-year floodplain.

Key factors associated with the areas and volumes to be addressed at this property group include:

- Raymark waste area: .....47,000 SF (Figure 4-16)
- Total volume of Raymark waste:.....10,444 CY
- Maximum depth of Raymark waste:..... 6 feet bgs
- Average depth to the seasonal high groundwater table:.....4.5 feet
- Raymark waste area outside of 100-year floodplain:..... 0 SF
- Raymark waste area in 100-year floodplain:..... 47,000 SF
- Raymark waste area in 100-year floodplain to 4.5 FT: .....7,833 CY
- Raymark waste area under pavement: ..... 0 SF
- Raymark waste in unpaved area:..... 47,000 SF
- Raymark waste located below the water table:.....2,611 CY (47,000 FT x 1.5 FT)
- Alternatives 3/4:
  - Raymark waste under pavement to 2.5 FT: .....0 CY
  - Raymark waste in unpaved area to 3 FT: .....5,222 (47,000 SF x 3 FT)
- Alternatives 5/6:
  - Raymark waste located above the water table: .....7,833 CY (47,000 FT x 4.5 FT)
- Alternatives 7/8:
  - Raymark waste under pavement to 2 FT: .....0 CY
  - Raymark waste in unpaved area to 4 FT: .....6,963 CY (47,000 SF x 4 FT)

- Alternatives 9/10:
  - Raymark waste to 4 FT: .....6.963 CY (47,000 SF x 4 FT)

The calculation of the average depth to the seasonal high water table of 4.5 feet below ground surface (bgs) is based on observations of water levels from soil borings advanced in the area. The calculation of the maximum depth of Raymark waste is based on data collected during the RI (TtNUS, 2005).

The detailed analysis of alternatives for this property group is presented below and consists of the following components:

- A list of key assumptions (Section 4.3.16.1) is used as the basis for the detailed analysis of alternatives and for the development of costs for the FS;
- Figure 4-16, which shows a map of Airport Property North of Marine Basin, the delineated Raymark waste area, the 100-year floodplain, and the proposed cap footprint;
- Table 4-16, which presents the individual detailed analysis of alternatives for Airport Property North of Marine Basin in tabular form;
- The comparative analysis of alternatives for Airport Property North of Marine Basin, presented in text form;
- Table 4-16A, which presents a tabular summary of the comparative analysis;
- Table 4-16B, which presents a summary of cost estimates for each of the alternatives;
- Table 4-16C, which provides a summary of ARARs for each of the Airport Property North of Marine Basin alternatives; and
- Cost Estimate Backup Sheets for the FS cost estimates, which are presented in Appendix G.

4.3.16.1 Airport Property North of Marine Basin Assumptions

Key assumptions associated with each alternative are presented in this section. Pairs of alternatives (3 and 4, 5 and 6, 7 and 8, and 9 and 10) have the same components except for the disposal of Raymark waste, which is either in-town or out-of-town. See Section 3.3 for details on the Remedial Alternatives discussed below. See Table 4-16 for a summary of the details on the analysis for the Airport Property North of Marine Basin property group.

4.3.16.1.1 Alternative 1 – No Action

Detailed descriptions of the no action alternative are presented in Section 3.5.1.

4.3.16.1.2 Alternative 2 – Restrictions with Long-Term Monitoring

Detailed descriptions of Alternative 2 are presented in Section 3.5.2. Property group-specific details include the following:

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group, Alternative 2 will include placement of institutional controls on the Airport Property North of Marine Basin property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above the seasonal high water table, all three wells will be monitored quarterly for 2 years, and annually thereafter.

- Existing Surfaces: Monthly surface inspections of vegetative covers will be required along with annual reporting to summarize inspection findings and to verify the effectiveness of institutional controls.

4.3.16.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4)

Detailed descriptions of Alternatives 3 and 4 are presented in Section 3.5.3. Raymark waste areas will be excavated 2.5 feet in paved areas and 3 feet in unpaved areas from the 100-year floodplain. Raymark waste within the property group will be consolidated under a RCRA cap.

Due to the non-contiguous nature of waste delineated within the Airport Property North of Marine Basin property group, additional excavation will be conducted between waste locations to facilitate construction of the RCRA cap to maintain existing grades after remedial action implementation. Additionally the clean, uncontaminated excavated soil will be staged for future use during cap construction. Excavated materials will be placed at an in-town consolidation area (Alternative 3) or an out-of-town disposal location (Alternative 4). The property group-specific details for Alternative 3 and 4 include the following:

Excavation Volumes/Final Cover

- Approximately 5,222 CY of Raymark waste and 5,889 CY of non-Raymark waste soil will be excavated 2.5 or 3 feet from areas within the 100-year floodplain.
- A low permeable RCRA cap with a footprint of approximately 100,000 square feet (2.30 acres) will be constructed over non-contiguous Raymark waste present on the property group (Figure 4-16).
- Final property contours will be designed to meet Airport Property North of Marine Basin and surrounding parcels at current elevations.
- The current ground surface within the Raymark waste area on this property group is primarily covered with grass, therefore, a vegetated RCRA cap is assumed.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated. Once excavated, this area will be backfilled with clean fill and revegetated or repaved to reflect existing conditions, as practicable. There will be no loss in current flood storage capacity or functionality after completion of the remedial actions.

- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain under the cap after completion of the excavation, Alternatives 3 and 4 will include placement of institutional controls on the

Airport Property North of Marine Basin property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above the seasonal high water table, all three wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: The O&M for Alternative 3 will require monthly cap inspections with annual reporting to summarize inspection findings and verify the effectiveness of institutional controls. A 30-year monitoring period is used in the present value cost analysis.

4.3.16.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6)

Detailed descriptions of Alternatives 5 and 6 are presented in Section 3.5.4. Raymark waste areas will be excavated to the seasonal high water table. Excavated material will be placed in an in-town consolidation area (Alternative 5) or an out-of-town disposal location (Alternative 6). The property group-specific details include the following:

Excavation Volumes/Final Cover

- Approximately 7,833 CY of Raymark waste will be excavated to the average seasonal high water table of 4.5 feet. Approximately 189 CY of non-Raymark waste soil will

additionally be excavated to facilitate safety requirements such as benching/sloping of sidewalls to prevent collapse.

- Raymark waste areas will be excavated to the water table and replaced with a vegetated, permeable soil cover.
- Final property contours will be designed to meet Airport Property North of Marine Basin and surrounding parcels at current elevations.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated to the seasonal high water table. Once excavated, this area will be backfilled with clean fill and revegetated with current elevations and drainage patterns retained so that the current flood storage capacity and functionality will not be diminished after completion of the remedial actions.

- No wetlands are present in the area of Raymark waste on this parcel

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 5 and 6 will include placement of institutional controls on the Airport Property North of Marine Basin property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA, and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because all Raymark waste above the seasonal high water table

will be removed, all three wells will be monitored quarterly for 2 years, after which groundwater monitoring may no longer be required.

- Cap/Final Cover: Vegetative covers must be inspected annually and maintained in good condition.

4.3.16.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8)

Detailed descriptions of Alternatives 7 and 8 are presented in Section 3.5.5. As all of the Raymark waste is within unpaved areas, the excavation depth will be 4 feet; which is the same as Alternatives 9 and 10. Because of this, Alternatives 7 and 8 are not evaluated.

4.3.16.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10)

Detailed descriptions of Alternatives 9 and 10 are presented in Section 3.5.6. Raymark waste areas will be excavated to a 4-foot depth. Excavated material will be placed in an in-town consolidation area (Alternative 9) or an out-of-town disposal location (Alternative 10). The property group-specific details include the following:

Excavation and Final Cover

- Approximately 6,963 CY of Raymark waste will be excavated to a depth of 4 feet.
- Raymark waste areas will be excavated to a 4-foot depth and replaced with a vegetated, permeable soil cover.
- Final property contours will be designed to meet Airport Property North of Marine Basin and surrounding parcels at current elevations.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated 4 feet. Once excavated, this area will be backfilled with clean fill and revegetated with current elevations and drainage patterns retained so that

the current flood storage capacity or functionality will not be diminished after completion of the remedial actions.

- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 9 and 10 will include placement of institutional controls on the Airport Property North of Marine Basin property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above seasonal high water table, all three wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: Vegetative covers must be inspected monthly and maintained in good condition. A 30-year monitoring period is used in the present value cost analysis.

4.3.16.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10)

Raymark waste treatment is presented in Section 3.1.3 for all property groups.

- Based on an evaluation of historical sampling data from <u>all</u> OU6 properties, it is assumed that approximately 10% of excavated Raymark waste will require treatment prior to disposal. Treatment will be required only when excavated materials exhibit concentrations of contaminants in excess of disposal requirements. All treatment will occur at an out-of-town facility.

- For alternatives featuring out-of-town disposal of Raymark waste (Alternatives 6 and 10), the concentration thresholds for treatment will be 10 times UTS thresholds.

- For alternatives featuring in-town consolidation (Alternatives 5 and 9), the concentration thresholds for treatment will be the PHC levels.

- Treatment volume estimates for Airport Property North of Marine Basin are based on the assumed quantity of excavation required to implement each alternative. Note that the waste volumes are rounded up or down as appropriate.

- A 1.5 conversion factor from tons to cubic yards is used.

  - <u>Alternatives 3/4</u>
    - 5,222 CY RW excavated * 1.2 bulking factor = 6,267 CY
    - 6,267 CY * 1.5 TON/CY = 9,401 TON
    - 9,401 TON * 10% = **940 TONS to be treated (627 CY)**

  - <u>Alternatives 5/6</u>
    - 7,833 CY RW excavated * 1.2 bulking factor = 9,400 CY
    - 9,400 CY * 1.5 TON/CY = 14,100 TON
    - 14,100 TON * 10% = **1,410 TONS to be treated (940 CY)**

  - <u>Alternatives 7/8</u>
    - Not applicable.

- Alternatives 9/10
  - 6,963 CY RW excavated * 1.2 bulking factor = 8,356 CY
  - 8,356 CY * 1.5 TON/CY = 12,534 TON
  - 12,534 TON * 10% = **1,253 TONS to be treated (836 CY)**

4.3.16.2 Comparative Analysis of Alternatives for Airport Property North of Marine Basin

This section presents the comparative analysis of alternatives for the Airport Property North of Marine Basin using the criteria described in Section 4.2. The comparative analysis of alternatives for this property is summarized in a comparison format on Table 4-16A.

4.3.16.2.1 Overall Protection of Human Health and the Environment

Alternative 1 (No Action) will not protect human health or the environment. Alternative 2 (Restrictions with Long-Term Monitoring) can provide limited protection of human health and the environment, if restrictions are monitored and enforced. Alternatives 3 and 4and 9 and 10 will achieve protection of human health and the environment through the placement of a low-permeability cap (Alternatives 3 and 4), excavation of varying amounts of Raymark waste, and the use of institutional controls, rendering the contaminated waste inaccessible. Alternatives 5 and 6 will protect human health and the environment through the removal of all Raymark waste located above the seasonal high water table and the use of institutional controls.

4.3.16.2.2 Compliance with ARARs

Alternative 1 (No Action) and Alternative 2 (Restrictions with Long-Term Monitoring) will not comply with chemical-specific ARARs because contaminants in Raymark waste will remain accessible in soils in excess of CT RSRs and federal risk criteria.

The ARARs associated with the implementation of Alternatives 3 through 6, and 9 and 10 are presented in Section 4.0 of this FS and on Table 4-16C. Alternatives 3 and 5 and 6 could be designed to comply with all chemical-specific, action-specific, and location-specific ARARs. Through excavation of Raymark waste to 4 feet, Alternatives 9 and 10 will render the remaining contaminated soil inaccessible, and will be compliant with the action-specific CT RSR Direct Exposure Criteria. Alternatives 9 and 10 may not comply with the numeric standards of

CTDEP's Pollutant Mobility Criteria, however RSRs allow for variances and alternate criteria. Alternatives 9 and 19 will comply with all other chemical, action, and location-specific ARARs.

4.3.16.2.3 Long-Term Effectiveness and Permanence

The magnitude of residual human health risk associated with Raymark waste will be highest for Alternative 1 (No Action), since no actions will be taken to mitigate human health risks. Residual human health risks for Alternative 2 (Restrictions with Long-Term Monitoring) will be lower than Alternative 1, but still above acceptable human health risk levels.

Residual human health risks after implementation of Alternatives 3 and 4 and Alternatives 9 and 10 will be slightly higher than for Alternatives 5 and 6 because Raymark waste will be left in-place above the seasonal high water table. Alternatives 5 and 6 will be more reliable than Alternatives 3 and 4 and 9 and 10 because there will be no Raymark waste remaining above the seasonal high water table and protection of human health through direct contact or mobilization of contaminants by rainwater infiltration will not be dependent upon maintenance of a low-permeable RCRA cap or a soil cover.

Alternatives 3 and 9 and 10 can provide protection in the long-term if the cover systems are maintained. Alternatives 5 and 6 will provide the greatest protection to human health and will be the most permanent. Alternatives 3through 6 and 9 and 10 could each be designed to allow for redevelopment potential on the property group.

4.3.16.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment

No treatment is required for Alternative 1 (No Action), Alternative 2 (Restrictions with Long-Term Monitoring). Alternatives 3 through 6 and 9 and 10 will require treatment prior to land disposal to address the assumed 10 percent fraction that exceeds the UTS or PHC levels. This treatment will result in reduction of toxicity, mobility, and volume of Raymark waste. Although, the estimated volumes that will require treatment are similar (ranging from 627 to 940 CY), Alternatives 5 and 6 will result in the greatest amount of reduction because a larger quantity of materials will be shipped offsite and is expected to require treatment prior to disposal.

4.3.16.2.5 Short-Term Effectiveness

No on-site actions will be taken under Alternative 1 (No Action) and minimal on-site actions will be taken under Alternative 2 (Restrictions with Long-Term Monitoring); therefore, there will be no short-term impacts to the community, workers, or the environment. Short-term impacts to the community, workers, and the environment from the implementation of Alternatives 3 through6 and 9 and 10 will be similar and can be mitigated using engineering controls.

Alternatives 5 and 6 will involve a higher volume of truck traffic to transport Raymark waste and backfill and will require a greater volume of Raymark waste handling than Alternatives 3 and 9 and 10.

Alternatives 3 and 4 will take approximately 8 months to complete, while Alternatives 5 and 6 and 9 and 10 will each require approximately 6 months to complete. For Alternatives 5 and 9, the estimated time to complete does not include the amount of time necessary to complete remedial activities at an in-town consolidation location.

4.3.16.2.6 Implementability

Alternatives 3 and 4 (low-permeability cap), Alternatives 5 and 6 (excavation to water table), and Alternatives 9 and 10 (4-foot excavation) all require excavation, which can be implemented through standard construction and environmental remediation methods. Alternatives 3 and 9 and 10 require specific site grading, placement of cap/cover materials based on design specifications, and O&M in the future. Alternatives 5 and 6 will involve excavation of the largest volume of Raymark waste (7,833 CY), and any expansions of the Raymark waste area due to confirmatory sampling will lead to a larger volume of excavated Raymark waste compared to Alternative 9 and 10 due to the excavation depth to the seasonal high water table.

Additional remedial actions will be more difficult to implement for Alternatives 3 and 4 due to the presence of a RCRA cap. Alternatives 9 and 10 are equally amenable to additional remedial actions at the property group, should they be deemed necessary. Alternatives 5 and 6 will be the most amenable to additional actions should they be necessary as all Raymark waste will be removed to the seasonal high water table.

Alternatives 3 and 4 and 9 and 10 will each require long-term groundwater monitoring. Alternatives 5 and 6 will require quarterly groundwater monitoring for only 2 years after which groundwater monitoring may no longer be required. Alternatives 3 and 9 and 10 will also require long-term operation and maintenance of the cap or soil cover.

Alternatives 3 through 6, and 9 and 10 will be similar in terms of the ability to coordinate with other agencies.

For Alternatives 3 through6, and 9 and 10, each involves conventional construction methods for which the required equipment and technical specialists will be readily available.

4.3.16.2.7 Cost

A comparison of costs for each of the alternatives that were evaluated for Airport Property North of Marine Basin is presented on Table 4-16B.

Table 4-16
Summary of Detailed Analysis for Airport Property North of Marine Basin
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4– Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8[1]– Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Overall Protection of Human Health and the Environment	Would not protect human health. RI did not identify any significant habitats for ecological receptors.	Some protection of human health, but human health risks still above acceptable limits. RI did not identify any significant habitats for ecological receptors.	Would protect human health through construction of a RCRA C-compliant cover (multi-component, drainage layer, gas vent layer, E-07 cm/s hydraulic conductivity), over Raymark waste. RI did not identify any significant habitats for ecological receptors.	Would protect human health through the removal of Raymark waste and placement of clean soil in its place. RI did not identify any significant habitats for ecological receptors.	NA	Would protect human health through construction of an engineered barrier over Raymark waste. RI did not identify any significant habitats for ecological receptors.
Compliance with ARARs	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs.	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-16C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-16C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-16C.	NA	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs with the use of alternate criteria. See Table 4-16C.
Long-Term Effectiveness and Permanence	Magnitude of residual risk high. No risk reduction. 5-year reviews required. No O&M or controls included for long term.	Residual human health risks above acceptable limits. No risk reduction. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would not be adequate to protect human health for the long-term.	Residual risk within acceptable limits. Raymark waste willl be left in-place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness. Capping technology reliable. Additional design analysis of cap in floodplains will be required during remedial design phase.	Residual risk within acceptable limits. Risk reduction would be permanent. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.	NA	Residual risk within acceptable limits. Raymark waste willl be left-in place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.
Reduction of Toxicity, Mobility, or Volume Through Treatment	None.	None.	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark waste treated (tons)= 940 Raymark waste treated (CY)= 627	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark waste treated (tons)= 1,410 Raymark waste treated (CY)= 940	NA	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark waste treated (tons)= 1,253 Raymark waste treated (CY)= 836
Short-Term Effectiveness	No actions, therefore no short-term impacts anticipated. Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures are applied. No adverse impacts to environment anticipated during implementation. Minimal on-site actions (well construction, signage, and fence installation, and groundwater sampling only). Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[2]= 6,267 Approximate truckloads of Raymark waste 522 Approximate truckloads of clean fill 522 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 3, this time frame does not include duration of capping activities at consolidation location. 8 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[2] = 9,400 Approximate truckloads of Raymark waste 783 Approximate truckloads of clean fill 783 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 5, this time frame does not include duration of capping activities at consolidation location. 6 Would achieve RAO.	NA	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[2] = 8,356 Approximate truckloads of Raymark waste 696 Approximate truckloads of clean fill 696 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 9, this time frame does not include duration of capping activities at consolidation location. 6 Would achieve RAO.

Table 4-16
Summary of Detailed Analysis for Airport Property North of Marine Basin
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4– Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8[1]– Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Implementability	Not applicable.	Would be implementable, assuming cooperation by property owners. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. May be difficult to implement additional remedial actions if required, because Raymark waste would be beneath RCRA C cover. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development could be hindered by the presence of the low-permeability cap.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by presence of Raymark waste left in place.	NA	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by presence of Raymark waste left in place.
Cost	**Alternative 1** Capital: $0 O&M (Years 1-2): $0 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: $21,578 PV of Alternative: $21,578 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 2** Capital: $77,965 O&M (Years 1-2): $63,989 O&M (Years 3-30): $37,046 Five-Year Reviews: $10,000/each Present Value of O&M: $529,993 Present Value of Alternative: $607,958 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 3** Capital: $2,738,768 O&M (Years 1-2): $59,963 O&M (Years 3-30): $33,020 Five-Year Reviews: $10,000/each PV of O&M: $480,036 PV of Alternative: $3,218,804 **Alternative 4** Capital: $6,171,599 O&M (Years 1-2): $59,963 O&M (Years 3-30): $33,020 Five-Year Reviews: $10,000/each PV of O&M: $480,036 PV of Alternative: $6,651,635 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 5** Capital: $1,727,312 O&M (Years 1-2): $45,728 O&M (Years 3-30): $9,804 Five-Year Reviews: $10,000/each PV of O&M: $208,187 PV of Alternative: $1,935,499 **Alternative 6** Capital: $6,911,095 O&M (Years 1-2): $45,728 O&M (Years 3-30): $9,804 Five-Year Reviews: $10,000/each PV of O&M: $208,187 PV of Alternative: $7,119,283 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 7** Capital: NA O&M (Years 1-2): NA O&M (Years 3-30): NA Five-Year Reviews: NA PV of O&M: NA PV of Alternative: NA **Alternative 8** Capital: NA O&M (Years 1-2): NA O&M (Years 3-30): NA Five-Year Reviews: NA PV of O&M: NA PV of Alternative: NA See Cost Estimate Backup Sheets in Appendix G.	**Alternative 9** Capital: $1,590,043 O&M (Years 1-2): $59,155 O&M (Years 3-30): $32,212 Five-Year Reviews: $10,000/each PV of O&M: $470,016 PV of Alternative: $2,060,059 **Alternative 10** Capital: $6,177,128 O&M (Years 1-2): $59,155 O&M (Years 3-30): $32,212 Five-Year Reviews: $10,000/each PV of O&M: $470,016 PV of Alternative: $6,647,144 See Cost Estimate Backup Sheets in Appendix G.

[1] Alternative 4 was not evaluated.
[2] Alternatives 7 and 8 were not evaluated.
[3] A bulking factor of 1.2 was used.

Table 4-16A
Comparative Analysis of Alternatives for Airport Property North of Marine Basin
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE[1]									
	1	2	3	4	5	6	7	8	9	10
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT										
Protection of Human Health	☐	☐	◘	NA	■	■	NA	NA	◘	◘
Protection of the Environment	☐	☐	◘	NA	■	■	NA	NA	◘	◘
COMPLIANCE WITH ARARs										
Chemical-Specific ARARs	☐	☐	■	NA	■	■	NA	NA	◘	◘
Location-Specific ARARs	NA	■	■	NA	■	■	NA	NA	◘	◘
Action-Specific ARARs	NA	■	■	NA	■	■	NA	NA	◘	◘
Other Criteria, Advisories, Guidance	NA	NA	■	NA	■	■	NA	NA	◘	◘
LONG-TERM EFFECTIVENESS AND PERMANENCE										
Magnitude of Residual Risk	☐	☐	◘	NA	■	■	NA	NA	◘	◘
Adequacy and Reliability of Controls	☐	☐	◘	NA	■	■	NA	NA	◘	◘
REDUCTION OF TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT										
Treatment/Recycling Processes Utilized	NA	NA	☐	NA	■	■	NA	NA	■	■
Amount of Hazardous Materials Destroyed or Treated	☐	☐	☐	NA	■	■	NA	NA	◘	◘
Degree of Expected Reductions in Tox, Mob, or Vol	☐	☐	☐	NA	■	■	NA	NA	◘	◘
Irreversibility	☐	☐	■	NA	■	■	NA	NA	■	■
Type and Quantity of [Process] Residuals	☐	☐	■	NA	■	■	NA	NA	■	■
SHORT-TERM EFFECTIVENESS										
Protection of Community During Remedial Actions	NA	■	◘	NA	◘	◘	NA	NA	◘	◘
Protection of Workers During Remedial Actions	NA	■	◘	NA	◘	◘	NA	NA	◘	◘
Environmental Impacts	■	■	◘	NA	◘	◘	NA	NA	◘	◘
Time Until Remedial Action Objectives are Achieved	☐	☐	◘	NA	◘	◘	NA	NA	◘	◘

Table 4-16A
Comparative Analysis of Alternatives for Airport Property North of Marine Basin
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE[1]									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
IMPLEMENTABILITY										
Ability to Construct and Operate the Technology	NA	■	■	NA	■	■	NA	NA	■	■
Reliability of the Technology	NA	□	◘	NA	■	■	NA	NA	◘	◘
Ease of Undertaking Additional Remedial Actions, if Necessary	■	■	◘	NA	■	■	NA	NA	◘	◘
Ability to Monitor Effectiveness of the Remedy	NA	NA	◘	NA	◘	◘	NA	NA	◘	◘
Ability to Obtain Approvals from Other Agencies	■	■	■	NA	■	■	NA	NA	■	■
Coordination with Other Agencies	◘	◘	■	NA	■	■	NA	NA	■	■
Availability of Off-Site Treatment, Storage, and Disposal Services and Capacity	NA	NA	NA	NA	■	■	NA	NA	■	■
Availability of Necessary Equipment and Specialists	NA	■	■	NA	■	■	NA	NA	■	■
Availability of Prospective Technologies	NA	■	■	NA	■	■	NA	NA	■	■
COST										
Capital	$0	$77,965	$2,738,768	$6,171,599	$1,727,312	$6,911,095	NA	NA	$1,590,043	$6,177,128
Present Value of O&M (First 30 Years)	$21,578	$529,993	$480,036	$480,036	$208,187	$208,187	NA	NA	$470,016	$470,016
Present Value of the Alternative	$21,578	$607,958	$3,218,804	$6,651,635	$1,935,499	$7,119,283	NA	NA	$2,060,059	$6,647,144

[1]Alternatives 4, 7 and 8 were not evaluated

Notes:

■ = Highest rating (most protective, most effective, most implementable)

◘ = Meets criterion, but another alternative(s) more protective/effective/implementable

□ = Does not meet criterion

Table 4-16B
Cost Estimate Summary for Airport Property North of Marine Basin
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Excavation Depth, ft	0	0	3	3	4.5	4.5	2 or 4	2 or 4	4	4
Cap/Cover	NA	NA	RCRA C	RCRA C	NA	NA	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover
Disposal Volumes (CY)										
In-Town Consolidation			5640	0	8460	0	0	0	7520	0
Out-of-Town (no treatment)			0	5,640	0	8,460	0	0	0	7,520
Out-of-Town (treatment)			627	627	940	940	0	0	836	836
Total Disposal Vol.			**6267**	**6267**	**9400**	**9400**	**0**	**0**	**8356**	**8356**
Cost										
Capital	**$0**	**$77,965**	**$2,738,768**	**$6,171,599**	**$1,727,312**	**$6,911,095**	**NA**	**NA**	**$1,590,043**	**$6,177,128**
O&M (present value)	**$21,578**	**$529,993**	**$480,036**	**$480,036**	**$208,187**	**$208,187**	**NA**	**NA**	**$470,016**	**$470,016**
Present Value	**$21,578**	**$607,958**	**$3,218,804**	**$6,651,635**	**$1,935,499**	**$7,119,283**	**NA**	**NA**	**$2,060,059**	**$6,647,144**

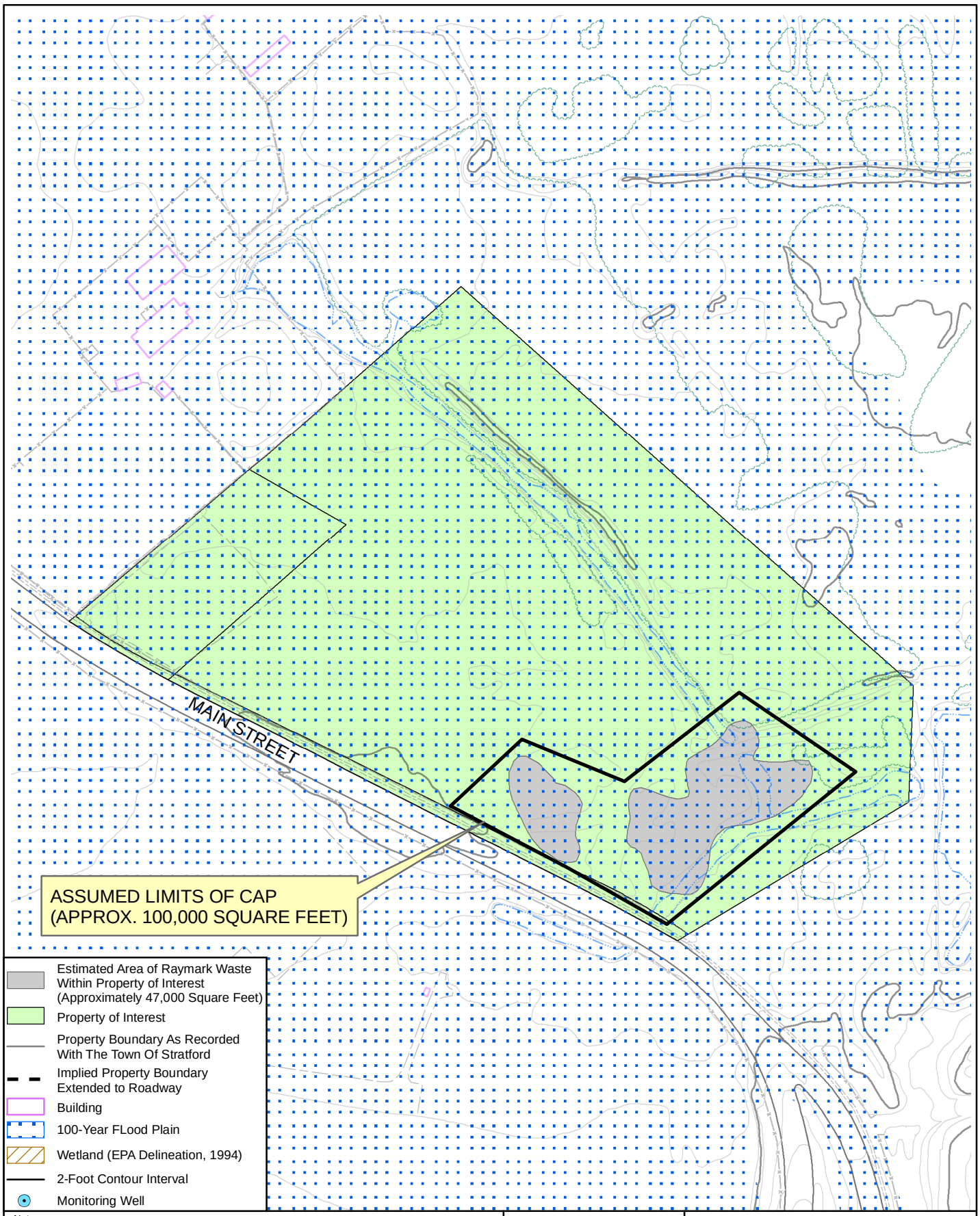
Notes:
Alternative 1 - No Action
Alternative 2 - Restrictions with Long-Term Monitoring
Alternative 3 - Low-Permeability Cap with In-Town Consolidation
Alternative 4 - Low-Permeability Cap with Out-Of-Town Disposal (Not applicable)
Alternative 5 - Excavation to the Water Table with In-Town Consolidation
Alternative 6 - Excavation to the Water Table with Out-Of-Town Disposal
Alternative 7 - Excavation to either 2 or 4 Feet with In-Town Consolidation (Not applicable)
Alternative 8 - Excavation to either 2 or 4 Feet with Out-Of-Town Disposal (Not applicable)
Alternative 9 - Excavation to 4 Feet with In-Town Consolidation
Alternative 10 - Excavation to 4 Feet with Out-Of-Town Disposal
NA = not applicable

Table 4-16C
Preliminary ARAR Summary - Airport Property North of Marine Basin
Raymark OU6 - Additional Properties
Stratford, Connecticut

Property Group	ARAR Tables				
	A	B	C	D	E
Alternative 1	X				
Alternative 2	X		X		
Alternative 3	X		X	X	X
Alternative 4					
Alternative 5	X		X		
Alternative 6	X		X		
Alternative 7					
Alternative 8					
Alternative 9	X		X		
Alternative 10	X		X		

A = ARARs for all Alternatives
B = ARAR add-ons for an alternative for the Raymark waste located in the wetlands
C = ARAR add-ons for an alternative for the Raymark waste located in the floodplains
D = ARAR add-ons for alternatives that include low-permeability caps
E = ARAR add-ons for alternatives that include CAMUs

Note:
ARAR Tables A-E are found in Volume II, Appendix C of this Feasibility Study.



Notes:
1) Plan not to be used for design.
2) All locations to be considered approximate.
3) Property boundaries are approximate based on Town of Stratford Engineering Department plans.
4) Floodplain extent based on Federal Emergency Management Agency Q3 Flood Data, Community Panel Numbers 090016 0001-0004, Revised June 16, 1992, FEMA, Washington D.C. and modified to Town of Stratford Engineering Plan 10-foot contour.
5) Adapted from TTNUS Remedial Investigation, 2005.

200 100 0 200 Feet

N

Nobis

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
(978) 683-0891
www.nobisengineering.com

FIGURE 4-16

AIRPORT PROPERTY NORTH OF MARINE BASIN
FEASABILITY STUDY
RAYMARK SUPERFUND SITE
STRATFORD, CONNECTICUT

Drawn By: D. McGrath	Approved By: H. Ford
Project: 80006	Date: 9/3/09 Rev00

R:\80000 Task Orders\80006 Raymark\Technical Data\GIS_Data\Figures\OU6_FS_Figures\Figure_04-16_Airport_Property_North_of_MB.mxd

4.3.17 Wooster Park Property

The Wooster Park property was evaluated as part of the OU6 Remedial Investigation (RI) report (TtNUS, 2005). This parcel encompasses approximately 4 acres of municipally-owned land located in a residential area in Stratford, Connecticut (see Figure 4-17). The property is bordered by Quail Street to the South, residential properties on Salvia Street and Bruce Brook to the east, Old Spring Road to the north and residential properties on Karen Avenue to the west. No residential properties directly abut the park along the north side of Quail Street. The property is undeveloped and heavily wooded with large old-growth trees. A cleared grassy area approximately 150 feet in length is present along Quail Street in the southern portion of the property. The topography of the property is flat. The property has no structures, but a dirt path has been built throughout the property's woodlands. Public access to the property is unrestricted from adjacent areas. The Town of Stratford has covered the entire Raymark waste area that was delineated with natural materials. The entire Raymark waste on the property group lies within the 100-year floodplain.

Key factors associated with the areas and volumes to be addressed at this property group include:

- Raymark waste area: .....7,100 SF (Figure 4-17)
- Total volume of Raymark waste:.....1,578 CY
- Maximum depth of Raymark waste:..... 6 feet bgs
- Average depth to the seasonal high groundwater table:.....6 feet
- Raymark waste area outside of 100-year floodplain: ..... 0 SF
- Raymark waste area in 100-year floodplain:..... 7,100 SF
- Raymark waste in 100-year floodplain to 6 FT:.....1,578 CY
- Raymark waste area under pavement: ..... 0 SF
- Raymark waste in unpaved areas:..... 7,100 SF
- Raymark waste located below the water table:.....0 CY
- Alternatives 3/4:
  - Raymark waste under pavement to 2.5 FT: .....0 CY
  - Raymark waste in unpaved area to 3 FT: .....789 CY (7,100 SF x 3 FT)
- Alternatives 5/6:
  - Raymark waste located above the water table: .....1,578 CY (7,100 FT x 6 FT)

- Alternatives 7/8:
  - Raymark waste under pavement to 2 FT: ..... 0 CY
  - Raymark waste in unpaved area to 4 FT: ..... 1,052 CY (7,100 SF x 4 FT)
- Alternatives 9/10:
  - Raymark waste to 4 FT: ..... 1,052 CY (7,100 SF x 4 FT)

The calculation of the average depth to the seasonal high water table of 6 feet below ground surface (bgs) is based on observations of water levels from soil borings advanced in the area. The calculation of the maximum depth of Raymark waste was based on data collected during the RI (TtNUS, 2005).

The detailed analysis of alternatives for this property group is presented in the following subsections and consists of the following components:

- A list of key assumptions (Section 4.3.17.1) is used as the basis for the detailed analysis of alternatives and for the development of costs for the FS;
- Figure 4-17, which shows a map of Wooster Park, the delineated Raymark waste area, the 100-year floodplain, and the proposed cap footprint;
- Table 4-17, which presents the individual detailed analysis of alternatives for Wooster Park in tabular form;
- The comparative analysis of alternatives for Wooster Park, presented in text form;
- Table 4-17A, which presents a tabular summary of the comparative analysis;
- Table 4-17B, which presents a summary of cost estimates for each of the alternatives;
- Table 4-17C, which provides a summary of ARARs for each of the Wooster Park alternatives; and
- Cost Estimate Backup Sheets for the FS cost estimates, which are presented in Appendix G.

4.3.17.1 Wooster Park Assumptions

Key assumptions associated with each alternative are presented in this section. Pairs of alternatives (3 and 4, 5 and 6, 7 and 8, and 9 and 10) have the same components except for the disposal of Raymark waste which is either in-town or out-of-town. See Section 3.3 for details on

the Remedial Alternatives discussed below. See Table 4-17 for a summary of the details on the analysis for the Wooster Park property group.

4.3.17.1.1 Alternative 1 – No Action

Detailed descriptions of the no action alternative are presented in Section 3.5.1.

4.3.17.1.2 Alternative 2 – Restrictions with Long-Term Monitoring

Detailed descriptions of Alternative 2 are presented in Section 3.5.2. Property group-specific details include the following:

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group, Alternative 2 will include placement of institutional controls on the Wooster Park property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above the seasonal high water table, all three wells will be monitored quarterly for 2 years, and annually thereafter.

- Existing Surfaces: Monthly surface inspections of vegetative covers will be required along with annual reporting to summarize inspection findings and to verify the effectiveness of institutional controls.

4.3.17.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4)

Detailed descriptions of Alternatives 3 and 4 are presented in Section 3.4.3. Raymark waste areas will be excavated 3 feet and consolidated under a RCRA cap. Due to the non-contiguous nature of waste delineated within the Wooster Park property group, additional excavation will be conducted between waste locations to facilitate construction of the RCRA cap and to maintain existing grades after remedial action implementation. Additionally, the clean, uncontaminated excavated soil will be staged for future use during cap construction. Excavated materials will be placed at an in-town consolidation area (Alternative 3) or an out-of-town disposal location (Alternative 4). The property group-specific details for Alternative 3 and 4 include the following:

Excavation Volumes/Final Cover

- Approximately 789 CY of Raymark waste and 1,767 CY of non-Raymark waste soil will be excavated 3 feet.
- A low permeable RCRA cap with a footprint of approximately 23,000 square feet (0.53 acres) will be constructed over non-contiguous Raymark waste present on the property group (Figure 4-17).
- Final property contours will be designed to meet Wooster Park and surrounding parcels at current elevations.
- The current ground surface within the Raymark waste area on this property group is covered with grass, therefore, a vegetated RCRA cap is assumed.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated 3 feet. Once excavated, this area will be backfilled with clean fill and revegetated to reflect existing conditions, as practicable. There will be no loss in current flood storage capacity or functionality after completion of the remedial actions.

- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain under the cap after completion of the excavation, Alternatives 3 and 4 will include placement of institutional controls on the Wooster Park property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above the seasonal high water table, all three wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in present value cost analysis.

- Cap/Final Cover: The O&M for Alternatives 3 and 4 will require monthly cap inspections with annual reporting to summarize inspection findings and verify the effectiveness of institutional controls. A 30-year monitoring period is used in present value cost analysis.

4.3.17.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6)

Detailed descriptions of Alternatives 5 and 6 are presented in Section 3.5.4. Raymark waste areas will be excavated to the seasonal high water table. Excavated material will be placed in an in-town consolidation area (Alternative 5) or an out-of-town disposal location (Alternative 6). The property group-specific details include the following:

Excavation Volumes/Final Cover

- Approximately 1,578 CY of Raymark waste will be excavated to the average seasonal high water table of 6 feet. Approximately 615 CY of non-Raymark waste soil will additionally be excavated to facilitate safety requirements such as benching/sloping of sidewalls to prevent collapse.

- Raymark waste areas will be excavated to the water table and replaced with a vegetated, permeable soil cover.

- Final property contours will be designed to meet Wooster Park and surrounding parcels at current elevations.

- Because all Raymark waste is located above the seasonal high water table, complete excavation of all Raymark waste will occur.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated the seasonal high water table. Once excavated, this area will be backfilled with clean fill and revegetated with current elevations and drainage patterns retained so that the current flood storage capacity will not be diminished after completion of the remedial actions.

- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- No future use restrictions are anticipated as all Raymark waste will be removed.

Operation and Maintenance

- Groundwater Monitoring Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the

vicinity of this parcel. To verify that all Raymark waste is removed from the property group, all three wells will be monitored quarterly for 2 years, after which groundwater monitoring may no longer be required.

4.3.17.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8)

Detailed descriptions of Alternatives 7 and 8 are presented in Section 3.5.5. As all of the Raymark waste is within unpaved areas, the excavation depth will be 4 feet; which is the same as Alternatives 9 and 10. Because of this, Alternatives 7 and 8 are not evaluated.

4.3.17.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10)

Detailed descriptions of Alternatives 9 and 10 are presented in Section 3.5.6. Raymark waste areas will be excavated to a 4-foot depth. Excavated material will be placed in an in-town consolidation area (Alternative 9) or an out-of-town disposal location (Alternative 10). The property group-specific details include the following:

Excavation and Final Cover

- Approximately 1,052 CY of Raymark waste will be excavated to a 4-foot depth.
- Raymark waste areas excavated to a 4-foot depth will be replaced with a vegetated, permeable soil cover.
- Final property contours will be designed to meet Wooster Park and surrounding parcels at current elevations.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated to 4 feet. Once excavated, this area will be backfilled with clean fill and revegetated with current elevations and drainage patterns retained so that the current flood storage capacity will not be diminished after completion of the remedial actions.

- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 9 and 10 will include placement of institutional controls on the Wooster Park property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above seasonal high water table, all three wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in present value cost analysis.

- Cap/Final Cover: Vegetative covers must be inspected monthly and maintained in good condition. A 30-year monitoring period is used in present value cost analysis.

4.3.17.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10)

Raymark waste treatment is described in Section 3.1.3 for all property groups.

- Based on an evaluation of historical sampling data from <u>all</u> OU6 properties, it is assumed that approximately 10% of excavated Raymark waste will require treatment prior to disposal. Treatment will be required only when excavated materials exhibit

concentrations of contaminants in excess of disposal requirements. All treatment will occur at an out-of-town facility.

- For alternatives featuring out-of-town disposal of Raymark waste (Alternatives 4, 6, and 10), the concentration thresholds for treatment will be 10 times UTS thresholds.

- For alternatives featuring in-town consolidation (Alternatives 3, 5, and 9), the concentration thresholds for treatment will be the PHC levels.

- Treatment volume estimates for Wooster Park are based on the assumed quantity of excavation required to implement each alternative. Note that the waste volumes are rounded up or down as appropriate.

- A 1.5 conversion factor from tons to cubic yards is used.

  - <u>Alternatives 3/4</u>
    - 789 CY RW excavated * 1.2 bulking factor = 947 CY
    - 947 CY X 1.5 TON/CY = 1,421 TON
    - 1,421 TON * 10% = **142 TONS to be treated (95 CY)**

  - <u>Alternatives 5/6</u>
    - 1,578 CY RW excavated * 1.2 bulking factor = 1,893 CY
    - 1,894 CY * 1.5 TON/CY = 2,840 TON
    - 2,840 TON * 10% = **284 TONS to be treated (189 CY)**

  - <u>Alternatives 7/8</u>
    - Not applicable

  - <u>Alternatives 9/10</u>
    - 1,052 CY RW excavated * 1.2 bulking factor = 1,262 CY
    - 1,262 CY * 1.5 TON/CY = 1,893 TON
    - 1,893 TON * 10% = **189 TONS to be treated (126 CY)**

4.3.17.2 Comparative Analysis of Alternatives for Wooster Park

This section presents the comparative analysis of alternatives for the Wooster Park using the criteria described in Section 4.2. The comparative analysis of alternatives for this property group is summarized in a comparison format on Table 4-17A.

4.3.17.2.1 Overall Protection of Human Health and the Environment

Alternative 1 (No Action) will not protect human health or the environment. Alternative 2 (Restrictions with Long-Term Monitoring) can provide limited protection of human health and the environment, if restrictions are monitored and enforced. Alternatives 3 and 4 and 9 and 10 will achieve protection of human health and the environment through the excavation of varying amounts of Raymark waste (low-permeability cap for Alternative 3 and 4) and the use of institutional controls, rendering the contaminated waste inaccessible. Alternatives 5 and 6 will also protect human health and the environment through the removal of all Raymark waste located on the property group.

4.3.17.2.2 Compliance with ARARs

Alternative 1 (No Action) and Alternative 2 (Restrictions with Long-Term Monitoring) will not comply with chemical-specific ARARs because contaminants in Raymark waste will remain accessible in soils in excess of CT RSRs and federal risk criteria.

The ARARs associated with the implementation of Alternatives 3 through 7 and 9 and 10 are presented in Section 4.0 of this FS and on Table 4-17C. Alternatives 3 through 6 could be designed to comply with all chemical-specific, action-specific, and location-specific ARARs. Through excavation of Raymark waste to 4 feet, Alternatives 9 and 10 will render the remaining contaminated soil inaccessible and will be compliant with the action-specific CT RSR Direct Exposure Criteria. Alternatives 9 and 10 may not comply with the numeric standards of CTDEP's Pollutant Mobility Criteria, however, the RSRs allow for variances and alternate criteria. Alternatives 9 and 10 will comply with all other chemical, action, and location-specific ARARs.

4.3.17.2.3 Long-Term Effectiveness and Permanence

The magnitude of residual human health risk associated with Raymark waste will be highest for Alternative 1 (No Action), since no actions will be taken to mitigate human health risks. Residual human health risks for Alternative 2 (Restrictions with Long-Term Monitoring) will be lower than Alternative 1, but still above acceptable human health risk levels.

Residual human health risks after implementation of Alternatives 3 and 4 and Alternatives 9 and 10 will be slightly higher than for Alternatives 5 and 6 because Raymark waste will be left in-place above the seasonal high water table Alternatives 5 and 6 will be more reliable than Alternatives 3 and 4 and 9 and 10 because there will be no Raymark waste left in-place on the property group and protection of human health through direct contact or mobilization of contaminants by rainwater infiltration will not be dependent on maintenance of a low-permeable RCRA cap or a soil cover.

Alternatives 3 and 4 and 9 and 10 can provide protection in the long-term if the cover systems are maintained. Alternatives 5 and 6 will provide the greatest protection to human health and will be the most permanent. Alternatives 3 through 6 and 9 and 10 each allow for redevelopment potential on the property.

4.3.17.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment

No treatment will be required for Alternative 1 (No Action) and Alternative 2 (Restrictions with Long-Term Monitoring). Alternatives 3 through 6 and 9 and 10 will require treatment prior to land disposal to address the assumed 10 percent fraction that exceeds the UTS or PHC levels. This treatment will result in the reduction of toxicity, mobility, and volume of Raymark waste. Although, the estimated volumes that will require treatment are similar (ranging from 95 to 189 CY), Alternatives 5 and 6 will result in the greatest amount of reduction because a larger quantity of materials will be shipped offsite and is expected to require treatment prior to disposal.

4.3.17.2.5 Short-Term Effectiveness

No on-site actions will be taken under Alternative 1 (No Action) and minimal on-site actions will be taken under Alternative 2 (Restrictions with Long-Term Monitoring); therefore, there will be

no short-term impacts to the community, workers, or the environment. Short-term impacts to the community, workers, and the environment from the implementation of Alternatives 3 through 6 and 9 and 10 will be similar and can be mitigated using engineering controls.

Alternatives 5 and 6 will involve a higher volume of truck traffic to transport Raymark waste and backfill and will require a greater volume of Raymark waste handling than Alternatives 3 and 4 and Alternatives 9 and 10.

Alternatives 3 and 4 will take approximately 4 months to complete, while Alternatives 5 and 6 and 9 and 10 will each take approximately 3 months to complete. For Alternatives 5 and 9 the estimated time to complete does not include the amount of time necessary to complete remedial activities at an in-town consolidation location.

4.3.17.2.6 Implementability

Alternatives 3 and 4 (low-permeability cap), Alternatives 5 and 6 (excavation to water table), and Alternatives 9 and 10 (4-foot excavation) all require excavation, which can be implemented through standard construction and environmental remediation methods. Alternatives 3 and 4 and 9 and 10 require specific site grading, placement of cap/cover materials based on design specifications, and O&M in the future. Alternatives 5 and 6 will involve excavation of the largest volume of Raymark waste (1578 CY) and any expansion of the Raymark waste area due to confirmatory sampling will lead to a larger volume of excavated Raymark waste compared to Alternatives 9 and 10 due to the excavation depth to the seasonal high water table.

Additional remedial actions will be more difficult to implement for Alternatives 3 and 4 due to the presence of a RCRA cap. Alternatives 9 and 10 are equally amenable to additional remedial actions at the property group, should they be deemed necessary. Alternatives 5 and 6 will be the most amenable to additional actions should they be necessary as all Raymark waste will be removed from the property group.

Alternatives 3 and 4 and 9 and 10 will each require long-term groundwater monitoring. Alternatives 5 and 6 will require quarterly monitoring for only 2 years after which groundwater monitoring may no longer be required. Alternatives 3 and 4 and 9 and 10 will also require long-term operation and maintenance of the cap or soil cover. Long-term operation and maintenance

requirements will not be required for Alternatives 5 and 6 as all Raymark waste will be removed from the property group.

Alternatives 3 through 6 and 9 and 10 will be similar in terms of the ability to coordinate with other agencies.

For Alternatives 3 through 6 and 9 and 10, each involves conventional construction methods for which the required equipment and technical specialists will be readily available.

4.3.17.2.7 Cost

A comparison of costs for each of the alternatives that were evaluated for Wooster Park is presented on Table 4-17B.

Table 4-17
Summary of Detailed Analysis for Wooster Park
Raymark OU6 - Additional Properties
Stratford. Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4 – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8[1]– Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Overall Protection of Human Health and the Environment	Would not protect human health. RI did not identify any significant habitats for ecological receptors.	Some protection of human health, but human health risks still above acceptable limits. RI did not identify any significant habitats for ecological receptors.	Would protect human health through construction of a RCRA C-compliant cover (multi-component, drainage layer, gas vent layer, E-07 cm/s hydraulic conductivity), over Raymark waste. RI did not identify any significant habitats for ecological receptors.	Would protect human health through the removal of Raymark waste and placement of clean soil in its place. RI did not identify any significant habitats for ecological receptors.	NA	Would protect human health through construction of an engineered barrier over Raymark waste. RI did not identify any significant habitats for ecological receptors.
Compliance with ARARs	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs.	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-17C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-17C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-17C.	NA	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs with the use of alternate criteria. See Table 4-17C.
Long-Term Effectiveness and Permanence	Magnitude of residual risk high. No risk reduction. 5-year reviews required. No O&M or controls included for long term.	Residual human health risks above acceptable limits. No risk reduction. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would not be adequate to protect human health for the long-term.	Residual risk within acceptable limits. Raymark waste willl be left in-place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness. Capping technology reliable. Additional design analysis of cap in floodplains will be required during remedial design phase.	Residual risk within acceptable limits. Risk reduction would be permanent. Controls would be adequate to ensure long-term effectiveness.	NA	Residual risk within acceptable limits. Raymark waste willl be left in-place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.
Reduction of Toxicity, Mobility, or Volume Through Treatment	None.	None.	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark waste treated (tons)= 142 Raymark waste treated (CY)= 95	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark waste treated (tons)= 284 Raymark waste treated (CY)= 189	NA	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark waste treated (tons)= 189 Raymark waste treated (CY)= 126
Short-Term Effectiveness	No actions, therefore no short-term impacts anticipated. Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures are applied. No adverse impacts to environment anticipated during implementation. Minimal on-site actions (well construction, signage, and fence installation, and groundwater sampling only). Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[2] = 6,400 Approximate truckloads of Raymark waste 533 Approximate truckloads of clean fill 533 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 3, this time frame does not include duration of capping activities at consolidation location. 14 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[2]= 17,067 Approximate truckloads of Raymark waste 1422 Approximate truckloads of clean fill 1422 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 5, this time frame does not include duration of capping activities at consolidation location. 10 Would achieve RAO.	NA	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[2] = 11,378 Approximate truckloads of Raymark waste 948 Approximate truckloads of clean fill 948 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 9, this time frame does not include duration of capping activities at consolidation location. 8 Would achieve RAO.

Table 4-17
Summary of Detailed Analysis for Wooster Park
Raymark OU6 - Additional Properties
Stratford. Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4 – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8[1]– Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Implementability	Not applicable.	Would be implementable, assuming cooperation by property owners. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. May be difficult to implement additional remedial actions if required, because Raymark waste would be beneath RCRA C cover. Excavated material would need to be transported off of this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development could be hindered by the presence of the low-permeability cap.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use.	NA	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill. Excavated material would need to be transported from off of this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by presence of Raymark waste left in place.
Cost	**Alternative 1** Capital: $0 O&M (Years 1-2): $0 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: $21,578 PV of Alternative: $21,578 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 2** Capital: $54,498 O&M (Years 1-2): $60,837 O&M (Years 3-30): $33,894 Five-Year Reviews: $10,000/each PV of O&M: $490,888 PV of Alternative: $545,386 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 3** Capital: $738,583 O&M (Years 1-2): $58,790 O&M (Years 3-30): $31,847 Five-Year Reviews: $10,000/each PV of O&M: $465,479 PV of Alternative: $1,204,061 **Alternative 4** Capital: $1,255,817 O&M (Years 1-2): $58,790 O&M (Years 3-30): $31,847 Five-Year Reviews: $10,000/each PV of O&M: $465,479 PV of Alternative: $1,721,296 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 5** Capital: $496,313 O&M (Years 1-2): $35,924 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: $64,952 PV of Alternative: $561,265 **Alternative 6** Capital: $1,535,387 O&M (Years 1-2): $35,924 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: $64,952 PV of Alternative: $1,600,339 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 7** Capital: NA O&M (Years 1-2): NA O&M (Years 3-30): NA Five-Year Reviews: NA PV of O&M: NA PV of Alternative: NA **Alternative 8** Capital: NA O&M (Years 1-2): NA O&M (Years 3-30): NA Five-Year Reviews: NA PV of O&M: NA PV of Alternative: NA See Cost Estimate Backup Sheets in Appendix G.	**Alternative 9** Capital: $425,972 O&M (Years 1-2): $58,548 O&M (Years 3-30): $31,604 Five-Year Reviews: $10,000/each PV of O&M: $462,473 PV of Alternative: $888,445 **Alternative 10** Capital: $1,117,920 O&M (Years 1-2): $58,548 O&M (Years 3-30): $31,604 Five-Year Reviews: $10,000/each PV of O&M: $462,473 PV of Alternative: $1,580,393 See Cost Estimate Backup Sheets in Appendix G.

[1] Alternatives 7 and 8 were not evaluated.
[2] A bulking factor of 1.2 was used.

Table 4-17A
Comparative Analysis of Alternatives for Wooster Park
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE[1]									
	1	2	3	4	5	6	7	8	9	10
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT										
Protection of Human Health	☐	☐	◘	◘	■	■	NA	NA	◘	◘
Protection of the Environment	☐	☐	◘	◘	■	■	NA	NA	◘	◘
COMPLIANCE WITH ARARs										
Chemical-Specific ARARs	☐	☐	■	■	■	■	NA	NA	◘	◘
Location-Specific ARARs	NA	■	■	■	■	■	NA	NA	◘	◘
Action-Specific ARARs	NA	■	■	■	■	■	NA	NA	◘	◘
Other Criteria, Advisories, Guidance	NA	NA	■	■	■	■	NA	NA	◘	◘
LONG-TERM EFFECTIVENESS AND PERMANENCE										
Magnitude of Residual Risk	☐	☐	◘	◘	■	■	NA	NA	◘	◘
Adequacy and Reliability of Controls	☐	☐	◘	◘	■	■	NA	NA	◘	◘
REDUCTION OF TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT										
Treatment/Recycling Processes Utilized	NA	NA	☐	☐	■	■	NA	NA	■	■
Amount of Hazardous Materials Destroyed or Treated	☐	☐	☐	☐	■	■	NA	NA	◘	◘
Degree of Expected Reductions in Tox, Mob, or Vol	☐	☐	☐	☐	■	■	NA	NA	◘	◘
Irreversibility	☐	☐	■	■	■	■	NA	NA	■	■
Type and Quantity of [Process] Residuals	☐	☐	■	■	■	■	NA	NA	■	■
SHORT-TERM EFFECTIVENESS										
Protection of Community During Remedial Actions	NA	■	◘	◘	◘	◘	NA	NA	◘	◘
Protection of Workers During Remedial Actions	NA	■	◘	◘	◘	◘	NA	NA	◘	◘
Environmental Impacts	■	■	◘	◘	◘	◘	NA	NA	◘	◘
Time Until Remedial Action Objectives are Achieved	☐	☐	◘	◘	◘	◘	NA	NA	◘	◘

Table 4-17A
Comparative Analysis of Alternatives for Wooster Park
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE[1]									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
IMPLEMENTABILITY										
Ability to Construct and Operate the Technology	NA	■	■	■	■	■	NA	NA	■	■
Reliability of the Technology	NA	□	◘	◘	■	■	NA	NA	◘	◘
Ease of Undertaking Additional Remedial Actions, if Necessary	■	■	◘	◘	■	■	NA	NA	◘	◘
Ability to Monitor Effectiveness of the Remedy	NA	NA	◘	◘	◘	◘	NA	NA	◘	◘
Ability to Obtain Approvals from Other Agencies	■	■	■	■	■	■	NA	NA	■	■
Coordination with Other Agencies	◘	◘	■	■	■	■	NA	NA	■	■
Availability of Off-Site Treatment, Storage, and Disposal Services and Capacity	NA	NA	NA	NA	■	■	NA	NA	■	■
Availability of Necessary Equipment and Specialists	NA	■	■	■	■	■	NA	NA	■	■
Availability of Prospective Technologies	NA	■	■	■	■	■	NA	NA	■	■
COST										
Capital	$0	$54,498	$738,583	$1,255,817	$496,313	$1,535,387	NA	NA	$425,972	$1,117,920
Present Value of O&M (First 30 Years)	$21,578	$490,888	$465,479	$465,479	$64,952	$64,952	NA	NA	$462,473	$462,473
Present Value of the Alternative	$21,578	$545,386	$1,204,061	$1,721,296	$561,265	$1,600,339	NA	NA	$888,445	$1,580,393

[1]Alternatives 7 and 8 were not evaluated.

Notes:

■ = Highest rating (most protective, most effective, most implementable)

◘ = Meets criterion, but another alternative(s) more protective/effective/implementable

□ = Does not meet criterion

Table 4-17B
Cost Estimate Summary for Wooster Park
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Excavation Depth, ft	0	0	3	3	6	6	2 or 4	2 or 4	4	4
Cap/Cover	NA	NA	RCRA C	RCRA C	NA	NA	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover
Disposal Volumes (CY)										
In-Town Consolidation			852	0	1704	0	0	0	1136	0
Out-of-Town			0	852	0	1,704	0	0	0	1,136
Treated			95	95	189	189	0	0	126	126
Total Disposal Vol.			**947**	**947**	**1893**	**1893**	**0**	**0**	**1262**	**1262**
Cost										
Capital	**$0**	**$54,498**	**$738,583**	**$1,255,817**	**$496,313**	**$1,535,387**	**NA**	**NA**	**$425,972**	**$1,117,920**
O&M (present value)	**$21,578**	**$490,888**	**$465,479**	**$465,479**	**$64,952**	**$64,952**	**NA**	**NA**	**$462,473**	**$462,473**
Present Value	**$21,578**	**$545,386**	**$1,204,061**	**$1,721,296**	**$561,265**	**$1,600,339**	**NA**	**NA**	**$888,445**	**$1,580,393**

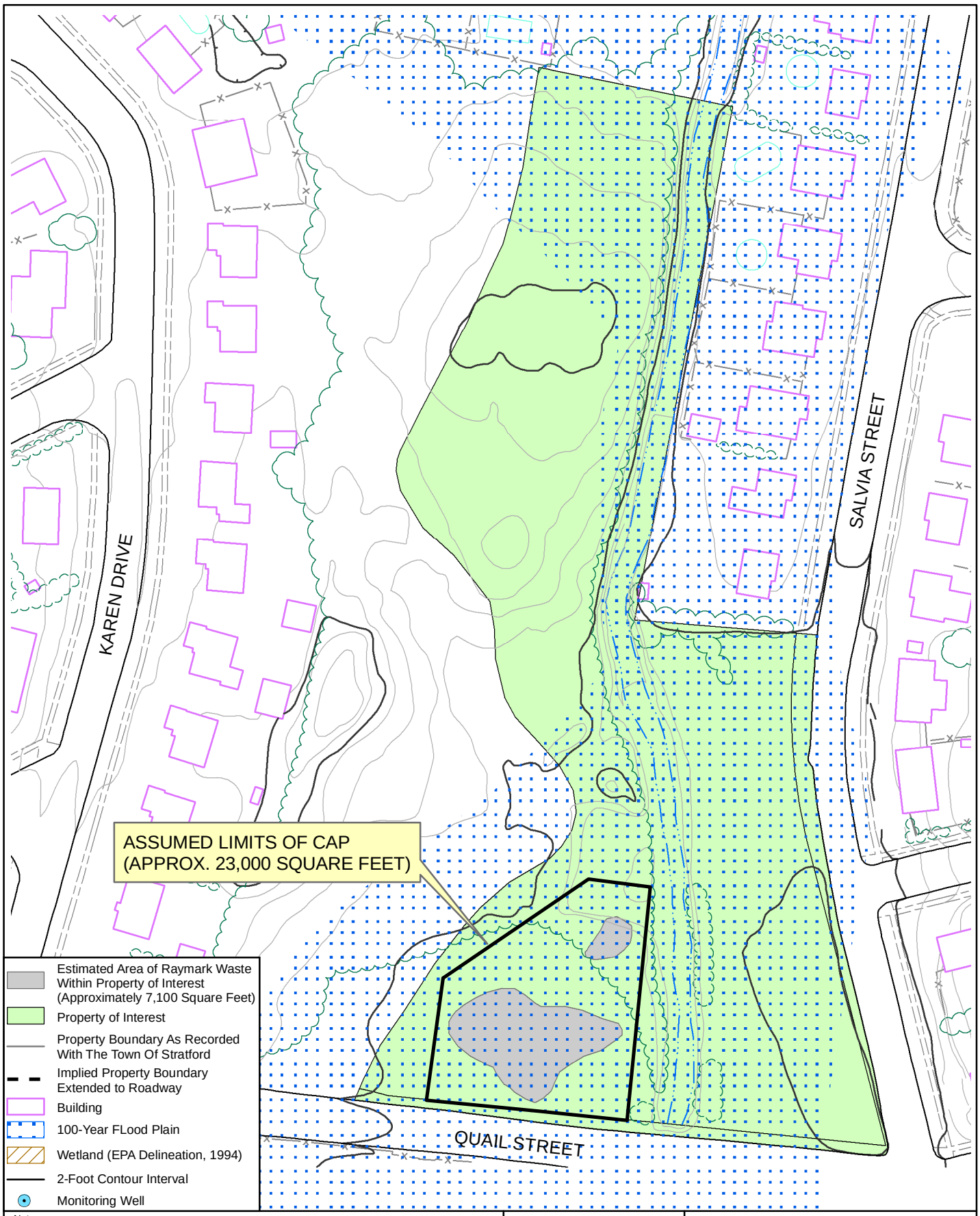
Notes:
Alternative 1 - No Action
Alternative 2 - Restrictions With Long-Term Monitoring
Alternative 3 - Low-Permeability Cap With In-Town Consolidation
Alternative 4 - Low-Permeability Cap With Out-Of-Town Disposal
Alternative 5 - Excavation To The Water Table With In-Town Consolidation
Alternative 6 - Excavation To The Water Table With Out-Of-Town Disposal
Alternative 7 - Excavation To Either 2 Or 4 Feet With In-Town Consolidation (Not applicable)
Alternative 8 - Excavation To Either 2 Or 4 Feet With Out-Of-Town Disposal (Not applicable)
Alternative 9 - Excavation To 4 Feet With In-Town Consolidation
Alternative 10 - Excavation To 4 Feet With Out-Of-Town Disposal
NA = not applicable

Table 4-17C
Preliminary ARAR Summary - Wooster Park
Raymark OU6 - Additional Properties
Stratford, Connecticut

Property Group	ARAR Tables				
	A	B	C	D	E
Alternative 1	X				
Alternative 2	X		X		
Alternative 3	X		X	X	X
Alternative 4	X		X	X	X
Alternative 5	X		X		
Alternative 6	X		X		
Alternative 7					
Alternative 8					
Alternative 9	X		X		
Alternative 10	X		X		

A = ARARs for all Alternatives
B = ARAR add-ons for an alternative for the Raymark waste located in the wetlands
C = ARAR add-ons for an alternative for the Raymark waste located in the floodplains
D = ARAR add-ons for alternatives that include low-permeability caps
E = ARAR add-ons for alternatives that include CAMUs

Note:
ARAR Tables A-E are found in Volume II, Appendix C of this Feasibility Study.



Notes:
1) Plan not to be used for design.
2) All locations to be considered approximate.
3) Property boundaries are approximate based on Town of Stratford Engineering Department plans.
4) Floodplain extent based on Federal Emergency Management Agency Q3 Flood Data, Community Panel Numbers 090016 0001-0004, Revised June 16, 1992, FEMA, Washington D.C. and modified to Town of Stratford Engineering Plan 10-foot contour.
5) Adapted from TTNUS Remedial Investigation, 2005.

100 50 0 100 Feet

N

Nobis

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
(978) 683-0891
www.nobisengineering.com

FIGURE 4-17

WOOSTER PARK
FEASABILITY STUDY
RAYMARK SUPERFUND SITE
STRATFORD, CONNECTICUT

Drawn By: D. McGrath	Approved By: H. Ford
Project: 80006	Date: 9/3/09 Rev00

R:\80000 Task Orders\80006 Raymark\Technical Data\GIS_Data\Figures\OU6_FS_Figures\Figure_04-17_Wooster_Park.mxd

4.3.18 Third Avenue Property

The Third Avenue property encompasses approximately 0.3 acres of residentially-zoned land located in Stratford, Connecticut. The property is bordered by two other residential properties to the north and south, the Fourth Avenue Pond to the west, and Third Avenue to the east.

The Third Avenue property is occupied by a private home. The house sits on the northern half of the property. The majority of the Raymark waste area that was delineated is covered by natural materials. The entire property group lies within the 100-year floodplain.

Key factors associated with the areas and volumes to be addressed at this property group include:

- Raymark waste area: .....1,700 SF (Figure 4-18)
- Total volume of Raymark waste:.....630 CY
- Maximum depth of Raymark waste:..... 10 feet bgs
- Average depth to the seasonal high groundwater table:.....6.5 feet
- Raymark waste area outside of 100-year floodplain:..... 0 SF
- Raymark waste area in 100-year floodplain:..... 1,700 SF
- Raymark waste in 100-year floodplain to 6.5 FT:.....409 CY (1,700 SF x 6.5 FT)
- Raymark waste area under pavement: ..... 340 SF
- Raymark waste in unpaved area:..... 1360 SF
- Raymark waste located below the water table:.....221 CY (1,700 SF x 3.5 FT)
- Alternatives 3/4:
  - Raymark waste under pavement to 2.5 FT: .....32 CY (340 SF x 2.5 FT)
  - Raymark waste in unpaved area to 3 FT: .....151 CY (1360 SF x 3 FT)
- Alternatives 5/6:
  - Raymark waste located above the water table: .....409 CY (1,700 SF x 6.5 FT)
- Alternatives 7/8:
  - Raymark waste under pavement to 2 FT: .....25 CY (340 SF x 2 FT)
  - Raymark waste in unpaved area to 4 FT: .....202 CY (1360 SF x 4 FT)
- Alternatives 9/10:
  - Raymark waste to 4 FT: .....252 CY (1,700 SF x 4 FT)

The calculation of the average depth to the seasonal high water table of 6.5 feet below ground surface (bgs) is based on observations of water levels from soil borings advanced in the area. The calculation of the maximum depth of Raymark waste is based on data collected during the RI (TtNUS, 2005).

The detailed analysis of alternatives for this property group is presented below and consists of the following components:

- A list of key assumptions (Section 4.3.18.1) is used as the basis for the detailed analysis of alternatives and for the development of costs for the FS;
- Figure 4-18, which shows a map of Third Avenue, the delineated Raymark waste area, the 100-year floodplain, and the proposed cap footprint;
- Table 4-18, which presents the individual detailed analysis of alternatives for Third Avenue in tabular form;
- The comparative analysis of alternatives for Third Avenue, presented in text form;
- Table 4-18A, which presents a tabular summary of the comparative analysis;
- Table 4-18B, which presents a summary of cost estimates for each of the alternatives;
- Table 4-18C, which provides a summary of ARARs for each of the Third Avenue alternatives; and
- Cost Estimate Backup Sheets for the FS cost estimates, which are presented in Appendix G.

4.3.18.1 Third Avenue Property Assumptions

Key assumptions associated with each alternative are presented in this section. Pairs of alternatives (3 and 4, 5 and 6, 7 and 8, and 9 and 10) have the same components except for the disposal of Raymark waste, which is either in-town or out-of-town. See Section 3.3 for details on the Remedial Alternatives discussed below. See Table 4-18 for a summary of the details on the analysis for the Third Avenue property group.

4.3.18.1.1 Alternative 1 – No Action

Detailed descriptions of the no action alternative are presented in Section 3.5.1.

4.3.18.1.2 Alternative 2 – Restrictions with Long-Term Monitoring

Detailed descriptions of Alternative 2 are presented in Section 3.5.2. Property group-specific details include the following:

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group, Alternative 2 will include placement of institutional controls on the Third Avenue property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above the seasonal high water table, all three wells will be monitored quarterly for 2 years, and annually thereafter.

- Existing Surfaces: Monthly surface inspections of both pavement and vegetative covers will be required along with annual reporting to summarize inspection findings and to verify the effectiveness of institutional controls.

4.3.18.1.3 Alternatives 3 and 4 – Low-Permeability Cap with In-Town Consolidation (Alt. 3) or Out-of-Town Disposal (Alt. 4)

Detailed descriptions of Alternatives 3 and 4 are presented in Section 3.5.3. Raymark waste areas will be excavated 2.5 feet in paved areas and 3 feet in unpaved areas from the 100-year floodplain. Raymark waste within the property group will be consolidated under a RCRA cap. Due to the non-contiguous nature of waste delineated within the Third Avenue property group, additional excavation will be conducted between waste locations to facilitate construction of the RCRA cap to maintain existing grades after remedial action implementation. Additionally the clean, uncontaminated excavated soil will be staged for future use during cap construction.

Excavated materials will be placed at an in-town consolidation area (Alternative 3) or an out-of-town disposal location (Alternative 4). The property group-specific details for Alternative 3 and 4 include the following:

Excavation Volumes/Final Cover

- Approximately 183 CY of Raymark waste and 144 CY of non-Raymark waste soil will be excavated 2.5 or 3 feet.

- A low permeable RCRA cap with a footprint of approximately 3,000 square feet (0.07 acres) will be constructed over non-contiguous Raymark waste areas present on the property group (Figure 4-18).

- Final property contours will be designed to meet Third Avenue and surrounding parcels at current elevations.

- The current ground surface within the Raymark waste area on this property group is primarily covered with grass, therefore a vegetated RCRA cap is assumed. However, a small portion (approximately 340 SF) that is currently paved will be repaved as a final surface cover following cap construction, if practicable.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated. Once excavated, this area will be backfilled with clean fill and revegetated or repaved to reflect existing conditions. There will be no loss in current flood storage capacity or functionality after completion of the remedial actions.

- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain under the cap after completion of the excavation, Alternatives 3 and 4 will include placement of institutional controls on the

Third Avenue property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above the seasonal high water table, all three wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: The O&M for Alternatives 3 and 4 will require monthly cap inspections with annual reporting to summarize inspection findings and verify the effectiveness of institutional controls. A 30-year monitoring program is used in the present value cost analysis.

4.3.18.1.4 Alternatives 5 and 6 – Excavation to the Water Table with In-Town Consolidation (Alt. 5) or Out-of-Town Disposal (Alt. 6)

Detailed descriptions of Alternatives 5 and 6 are presented in Section 3.5.4. Raymark waste areas will be excavated to the seasonal high water table. Excavated material will be placed in an in-town consolidation area (Alternative 5) or an out-of-town disposal location (Alternative 6). The property group-specific details include the following:

Excavation Volumes/Final Cover

- Approximately 409 CY of Raymark waste will be excavated to the average seasonal high water table of 6.5 feet. Approximately 213 CY of non-Raymark waste soil will

additionally be excavated to facilitate safety requirements such as benching/sloping of sidewalls to prevent collapse.

- Raymark waste in paved areas will be excavated to the water table and replaced with clean fill. The top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat. Raymark waste in unpaved areas will be excavated to the water table and replaced with a vegetated, permeable soil cover.

- Final property contours will be designed to meet Third Avenue and surrounding parcels at current elevations.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated to the seasonal high water table. Once excavated, this area will be backfilled with clean fill and revegetated or repaved with current elevations and drainage patterns retained so that the current flood storage capacity will not be diminished after completion of the remedial actions.

- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 5 and 6 will include placement of institutional controls on the Third Avenue property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because all Raymark waste above the seasonal high water table will be removed, all three wells will be monitored quarterly for 2 years, after which groundwater monitoring may no longer be required.

- Cap/Final Cover: Paved areas and vegetative covers must be inspected annually and maintained in good condition.

4.3.18.1.5 Alternatives 7 and 8 – Excavation to Either 2 Feet or 4 Feet with In-Town Consolidation (Alt. 7) or Out-of-Town Disposal (Alt. 8)

Detailed descriptions of Alternatives 7 and 8 are presented in Section 3.5.5. Raymark waste areas will be excavated to either a depth of 2 feet (current paved areas) or a depth of 4 feet (current unpaved areas). Excavated material will be placed in an in-town consolidation area (Alternative 7) or an out-of-town disposal location (Alternative 8). The property group-specific details include the following:

Excavation Volumes/Final Covers

- Approximately 25 CY of Raymark waste will be excavated 2 feet from currently paved areas, while an estimated 202 CY will be excavated 4 feet from currently unpaved areas. These excavations will occur in areas within the 100-year floodplain.

- Raymark waste in paved areas will be excavated to a 2-foot depth and replaced with clean fill. The top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat. Raymark waste in unpaved areas will be excavated to a 4-foot depth and replaced with a vegetated, permeable soil cover.

- Final property contours will be designed to meet Third Avenue and surrounding parcels at current elevations.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated 2 or 4 feet. Once excavated, this area will be backfilled with clean fill and revegetated or repaved with current elevations and drainage patterns retained so that the current flood storage capacity will not be diminished after completion of the remedial actions.

- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 7 and 8 will include placement of institutional controls on the Third Avenue property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above the seasonal high water table, all three wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: Paved areas and vegetative covers must be inspected monthly and maintained in good condition. A 30-year monitoring program is used in the present value cost analysis.

4.3.18.1.6 Alternatives 9 and 10 – Excavation to 4 Feet with In-Town Consolidation (Alt. 9) or Out-of-Town Disposal (Alt. 10)

Detailed descriptions of Alternatives 9 and 10 are presented in Section 3.5.5. Raymark waste areas will be excavated to a 4-foot depth. Excavated material will be placed in an in-town consolidation area (Alternative 9) or an out-of-town disposal location (Alternative 10). The property group-specific details include the following:

Excavation and Final Cover

- Approximately 252 CY of Raymark waste will be excavated 4 feet from areas within the 100-year floodplain.
- Raymark waste in <u>paved</u> areas will be excavated to a 4-foot depth and replaced with clean fill. The top of fill is assumed to include an 18-inch thick layer of base materials and a paved layer of 3-inches which includes a layer of binder coarse and a layer of top coat. Raymark waste in <u>unpaved</u> areas will be excavated to a 4-foot depth and replaced with a vegetated, permeable soil cover.
- Final property contours will be designed to meet Third Avenue and surrounding parcels at current elevations.

Floodplain and Wetlands

- Temporary impacts to floodplains are anticipated as Raymark waste within the 100-year floodplain will be excavated to 4 feet. Once excavated, this area will be backfilled with clean fill and revegetated or repaved with current elevations and drainage patterns retained so that the current flood storage capacity will not be diminished after completion of the remedial actions.

- No wetlands are present in the area of Raymark waste on this parcel.

Future Use Restrictions

- Due to the Raymark waste that will remain at this property group after completion of the excavation, Alternatives 9 and 10 will include placement of institutional controls on the Third Avenue property group to prohibit certain types of activities such as excavations without written authorization from EPA and DEP, and to prohibit groundwater use of any kind.

- Any future activities prohibited by an ELUR will require a formal request to and written approval from EPA and CTDEP prior to implementing such activities. (See Section 3.2.3).

Operation and Maintenance

- Groundwater Monitoring: Three monitoring wells will be installed to support long-term groundwater monitoring. There are no existing monitoring wells installed on or in the vicinity of this parcel. Because Raymark waste will remain above seasonal high water table, all three wells will be monitored quarterly for 2 years, and annually thereafter. A 30-year long-term monitoring period is used in the present value cost analysis.

- Cap/Final Cover: Paved areas and vegetative covers must be inspected monthly and maintained in good condition. A 30-year monitoring program is used in the present value cost analysis.

4.3.18.1.7 Treatment of Raymark Waste (applies to Alternatives 3 through 10)

Raymark waste treatment is presented in Section 3.1.3 for all property groups.

- Based on an evaluation of historical sampling data from <u>all</u> OU6 properties, it is assumed that approximately 10% of excavated Raymark waste will require treatment prior to disposal. Treatment will be required only when excavated materials exhibit concentrations of contaminants in excess of disposal requirements. All treatment will occur at an out-of-town facility.

- For alternatives featuring out-of-town disposal of Raymark waste (Alternatives 4, 6, 8, and 10), the concentration thresholds for treatment will be 10 times UTS thresholds.

- For alternatives featuring in-town consolidation (Alternatives 3, 5, 7, and 9), the concentration thresholds for treatment will be the PHC levels.

- Treatment volume estimates for Third Avenue are based on the assumed quantity of excavation required to implement each alternative. Note that the waste volumes are rounded up or down as appropriate.

- A 1.5 conversion factor from tons to cubic yards is used.

  - <u>Alternatives 3/4</u>
    - 183 CY RW excavated * 1.2 bulking factor= 219 CY
    - 219 CY * 1.5 TON/CY = 329 TON
    - 329 TON * 10% = **33 TONS to be treated (22 CY)**

  - <u>Alternatives 5/6</u>
    - 409 CY RW excavated * 1.2 bulking factor = 491 CY
    - 491 CY * 1.5 TON/CY = 737 TON
    - 737 TON * 10% = **74 TONS to be treated (49 CY)**

  - <u>Alternatives 7/8</u>
    - 227 CY RW excavated * 1.2 bulking factor = 272 CY
    - 272 CY * 1.5 TON/CY = 408 TON
    - 408 TON * 10% = **41 TONS to be treated (27 CY)**

  - <u>Alternatives 9/10</u>
    - 252 CY RW excavated * 1.2 bulking factor= 302 CY
    - 302 CY * 1.5 TON/CY = 453 TON
    - 453 TON * 10% = **45 TONS to be treated (30 CY)**

4.3.18.2 Comparative Analysis of Alternatives for Third Avenue Property

This section presents the comparative analysis of alternatives for Third Avenue using the criteria described in Section 4.2. The comparative analysis of alternatives for this property group is summarized in a comparison format on Table 4-18A.

4.3.18.2.1 Overall Protection of Human Health and the Environment

Alternative 1 (No Action) will not protect human health or the environment. Alternative 2 (Restrictions with Long-Term Monitoring) can provide limited protection of human health and the environment, if restrictions are monitored and enforced. Alternatives 3 and 4 and 7 through 10 will achieve protection of human health and the environment through the excavation of varying amounts of Raymark waste (low-permeability cap for Alternative 3 and 4) and the use of institutional controls, rendering the contaminated waste inaccessible. Alternatives 5 and 6 will also protect human health and the environment through the removal of all Raymark waste located above the seasonal high water table and the use of institutional controls.

4.3.18.2.2 Compliance with ARARs

Alternative 1 (No Action) and Alternative 2 (Restrictions with Long-Term Monitoring) will not comply with ARARs because contaminants in Raymark waste will remain accessible in soils in excess of CT RSRs and federal risk criteria.

The ARARs associated with the implementation of Alternatives 3 through 10 are presented in Section 4.0 of this FS and on Table 4-18C. Alternatives 3 through 6 could be designed to comply with all chemical-specific, action-specific, and location-specific ARARs. Through excavation of Raymark waste to 2 feet (paved areas) or 4 feet (unpaved areas), Alternatives 7 through 10 will render the remaining contaminated soil inaccessible and will be compliant with the action-specific CT RSR Direct Exposure Criteria. Alternatives 7 through 10 may not comply with the numeric standards of CTDEP's Pollutant Mobility Criteria, however, the RSRs allow for variances and alternate criteria. Alternatives 7 through 10 will comply with all other action, chemical, and location-specific ARARs.

4.3.18.2.3 Long-Term Effectiveness and Permanence

The magnitude of residual human health risk associated with Raymark waste will be highest for Alternative 1 (No Action), since no actions will be taken to mitigate human health risks. Residual human health risks for Alternative 2 (Restrictions with Long-Term Monitoring) will be lower than Alternative 1, but still above acceptable human health risk levels.

Residual human health risks after implementation of Alternatives 3 and 4 and Alternatives 7 through 10 will be slightly higher than for Alternatives 5 and 6 because Raymark waste will be in-place above the seasonal high water table. Alternatives 5 and 6 will be more reliable than Alternatives 3 and 4 and 7 through 10 because there will be no Raymark waste left in place above the seasonal high water table and protection of human health through direct contact or mobilization of contaminants by rainwater infiltration will not be dependent on maintenance of a low-permeable RCRA cap or soil or paved cover.

Alternatives 3 and 4 and 7 through 10 can provide protection in the long-term if the cover systems are maintained. Alternatives 5 and 6 will provide the greatest protection to human health and will be the most permanent. Alternative 3 through 10 could each be designed to allow for redevelopment potential on the property group.

4.3.18.2.4 Reduction of Toxicity, Mobility, and Volume through Treatment

No treatment will be required for Alternative 1 (No Action) and Alternative 2 (Restrictions with Long-Term Monitoring). Alternatives 3 through 10 will require treatment prior to land disposal to address the assumed 10 percent fraction that exceeds the UTS or PHC levels. This treatment will result in reduction of toxicity, mobility, and volume of Raymark waste. Although, the estimated volumes that will require treatment are similar (ranging from 22 to 49 CY), Alternatives 5 and 6 will result in the greatest amount of reduction because a larger quantity of materials will be shipped offsite and is expected to require treatment prior to disposal.

4.3.18.2.5 Short-Term Effectiveness

No on-site actions will be taken under Alternative 1 (No Action) and minimal on-site actions will be taken under Alternative 2 (Restrictions with Long-Term Monitoring); therefore, there will be no short-term impacts to the community, workers, or the environment. Short-term impacts to

the community, workers, and the environment from the implementation of Alternatives 3 through 10 will be similar and can be mitigated using engineering controls.

Alternatives 5 and 6 will involve a higher volume of truck traffic to transport Raymark waste and backfill will require a greater volume of Raymark waste handling than Alternatives 3 and 4 and 7 through 10.

Alternatives 3 and 4 will take approximately 2 months to complete, while Alternatives 5 and 6 will each require approximately 3 months to complete. Alternatives 7 through 10 will each require approximately 1 month to complete. For Alternatives 5, 7, and 9, the estimated time to complete does not include the amount of time necessary to complete remedial activities at an in-town consolidation location.

4.3.18.2.6 Implementability

Alternatives 3 and 4 (low-permeability cap), Alternatives 5 and 6 (excavation to water table), and Alternatives 7 through 10 (2 to 4-foot excavation) all require excavation, which can be implemented through standard construction and environmental remediation methods. Alternatives 3 and 4 and 7 through 10 require specific site grading, placement of cap/cover materials based on design specifications, and O&M in the future. Alternatives 5 and 6 will involve excavation of the largest volume of Raymark waste (409 CY), and any expansions of the Raymark waste area due to confirmatory sampling will lead to a larger volume of excavated Raymark waste compared to Alternative 7 through 10 due to the excavation depth to the seasonal high water table.

Additional remedial actions will be more difficult to implement for Alternatives 3 and 4 due to the presence of a RCRA cap. Alternatives 7 through 10 are equally amenable to additional remedial actions at the property group, should they be deemed necessary. Alternatives 5 and 6 will be the most amenable to additional actions should they be necessary as all Raymark waste will be removed to the seasonal high water table.

Alternatives 3 and 4 and 7 through 10 will each require long-term groundwater monitoring. Alternatives 5 and 6 will require quarterly groundwater monitoring for only 2 years after which

groundwater monitoring may no longer be required. Alternatives 3 and 4 and 7 though 10 will also require long-term operation and maintenance of the cap or soil cover.

Alternatives 3 through 10 will be similar in terms of the ability to coordinate with other agencies.

For Alternatives 3 through 10, each involves conventional construction methods for which the required equipment and technical specialists will be readily available.

4.3.18.2.7 Cost

A comparison of costs for each of the alternatives that were evaluated for Third Avenue is presented on Table 4-18B.

Table 4-18
Summary of Detailed Analysis for Third Avenue Property
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4 – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8 – Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Overall Protection of Human Health and the Environment	Would not protect human health. RI did not indentify any significant habitats for ecological receptors.	Some protection of human health, but human health risks still above acceptable limits. RI did not indentify any significant habitats for ecological receptors.	Would protect human health through construction of a RCRA C-compliant cover (multi-component, drainage layer, gas vent layer, E-07 cm/s hydraulic conductivity) over Raymark waste. RI did not indentify any significant habitats for ecological receptors.	Would protect human health through the removal of Raymark waste and placement of clean soil in its place. RI did not indentify any significant habitats for ecological receptors.	Would protect human health through construction of an engineered barrier over Raymark waste. RI did not indentify any significant habitats for ecological receptors.	Would protect human health through construction of an engineered barrier over Raymark waste. RI did not indentify any significant habitats for ecological receptors.
Compliance with ARARs	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs.	Would not comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-18C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-18C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs. See Table 4-18C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs with the use of waivers and/or alternate criteria. See Table 4-18C.	Would comply with chemical-specific (RSRs) and action-specific (RCRA) ARARs with the use of alternate criteria. See Table 4-18C.
Long-Term Effectiveness and Permanence	Magnitude of residual risk high. No risk reduction. 5-year reviews required. No O&M or controls included for long term.	Residual human health risks above acceptable limits. No risk reduction. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would not be adequate to protect human health for the long-term.	Residual risk within acceptable limits. Raymark waste willl be left-in place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness. Capping technology reliable. Additional design analysis of cap in floodplains will be required during remedial design phase.	Residual risk within acceptable limits. Risk reduction would be permanent. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.	Residual risk within acceptable limits. Raymark waste willl be left-in place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.	Residual risk within acceptable limits. Raymark waste willl be left-in place above the water table. Risk reduction would be dependent on proper execution of O&M program. 5-year reviews required. Institutional controls such as no excavation without written approval from EPA and DEP or use of groundwater. Groundwater monitoring required. Controls would be adequate to ensure long-term effectiveness.
Reduction of Toxicity, Mobility, or Volume Through Treatment	None.	None.	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 33 Raymark Waste treated (CY)= 22	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 74 Raymark Waste treated (CY)= 49	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 41 Raymark Waste treated (CY)= 27	Treatment assumed for 10 percent of excavated volume to comply with disposal regulations (see assumptions). Raymark Waste treated (tons)= 45 Raymark Waste treated (CY)= 30
Short-Term Effectiveness	No actions, therefore no short-term impacts anticipated. Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures are applied. No adverse impacts to environment anticipated during implementation. Minimal on-site actions (well construction, signage, and fence installation, and groundwater sampling only). Would not achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1] = 219 Approximate truckloads of Raymark waste 18 Approximate truckloads of clean fill 18 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 3, this time frame does not include duration of capping activities at consolidation location. 2 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1] = 491 Approximate truckloads of Raymark waste 41 Approximate truckloads of clean fill 41 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 5, this time frame does not include duration of capping activities at consolidation location. 3 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1] = 272 Approximate truckloads of Raymark waste 23 Approximate truckloads of clean fill 23 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 7, this time frame does not include duration of capping activities at consolidation location. 1 Would achieve RAO.	No adverse impacts to community or workers anticipated during implementation, if proper health and safety measures and construction methods are applied. No adverse impacts to environment anticipated during implementation. Monitoring would be conducted during remedial action to verify effectiveness of controls. Total excavated volume of RW (CY)[1] = 302 Approximate truckloads of Raymark waste 25 Approximate truckloads of clean fill 25 Assume 12 CY per truckload. Approximate months to complete remedial action. For Alternative 9, this time frame does not include duration of capping activities at consolidation location. 1 Would achieve RAO.

Table 4-18
Summary of Detailed Analysis for Third Avenue Property
Raymark OU6 - Additional Properties
Stratford, Connecticut

Criterion	Alternative 1 – No Action	Alternative 2 – Restrictions with Long-Term Monitoring	Alternatives 3/4 – Low Permeability Cap with In-Town Consolidation or Out-of-Town Disposal	Alternatives 5/6 – Excavation to Water Table and In-Town Consolidation or Out-of-Town Disposal	Alternatives 7/8 – Excavation to 2 Feet or 4 Feet In-Town Consolidation or Out-of-Town Disposal	Alternatives 9/10 – Excavation to 4 Feet and In-Town Consolidation or Out-of-Town Disposal
Implementability	Not applicable.	Would be implementable, assuming cooperation by property owners. Would require coordination with state/town officials to perform O&M and to document compliance with institutional controls.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. May be difficult to implement additional remedial actions if required, because Raymark waste would be beneath RCRA C cover. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or building on Third Avenue would need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development could be hindered by the presence of the low-permeability cap.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or building on Third Avenue would need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by presence of Raymark waste left in place.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or building on Third Avenue would need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by presence of Raymark waste left in place.	Excavation in floodplains anticipated. All areas within 100-year floodplain would be restored to their current elevation with equivalent material. Additional remedial actions can be implemented, will only require removal of backfill, and/or pavement. Measures would need to be taken to secure the building foundation during excavation adjacent to structure, or building on Third Avenue would need to be demolished. Excavated material would need to be transported off this property. All potential exposure pathways could be monitored adequately. Would require coordination with state/town officials and property owners to perform O&M and to document compliance with institutional controls. Decisions on disposal locations will be made subsequent to the FS based on total project needs. Required equipment and specialists readily available. Technology available and in full-scale use. Future development of site could be hindered by presence of Raymark waste left in place.
Cost	**Alternative 1** Capital: $0 O&M (Years 1-2): $0 O&M (Years 3-30): $0 Five-Year Reviews: $10,000/each PV of O&M: $21,578 PV of Alternative: $21,578 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 2** Capital: $42,670 O&M (Years 1-2): $59,619 O&M (Years 3-30): $32,676 Five-Year Reviews: $10,000/each Present Value of O&M: $475,770 Present Value of Alternative: $518,440 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 3** Capital: $275,610 O&M (Years 1-2): $58,858 O&M (Years 3-30): $31,915 Five-Year Reviews: $10,000/each PV of O&M: $466,330 PV of Alternative: $741,940 **Alternative 4** Capital: $396,926 O&M (Years 1-2): $58,858 O&M (Years 3-30): $31,915 Five-Year Reviews: $10,000/each PV of O&M: $466,330 PV of Alternative: $863,256 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 5** Capital: $292,575 O&M (Years 1-2): $46,049 O&M (Years 3-30): $10,125 Five-Year Reviews: $10,000/each PV of O&M: $212,172 PV of Alternative: $504,748 **Alternative 6** Capital: $562,187 O&M (Years 1-2): $46,049 O&M (Years 3-30): $10,125 Five-Year Reviews: $10,000/each PV of O&M: $212,172 PV of Alternative: $774,359 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 7** Capital: $236,497 O&M (Years 1-2): $58,813 O&M (Years 3-30): $31,870 Five-Year Reviews: $10,000/each PV of O&M: $465,763 PV of Alternative: $702,260 **Alternative 8** Capital: $383,161 O&M (Years 1-2): $58,813 O&M (Years 3-30): $31,870 Five-Year Reviews: $10,000/each PV of O&M: $465,763 PV of Alternative: $848,924 See Cost Estimate Backup Sheets in Appendix G.	**Alternative 9** Capital: $239,607 O&M (Years 1-2): $58,813 O&M (Years 3-30): $31,870 Five-Year Reviews: $10,000/each PV of O&M: $465,763 PV of Alternative: $705,370 **Alternative 10** Capital: $405,480 O&M (Years 1-2): $58,813 O&M (Years 3-30): $31,870 Five-Year Reviews: $10,000/each PV of O&M: $465,763 PV of Alternative: $871,243 See Cost Estimate Backup Sheets in Appendix G.

[1] A bulking factor of 1.2 was used.

Table 4-18A
Comparative Analysis of Alternatives for Third Avenue Property
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	2	3	4	5	6	7	8	9	10
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT										
Protection of Human Health	☐	☐	◘	◘	■	■	◘	◘	◘	◘
Protection of the Environment	☐	☐	◘	◘	■	■	◘	◘	◘	◘
COMPLIANCE WITH ARARs										
Chemical-Specific ARARs	☐	☐	■	■	■	■	■	■	◘	◘
Location-Specific ARARs	NA	■	■	■	■	■	■	■	◘	◘
Action-Specific ARARs	NA	■	■	■	■	■	■	■	◘	◘
Other Criteria, Advisories, Guidance	NA	NA	■	■	■	■	■	■	◘	◘
LONG-TERM EFFECTIVENESS AND PERMANENCE										
Magnitude of Residual Risk	☐	☐	◘	◘	■	■	◘	◘	◘	◘
Adequacy and Reliability of Controls	☐	☐	◘	◘	■	■	◘	◘	◘	◘
REDUCTION OF TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT										
Treatment/Recycling Processes Utilized	NA	NA	☐	☐	■	■	■	■	■	■
Amount of Hazardous Materials Destroyed or Treated	☐	☐	☐	☐	■	■	◘	◘	◘	◘
Degree of Expected Reductions in Tox, Mob, or Vol	☐	☐	☐	☐	■	■	◘	◘	◘	◘
Irreversibility	☐	☐	■	■	■	■	■	■	■	■
Type and Quantity of [Process] Residuals	☐	☐	■	■	■	■	■	■	■	■
SHORT-TERM EFFECTIVENESS										
Protection of Community During Remedial Actions	NA	■	◘	◘	◘	◘	◘	◘	◘	◘
Protection of Workers During Remedial Actions	NA	■	◘	◘	◘	◘	◘	◘	◘	◘
Environmental Impacts	■	■	◘	◘	◘	◘	◘	◘	◘	◘
Time Until Remedial Action Objectives are Achieved	☐	☐	◘	◘	◘	◘	◘	◘	◘	◘

Table 4-18A
Comparative Analysis of Alternatives for Third Avenue Property
Raymark OU6 - Additional Properties
Stratford, Connecticut

	ALTERNATIVE									
	1	2	3	4	5	6	7	8	9	10
IMPLEMENTABILITY										
Ability to Construct and Operate the Technology	NA	■	■	■	■	■	■	■	■	■
Reliability of the Technology	NA	□	◘	◘	■	■	◘	◘	◘	◘
Ease of Undertaking Additional Remedial Actions, if Necessary	■	■	◘	◘	■	■	◘	◘	◘	◘
Ability to Monitor Effectiveness of the Remedy	NA	NA	◘	◘	■	◘	◘	◘	◘	◘
Ability to Obtain Approvals from Other Agencies	■	■	■	■	■	■	■	■	■	■
Coordination with Other Agencies	◘	◘	■	■	■	■	■	■	■	■
Availability of Off-Site Treatment, Storage, and Disposal Services and Capacity	NA	NA	■	■	■	■	■	■	■	■
Availability of Necessary Equipment and Specialists	NA	■	■	■	■	■	■	■	■	■
Availability of Prospective Technologies	NA	■	■	■	■	■	■	■	■	■
COST										
Capital	$0	$42,670	$275,610	$396,926	$292,575	$562,187	$236,497	$383,161	$239,607	$405,480
Present Value of O&M (First 30 Years)	$21,578	$475,770	$466,330	$466,330	$212,172	$212,172	$465,763	$465,763	$465,763	$465,763
Present Value of the Alternative	$21,578	$518,440	$741,940	$863,256	$504,748	$774,359	$702,260	$848,924	$705,370	$871,243

Notes:

■ = Highest rating (most protective, most effective, most implementable)

◘ = Meets criterion, but another alternative(s) more protective/effective/implementable

□ = Does not meet criterion

Table 4-18B
Cost Estimate Summary for Third Avenue Property
Raymark OU6 - Additional Property
Stratford, Connecticut

	ALTERNATIVE									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Excavation Depth, ft	0	0	3	3	6.5	6.5	2 or 4	2 or 4	4	4
Cap/Cover	NA	NA	RCRA C	RCRA C	NA	NA	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover	Asphalt or Soil Cover
Disposal Volumes (CY)										
In-Town Consolidation			197	0	442	0	245	0	272	0
Out-of-Town (not treated)			0	197	0	442	0	245	0	272
Out-of-Town (treated)			22	22	49	49	27	27	30	30
Total Disposal Vol.			**219**	**219**	**491**	**491**	**272**	**272**	**302**	**302**
Cost										
Capital	**$0**	**$42,670**	**$275,610**	**$396,926**	**$292,575**	**$562,187**	**$236,497**	**$383,161**	**$239,607**	**$405,480**
O&M (present value)	**$21,578**	**$475,770**	**$466,330**	**$466,330**	**$212,172**	**$212,172**	**$465,763**	**$465,763**	**$465,763**	**$465,763**
Present Value	**$21,578**	**$518,440**	**$741,940**	**$863,256**	**$504,748**	**$774,359**	**$702,260**	**$848,924**	**$705,370**	**$871,243**

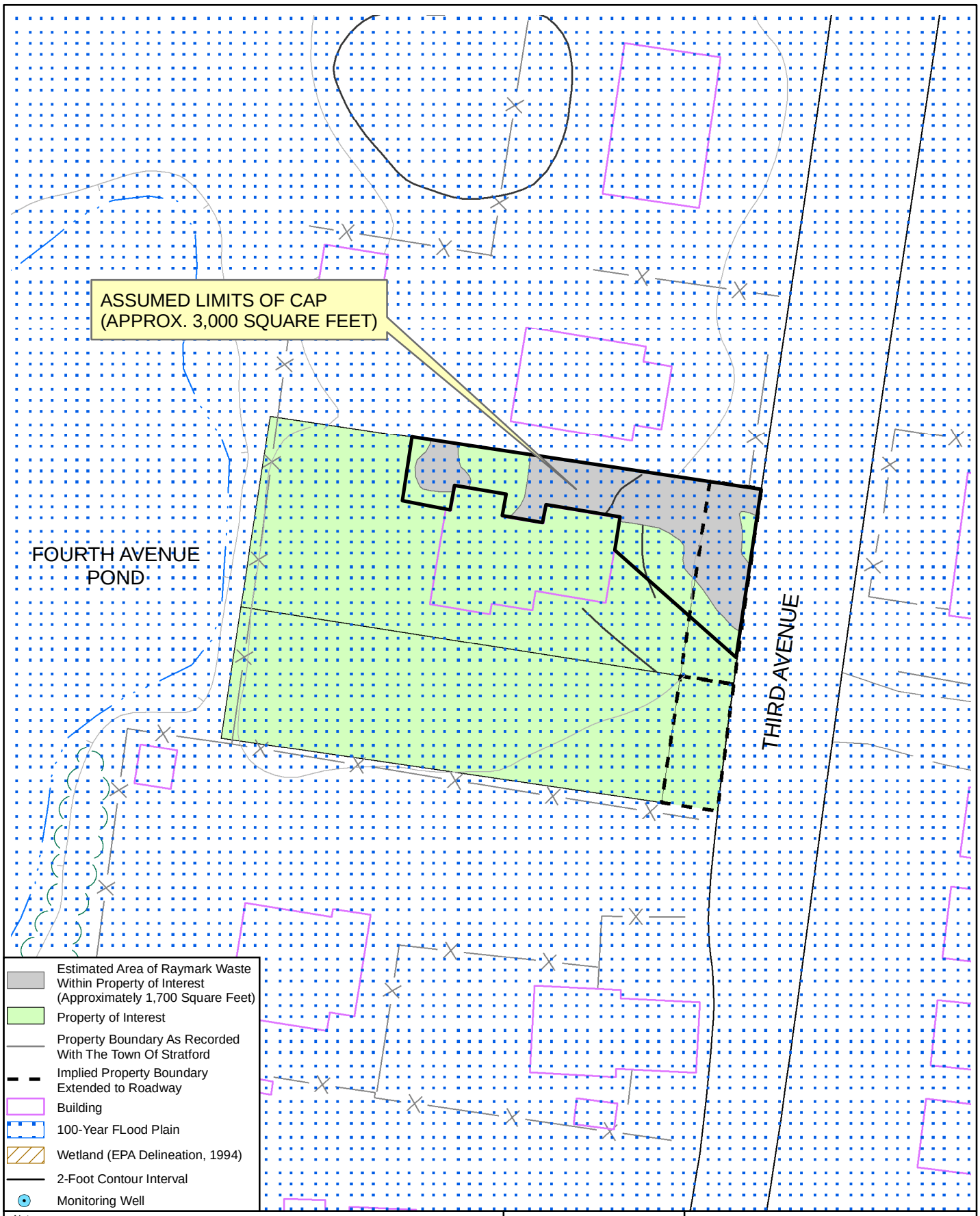
Notes:
Alternative 1 - No Action
Alternative 2 - Restrictions With Long-Term Monitoring
Alternative 3 - Low-Permeability Cap With In-Town Consolidation
Alternative 4 - Low-Permeability Cap With Out-Of-Town Disposal
Alternative 5 - Excavation To 10 Feet With In-Town Consolidation
Alternative 6 - Excavation To 10 Feet With Out-Of-Town Disposal
Alternative 7 - Excavation To Either 2 Or 4 Feet With In-Town Consolidation
Alternative 8 - Excavation To Either 2 Or 4 Feet With Out-Of-Town Disposal
Alternative 9 - Excavation To 4 Feet With In-Town Consolidation
Alternative 10 - Excavation To 4 Feet With Out-Of-Town Disposal

Table 4-18C
Preliminary ARAR Summary - Third Avenue Property
Raymark OU6 - Additional Properties
Stratford, Connecticut

Property Group	ARAR Tables				
	A	B	C	D	E
Alternative 1	X				
Alternative 2	X				
Alternative 3	X		X	X	X
Alternative 4	X		X	X	X
Alternative 5	X		X		
Alternative 6	X		X		
Alternative 7	X		X		
Alternative 8	X		X		
Alternative 9	X		X		
Alternative 10	X		X		

A = ARARs for all Alternatives
B = ARAR add-ons for an alternative for the Raymark waste located in the wetlands
C = ARAR add-ons for an alternative for the Raymark waste located in the floodplains
D = ARAR add-ons for alternatives that include low-permeability caps
E = ARAR add-ons for alternatives that include CAMUs

Note:
ARAR tables A-E are found in Volume II, Appendix C of this Feasibility Study.



Notes:
1) Plan not to be used for design.
2) All locations to be considered approximate.
3) Property boundaries are approximate based on Town of Stratford Engineering Department plans.
4) Floodplain extent based on Federal Emergency Management Agency Q3 Flood Data, Community Panel Numbers 090016 0001-0004, Revised June 16, 1992, FEMA, Washington D.C. and modified to Town of Stratford Engineering Plan 10-foot contour.
5) Adapted from TTNUS Remedial Investigation, 2005.

40 20 0 40 Feet

N

Nobis

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
(978) 683-0891
www.nobisengineering.com

FIGURE 4-18

THIRD AVENUE PROPERTY
FEASABILITY STUDY
RAYMARK SUPERFUND SITE
STRATFORD, CONNECTICUT

Drawn By: D. McGrath	Approved By: H. Ford
Project: 80006	Date: 9/3/09 Rev00

R:\80000 Task Orders\80006 Raymark\Technical Data\GIS_Data\Figures\OU6_FS_Figures\Figure_04-18_Third_Avenue.mxd

TABLES

Table 2-1
Remedial Action Objectives, General Response Actions,
Technology Types, and Process Options
Raymark – OU6 – Additional Properties
Stratford, Connecticut

Environmental Medium	Remedial Action Objective (from site characterization)	General Response Action	Remedial Technology Types (for general response actions)	Process Options
Soil	Protection of Human Health Prevent direct exposure (inhalation, dermal contact, or ingestion) with soil meeting the definition of Raymark waste (Section 2.2.2.1)	No Action	No Action	- not applicable
		Institutional Actions	Institutional Controls	- deed restrictions - local ordinances
			Access Restrictions	- fencing/signage
			Monitoring	- environmental sampling
		Containment	Horizontal Barriers	- impermeable cap - permeable cover
		Excavation	Excavation	- bulk mechanical excavation
		Disposal	Disposal	- out-of-town disposal - in-town consolidation
		Treatment Immobiliz	ation	- solidification/stabilization - microencapsulation
			Thermal Treatment	- incineration - pyrolysis - thermal desorption - supercritical water oxidation - vitrification
			Physical Treatment	- soil flushing - soil washing - liquefied gas solvent extract - soil vapor extraction - electrokinetic separation
Soil		Treatment (continued)	Chemical Treatment	- dehalogenation - chemical oxidation - solvent extraction
			Biological Treatment	- aerobic biodegradation - anaerobic biodegradation - biopiles - bioventing - phytoremediation

Table 2-2
Summary of Estimated Raymark Waste Areas and Volumes by Property Group
Raymark OU6 - Additional Properties
Stratford, Connecticut

Operable Unit	Property Group	Estimated Area of Raymark Waste (SF)	Depth of Raymark Waste (FT)	Total Volume of Raymark Waste (CY)	Seasonal High Groundwater Table Depth (FT bgs)	Volume of Waste Above Water Table (CY)	Volume of Waste Below Water Table (CY)
OU6	Lockwood Ave	80,000	8	23703	2.5	7407	16296
OU6	200 Ferry Boulevard	2,000	5.5	407	5.5	407	0
OU6	Ferry Boulevard Properties (230, 250, 280, 300 Ferry Boulevard)	170,000	16	100741	6	37778	62963
OU6	Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue	40,000	10	14444	6	8667	5777
OU6	326 Ferry Boulevard	2,700	10	1000	5	500	500
OU6	576 and 600 East Broadway	64,000	18	42667	6	14222	28445
OU6	Vacant DOT Lot Abutting I-95 Property	9,000	8	2706	8	2706	0
OU6	Connecticut Right-of-Way Property	4,300	10	1593	10	1593	0
OU6	250, 304 and 340 East Main Street	18,000	10	6667	5	3333	3334
OU6	380 East Main Street	130	5	24	5	24	0
OU6	DPW Lot AOC 1	18,000	8	6222	8	6222	0
OU6	DPW Lot AOC 2 & 251 E. Main St	15,000	7.5	2778	7.5	2778	0
OU6	Beacon Point AOC 1	10,000	6	1267	6	1267	0
OU6	Beacon Point AOC 2	17,000	10[(1)]	1260	5	0	1260
OU6	Beacon Point AOC 3	30,000	10	10000	5	5000	5000
OU6	Airport Property North of Marine Basin Property	46,500	6	10444	4.5	7833	2611
OU6	Wooster Park Property	7,100	6	1578	6	1578	0
OU6	Third Avenue	1700	10	630	6.5	409	221
	TOTAL			**228,131**		**101,724**	**126,407**

Notes:
[(1)] Raymark waste detected at the 8 to 10 feet sample interval, below the water table.
All Raymark waste quantities are subject to change if additional information becomes available.
bgs = Below ground surface
SF = Square feet
CY = Cubic yards
FT = Feet

Table 2-3
Preliminary Screening of Remedial Technologies and Process Options
Raymark – OU6 – Additional Properties
Stratford, Connecticut

General Response Action (GRA)	Remedial Technology	Process Option	Description	Screening Comments
No Action	No Action	Not Applicable	No activities conducted to address soil contamination.	Retained. Used as baseline for comparison with other options as required by National Contingency Plan.
Institutional Actions	Institutional Controls	Deed Restrictions Local Ordinances	Administrative action used to restrict future site activities on individual properties. Restrictions would manage, limit, or prevent activities such as excavation or residential development.	Potentially applicable.
	Access Restrictions	Fencing and Signage	Barrier erected to restrict access to contaminated properties with "No Trespassing" or hazard warning signs posted.	Potentially applicable.
	Monitoring Enviro	nmental Sampling	Periodic monitoring events that include soil sampling to determine whether soils are a continuing source of contamination.	Potentially applicable.
Containment Horizo	ntal Barriers	Impermeable Cap	Asphalt, concrete, geosynthetics, or multimedia materials are used to form an impermeable barrier to prevent direct contact with contaminated material and to minimize leaching of contaminants to groundwater.	Potentially applicable.
		Permeable Cover	Soil, crushed stone, geosynthetics, and vegetative cover used to prevent direct contact with contaminated soil and minimize erosion and surface migration of contaminated soil.	Potentially applicable.
Excavation Ex	cavation	Bulk Mechanical Excavation	Use of common construction equipment to remove contaminated soil. Excavation would be a prerequisite to any other process option that is performed ex-situ.	Potentially applicable.
Disposal Dispos	al	Out-of-Town Disposal	Transportation and disposal of treated or untreated soil to an approved, licensed, out-of-town disposal location. Would be used in conjunction with excavation and/or dredging. Could also be used as an ultimate disposal location after an ex-situ treatment process.	Potentially applicable.
		In-Town Disposal/ Consolidation	Disposal of treated or untreated soil in one or more selected areas within the Town of Stratford.	Potentially applicable.
Treatment	Immobilization	Solidification/ Stabilization	Soil mixing equipment used to mix reagents with contaminated soil to physically and/or chemically decrease the mobility of contaminants. Potential reagents include cement, pozzolanic material, thermoplastics, polymers and asphalt. Treatment may be done in situ or ex situ.	Potentially applicable.
		Micro-encapsulation	Contaminants adsorbed to soil particles are desorbed and then encapsulated by an inert, silica-based solution that will minimize leaching. Treatment would be done ex situ.	Eliminated. Not feasible in cases involving large quantities of contaminated material.

Table 2-3
Preliminary Screening of Remedial Technologies and Process Options
Raymark – OU6 – Additional Properties
Stratford, Connecticut

General Response Action (GRA)	Remedial Technology	Process Option	Description	Screening Comments
Treatment (cont.)	Thermal Treatment	Incineration	Destruction of organic contaminants by subjecting them to high temperatures under controlled conditions in a combustion chamber. Treatment would be done ex situ.	Potentially applicable to treat organic contaminants.
		Pyrolysis	Chemical decomposition of organic contaminants by heating the material in the absence of oxygen. Treatment would be done ex situ.	Potentially applicable to treat organic contaminants.
		Thermal Desorption	Air, heat and mechanical agitation are used to volatilize organic contaminants from soil into a vapor stream. Vapor is usually further treated. Treatment would be done ex situ.	Potentially applicable to treat organic contaminants.
		Supercritical Water Oxidation	Contaminated media is exposed to water in a high temperature, high pressure environment. Under such conditions, organic substances are oxidized. Treatment would be done ex situ.	Potentially applicable to treat organic contaminants.
		Vitrification	Melting of contaminated material to volatilize or pyrolyze organics and entrain inorganics in a stable vitreous residual. Treatment may be done in situ or ex situ.	Eliminated due to technical implementability based on the distribution and orientation of contaminants at the site.
	Physical Treatment	Soil Flushing	Contaminants sorbed to soil are mobilized or dissolved in an aqueous flushing solution in situ. The flushing solution is then extracted from the subsurface and treated. Flushing solution may be augmented by chemicals which increase the mobilization or dissolution of organics and some heavy metals from the soil. Treatment will be done in situ.	Eliminated. Difficult to ensure capture of flushing solution due to shallow water table. Not a reliable method in cases involving multiple types of contaminants.
		Soil Washing	Process reduces the amount of contaminated material by two means. Finer particles, which contain the bulk of contaminants, are separated from more coarse material. Contaminants sorbed to soil are dissolved in an aqueous washing solution. The wash water may be augmented by chemicals which increase the leaching of organics and some heavy metals from the soil. Treatment would be performed ex situ.	Eliminated due to technical implementability issues related to the feasibility of washing the anticipated volume of contaminated soil.
		Liquefied Gas Solvent Extraction	Liquefied gas solvents, such as propane, are used to extract organics from soil. Treatment would be done ex- situ.	Potentially applicable to treat organic contaminants.
		Soil Vapor Extraction	In situ technology in which vacuum blowers and extraction wells are used to strip volatile organic compounds from unsaturated soil. Treatment will be done in situ.	Eliminated. Not effective for treatment of metals, PCBs, or asbestos.

Table 2-3
Preliminary Screening of Remedial Technologies and Process Options
Raymark – OU6 – Additional Properties
Stratford, Connecticut

General Response Action (GRA)	Remedial Technology	Process Option	Description	Screening Comments
Treatment (cont.)		Electrokinetic Separation	A low-intensity direct current is applied to contaminated soil between electrodes, causing ions to move towards the positive or negative electrode. Once contaminants have been separated from soil particles in this manner, they may be either recovered and treated ex-situ or in-situ.	Eliminated. Technical implementability low.
	Chemical Treatment	Dehalogenation	Contaminated soil is screened, processed with a crusher and pug mill, and mixed with reagents. The mixture is heated in a reactor. Dehalogenation occurs through either replacement of the halogen molecules or the decomposition and partial volatilization of contaminants. Treatment would be done ex situ.	Eliminated. Could treat PCBs, but no other site contaminants.
		Chemical Oxidation	Oxidants are injected or mixed into the subsurface where they react with contaminants to form less toxic or harmless end products. Treatment would be performed in situ.	Eliminated. Generally more effective for treatment of aqueous wastes.
		Solvent Extraction	Chemical desorption and dissolution of organic and some inorganic contaminants by washing soil with a solvent solution. Treatment would be done ex situ.	Eliminated due to technical feasibility issues associated with formulating solvents capable of treating multiple contaminants.
	Biological Treatment	Aerobic Biodegradation	Microorganisms degrade organic contaminants to carbon dioxide and water. Oxygen is used as an electron acceptor in the degradation process. Treatment may be done in situ or ex situ.	Eliminated. Inorganic contaminants and PCBs generally not amenable to biological treatment.
		Anaerobic Biodegradation	An electron acceptor other than oxygen is used in the process in which microorganisms degrade organic contaminants. Treatment may be done in situ or ex situ.	Eliminated. Not likely to be effective at treating site wastes.
		Biopiles	Excavated soils are mixed with soil amendments and placed on a treatment area that includes leachate collection systems and some form of aeration. Moisture, heat, nutrient, and oxygen levels are controlled to enhance the biodegradation of contaminants.	Eliminated. Not implementable at this site.
		Bioventing	Oxygen is directly injected into unsaturated subsurface soils via a network of air injection wells at air flow rates adequate to sustain microbial activity. Volatile contaminants are desorbed from soil and biodegraded as vapors move through the biologically active soil.	Eliminated. Not technically feasible due to the need for installation of pipe networks to inject air into vadose zone.

Table 2-3
Preliminary Screening of Remedial Technologies and Process Options
Raymark – OU6 – Additional Properties
Stratford, Connecticut

General Response Action (GRA)	Remedial Technology	Process Option	Description	Screening Comments
Treatment (cont.)	Biological Treatment (cont.)	Phytoremediation	Plants are used to naturally remediate contaminants via three mechanisms: direct uptake and accumulation of contaminants in plant tissue, release of enzymes that stimulate microbial activity and biochemical transformation, and enhancement of mineralization in plants' roots. Treatment would be done in situ.	Eliminated. Effectiveness limited to soil within the reach of plant root systems. Plants would require harvesting, proper disposal, and replanting. Not effective for certain site contaminants. Reliable cost information not available.

Notes:

1. General response actions, remedial technologies, and process options for soil were adapted from Table 2-1.
2. Process options were retained or eliminated based on an evaluation of their technical implementability given the contaminant types and concentrations in soil, and other relevant site characteristics such as the location and distribution of contaminated soil throughout Stratford.

Eliminated process option (see screening comment)

Table 2-4
Preliminary Screening of Technologies and Process Option for Soils
Raymark – OU6 – Additional Properties
Stratford, Connecticut

General Response Action (GRA)	Technology	Process Option	Effectiveness[1]	Implementability[2]	Cost[3]	Conclusion
No Action	No Action	Not Applicable	Would not achieve remedial action objective.	No permits required; no treatment, storage, or disposal involved; no equipment or services required.	Capital: None O&M: None	Retain
Institutional Actions	Institutional Controls	Deed Restrictions Local Ordinances	Would not achieve remedial action objective without other actions. No human health or environmental impacts from implementation. Reliable to the extent that restrictions can be enforced.	Deed restrictions and local ordinances would require legal and/or political actions from others. No treatment, storage, or disposal involved. Services readily available to implement institutional controls.	Capital: Low O&M: Low	Retain
	Access Restrictions	Fencing/ Signage	Would not achieve remedial action objective without other actions. No human health or environmental impacts from implementation. Reliable to the extent that barriers are maintained and warnings are heeded.	No treatment, storage, or disposal involved. Conventional construction, readily available skilled labor and services from several sources.	Capital: Medium O&M: Low	Retain
	Monitoring	Environmental Sampling	Would not achieve remedial action objective without other actions. Very low potential for impacts to human health and environment during implementation. Reliable process for the evaluation of contaminant migration trends and to monitor the progress of remediation.	No permits required for implementation. No treatment, storage, or disposal involved. Labor and services readily available from several sources.	Capital: None O&M: Medium	Retain
Containment	Horizontal Barriers	Low Permeable Cap	Would achieve remedial action objective by preventing direct contact with contaminated soils. No adverse impacts during construction or implementation beyond those typical of any earth-moving construction activity. Reliable technology when implemented with an adequate O&M plan.	ARARs may restrict construction in wetland/floodplain areas and/or require compensation and mitigation. No treatment, storage, or disposal involved. Materials, labor, and services for implementation readily available from several sources.	Capital: Medium O&M: Medium	Retain
		Permeable Cover	Would achieve remedial action objective by preventing direct contact with contaminated soils. May not comply with CT RSR requirements for pollutant mobility. No adverse impacts during construction or implementation beyond those typical of any earth-moving construction activity. Reliable technology when implemented with an adequate O&M plan.	ARARs may restrict construction in wetland/floodplain areas and/or require compensation and mitigation. No treatment, storage, or disposal involved. Materials, labor, and services for implementation readily available from several sources.	Capital: Low O&M: Medium	Retain

Table 2-4
Preliminary Screening of Technologies and Process Option for Soils
Raymark – OU6 – Additional Properties
Stratford, Connecticut

General Response Action (GRA)	Technology	Process Option	Effectiveness[1]	Implementability[2]	Cost[3]	Conclusion
Excavation	Excavation	Bulk Mechanical Excavation	Would achieve remedial action objective by removing all soil with concentrations exceeding remedial goals. No adverse impacts during implementation beyond those typical of any earth-moving construction activity. Decontamination and health and safety (H&S) measures could be taken to prevent the spread of contamination during excavation. Very reliable process for the removal contaminated soil.	ARARs may restrict construction in wetland/floodplain areas and/or require compensation and mitigation. Adequate on-site capacity available for temporary storage of excavated material. Location to be determined. No treatment or disposal involved. Conventional construction process that is easily implemented with equipment and services that are readily available from several sources. Excavation in soil located below the water table could present technical implementability issues.	Capital: Low O&M: None <u>Note</u>: Includes cost of excavating only. Transport, treatment, or disposal of soil not included.	Retain
Disposal	Disposal	Out-of-Town Disposal	Feasible for anticipated volume of contaminated soil. Remedial action objective would be achieved since all contamination would be removed from site. Potential impacts to human health and the environment from excavation of contaminated soil and transportation to the disposal facility could be mitigated using proper decontamination procedures, H&S procedures, and engineering controls. Proven and reliable for site contaminants.	Permits for off-site landfill disposal could easily be obtained. Off-site disposal capacity for the anticipated volume of contaminated soil would be available, although out-of-town disposal of the entire volume of Raymark waste (>100,000 CY) would be problematic. Easily implementable.	Capital: High O&M: Low	Retain
		In-Town Consolidation	In-town consolidation would be limited by the capacity that is available at each of the prospective consolidation properties. Remedial action objective would be achieved for any soil that is consolidated and isolated beneath an impermeable cap. Potential impacts to human health and the environment from excavation of contaminated soil and transportation to consolidation areas could be mitigated using proper decontamination procedures, H&S procedures, and engineering controls. Proven and reliable for site contaminants. Would be implemented with an impermeable cap to eliminate direct contact risks by isolating wastes from human and environmental contact.	Disposal capacity for the anticipated volume of contaminated soil would be available. Materials and services required to implement technology readily available.	Capital: Low O&M: High	Retain

Table 2-4
Preliminary Screening of Technologies and Process Option for Soils
Raymark – OU6 – Additional Properties
Stratford, Connecticut

General Response Action (GRA)	Technology	Process Option	Effectiveness[1]	Implementability[2]	Cost[3]	Conclusion
Treatment	Immobilization	Solidification/ Stabilization	Could not achieve remedial action objective for the volume of contaminated soil present at the site without another treatment process (not effective for treating soil contaminated with organic contaminants). Potential impacts to human health and the environment from the implementation of S/S process could be mitigated using proper decontamination procedures, H&S procedures, and engineering controls. S/S would be implemented at an off-site location. Very reliable process for the treatment of soil contaminated with inorganic contaminants.	Permits or approvals required to implement off-site S/S should be obtainable. Implementability limitations associated with S/S of entire volume of Raymark waste. S/S of partial volume of Raymark waste would be implementable. Equipment and skilled labor required for treatment readily available from several vendors.	Capital: Medium O&M: None	Eliminate
	Thermal Treatment	Incineration	Could not achieve remedial action objective for the volume of contaminated soil present at the site without another treatment process (not effective for treating soil contaminated with inorganic contaminants). Potential impacts to human health and the environment from incineration would be minimal, and could be mitigated using air pollution controls, decontamination procedures, and H&S procedures. Incineration would be performed at an off-site location. Very reliable process for the treatment of soil contaminated with organic contaminants.	Permits or approvals required to incinerate site soils off site should be obtainable. Implementability limitations associated with incineration of entire volume of Raymark waste. Incineration of partial volume of Raymark waste would be implementable. Equipment/ facilities required for treatment are available. Distance to incineration facility greater than 500 miles from site.	Capital: High O&M: None	Eliminate
		Pyrolysis	Could not achieve remedial action objective for the volume of contaminated soil present at the site without another treatment process (not effective for treating soil contaminated with inorganic contaminants). Potential impacts to human health and the environment from pyrolysis would be minimal, and could be mitigated using air pollution controls, decontamination procedures, and H&S procedures. Treatment would be performed at an off-site location. Somewhat reliable for the treatment of soil contaminated with organic contaminants. Not as established as other thermal treatment technologies such as incineration or thermal desorption.	Permits or approvals required to treat soils off site should be obtainable. Implementability limitations associated with treatment of entire volume of Raymark waste. Treatment of partial volume of Raymark waste would be implementable. Availability of equipment/facilities required for treatment would be limited.	Capital: High O&M: None	Eliminate

Table 2-4
Preliminary Screening of Technologies and Process Option for Soils
Raymark – OU6 – Additional Properties
Stratford, Connecticut

General Response Action (GRA)	Technology	Process Option	Effectiveness[1]	Implementability[2]	Cost[3]	Conclusion
Treatment (cont.)	Thermal Treatment (cont.)	Thermal Desorption	Could not achieve remedial action objective for the volume of contaminated soil present at the site without another treatment process (not effective for treating soil contaminated with inorganic contaminants). Potential impacts to human health and the environment from thermal desorption would be minimal, and could be mitigated using air pollution controls, decontamination procedures, and H&S procedures. Treatment would be performed at an off-site location. Very reliable process for the treatment of soil contaminated with organic contaminants.	Permits or approvals required to treat site soils off site should be obtainable. Implementability limitations associated with treatment of entire volume of Raymark waste. Treatment of partial volume of Raymark waste would be implementable. Equipment/facilities required for treatment are available. Distance to treatment facility greater than 500 miles from site.	Capital: High O&M: None	Eliminate
		Supercritical Water Oxidation	Could not achieve remedial action objective for the volume of contaminated soil present at the site without another treatment process (not effective for treating soil contaminated with inorganic contaminants). Potential impacts to human health and the environment from treatment would be minimal, and could be mitigated using air pollution controls, decontamination procedures, and H&S procedures. Treatment would be performed at an off-site location. Technology still emerging. Not yet proven to be reliable for treatment at full scale.	Permits or approvals required to treat site soils off site should be obtainable. Would not be implementable for entire volume of Raymark waste. Equipment/ facilities required for treatment are limited.	Capital: High O&M: None	Eliminate
		Liquefied Gas Solvent Extraction	Could not achieve remedial action objective for the volume of contaminated soil present at the site without another treatment process (not effective for treating soil contaminated with inorganic contaminants). Potential impacts to human health and the environment from treatment would be minimal, and could be mitigated using proper decontamination and H&S procedures. Treatment would be performed at an off-site location. Technology still emerging. Not yet proven to be reliable for treatment at full scale.	Permits or approvals required to treat site soils off site should be obtainable. Would not be implementable for entire volume of Raymark waste. Equipment/facilities required for treatment are limited.	Capital: High O&M: None	Eliminate

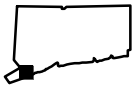
Notes:

1. Effectiveness is evaluated relative to other processes within the same technology type using the following criteria:
   A. Potential effectiveness of process option in handling the estimated volume of contaminated soil and meeting the preliminary remediation goals.
   B. Potential impacts to human health and the environment during the construction and implementation phase.
   C. Reliability of the process with respect to the contaminants and conditions at the site.

Table 2-4
Preliminary Screening of Technologies and Process Option for Soils
Raymark – OU6 – Additional Properties
Stratford, Connecticut

2. Implementability is evaluated relative to other processes within the same technology type using the following criteria:
   A. Ability to obtain necessary permits for off-site actions.
   B. Availability of treatment, storage, and disposal services (including capacity).
   C. Availability of necessary equipment and skilled workers to implement the technology.
   D. Potential technical implementability concerns.
3. Cost plays a limited role in the screening of process options. Relative capital and operations and maintenance (O&M) costs are used at this stage rather than detailed cost estimates. Cost analysis is made on the basis of engineering judgment, and each process is evaluated as to whether costs are high, medium, or low relative to other process options in the same technology type.

FIGURES



Quadrangle Location

USGS TOPOGRAPHIC MAP

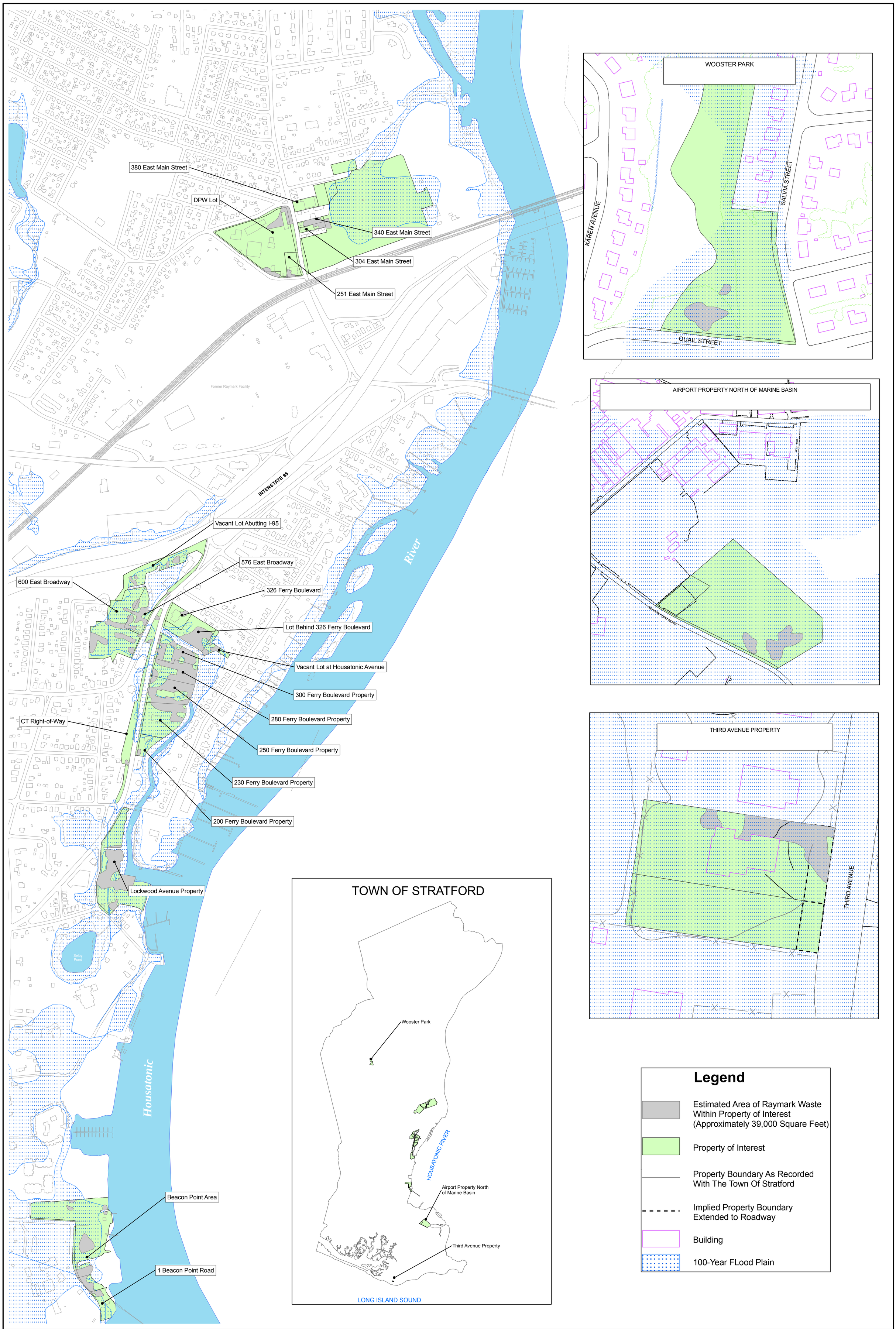
BRIDGEPORT, CONNECTICUT 1970; (Photo-revised 1984) &
MILFORD, CONNECTICUT 1960; (Photo-revised 1984).

APPROXIMATE SCALE
1" = 4,000 FEET

Image obtained from UCONN MAGIC GIS System

FIGURE 1-1	RAYMARK INDUSTRIES OPERABLE UNIT 6 STRATFORD, CONNECTICUT SITE LOCUS PLAN	Nobis Nobis Engineering, Inc. 585 Middlesex Street Lowell, MA 01851 (978) 683-0891 www.nobisengineering.com	DATE: 09/03/09 REV. 0 PROJECT NO. 80006 PREPARED BY: D. McGRATH CHECKED BY: H. FORD	N

R:\80000 Task Orders\80006 Raymark\Technical Data\GIS_Data\Figures\OU6_FS_Figures\Figure_01-01_Site_Locus.mxd



N

Drawn By: CR	Checked By:
Filename: Completed Sample Loc.mxd	
Date: 04/28/09	Revision No. 00

APPROXIMATE SCALE
0 400 800
Feet

Notes:
1) Plan not to be used for design.
2) All locations to be considered approximate.
3) Property boundaries are approximate based on Town of Stratford Engineering Department plans.
4) Floodplain extent based on Federal Emergency Management Agency Q3 Flood Data, Community Panel Numbers 090016 0001-0004, Revised June 16, 1992, FEMA, Washington D.C. and modified to Town of Stratford Engineering Plan 10-foot contour.
5) Adapted from TTNUS Remedial Investigation, 2005.

FIGURE 1-2

LOCATION OF PROPERTIES
FEASABILITY STUDY
RAYMARK OU-6
STRATFORD, CONNECTICUT

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
tel (978) 683-0891
fax (978) 683-0966
www.nobisengineering.com

REFERENCES

REFERENCES

Brown & Root Environmental (B&RE) 1998. Wetlands Evaluation, Raymark – Ferry Creek – OU3, Stratford, Connecticut. Draft Technical Memorandum. June.

Connecticut Department of Environmental Protection (CT DEP), 1996. Remediation Standard Regulations. Sections 22a-133k-1 through 22a-133k-3 of Regulations of Connecticut State Agencies. Bureau of Water Management, Permitting, Enforcement and Remediation Division, Hartford, Connecticut. January.

Environmental Laboratories, Inc. (ELI), 1995. Final RCRA Facility Investigation Report, Raymark Industries, Inc. February 10.

Federal Emergency Management Agency (FEMA), 1992. "Flood Insurance Rate Map, Town of Stratford, Connecticut, Fairfield County; Community Panel Nos. 090016 0001-0004". June 16.

Flint, Richard Foster (Flint), 1968. The Surficial Geology of the Ansonia and Milford Quadrangles, State Geological and Natural History Survey of Connecticut, Quadrangle Report No. 23.

Halliburton NUS Corporation (HNUS), 1994. Final Treatability Study Report for Thermal Treatment. October.

Halliburton NUS Corporation (HNUS), 1995a. Final Remedial Investigation Report, Remedial Investigation/Feasibility Study, Raymark Industries, Inc. Facility, Stratford, Connecticut. April.

Halliburton NUS Corporation (HNUS), 1995b. Final Feasibility Study Report, Remedial Investigation/Feasibility Study, Raymark Industries, Inc. Facility. Stratford, Connecticut. April.

Maguire, 2003. Strategic Redevelopment Initiative Pilot Project: Stratford, CT, prepared by Maguire Group, Inc: HRP Associates, Inc. and Rafferty Specialty Finance Co. Inc., June 2003.

National Oceanic and Atmospheric Administration (NOAA), 2002. "Local Climatological Data for Bridgeport, Connecticut."

Tetra Tech NUS (TtNUS), 1999a. Final Remedial Investigation, Raymark OU4 – Ballfield. August.

Tetra Tech NUS (TtNUS), 1999b. Final Area I Remedial Investigation, Raymark – Ferry Creek OU3. October.

Tetra Tech NUS (TtNUS), 2000a. Draft Final Area II Remedial Investigation, Raymark – Ferry Creek OU3. November.

Tetra Tech NUS (TtNUS), 2000b. Draft Final Area III Remedial Investigation, Raymark – Ferry Creek OU3. November.

Tetra Tech NUS (TtNUS), 2000c. Draft Final Remedial Investigation, Raymark – OU2 – Groundwater. November.

Tetra Tech NUS (TtNUS), 2005. Final Remedial Investigation, Raymark – OU6 – Additional Properties. June.

United States Army Corps of Engineers (USACE), 1998 (pg. 3-1). Hydrologic and Hydraulic Analysis, Remedial Investigation and Feasibility Study, Raymark-Ferry Creek-Operable Unit No. 3, Stratford, Connecticut. March.

United States Environmental Protection Agency (EPA), 1988. "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA". EPA/540/G-89/004. October.

United States Environmental Protection Agency (EPA), Region I, 1989a. Draft Final Supplemental Risk Assessment Guidance for the Superfund Program. EPA/901/5-89/001. Boston, Massachusetts. June.

United States Environmental Protection Agency (EPA), 1989b. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part A) - Interim Final. EPA/540/1-89/002. Office of Emergency and Remedial Response. December.

United States Environmental Protection Agency (EPA), 1990. National Emission Standard for Hazardous Air Pollutants for Asbestos. In Federal Register: 40 CFR Part 61, Appendix A to Subpart M. November.

United States Environmental Protection Agency (EPA), 1990b. Remedial Actions for Superfund Sites with PCB Contamination. Office of Solid Waste and Emergency Response, Washington, D.C. August.

United States Environmental Protection Agency (EPA), 1991a. Risk Assessment Guidance for Superfund - Volume I: Human Health Evaluation Manual - Supplemental Guidance - "Standard Default Exposure Factors" - Interim Final. OSWER Directive 9285.6-03. Office of Emergency and Remedial Response. March 25.

United States Environmental Protection Agency (EPA), 1991b, Risk Assessment Guidance for Superfund – Volume I: Human Health Evaluation Manual (Part B) Interim Guidance Office of Emergency and Remedial Response Publication 9285.7-01B. December.

United States Environmental Protection Agency (EPA), 1992. Soil Screening Level Guidance and Revised Interim Soil Lead Guidance.

United States Environmental Protection Agency (EPA), 1994. Revised Interim Guidance on Establishing Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities. OSWER Directive 9355.4-12. July 14.

United States Environmental Protection Agency (EPA), 2001. Revised Alternative Cap Design Guidance Proposed for Unlined, Hazardous Waste Landfills in the EPA Region I. (Gagne and Choi).

United States Environmental Prot ection Agency (EPA), 2 004. Clarifying cleanup goals and Identifications of New Assessment Tools for Evaluating Asbestos at Superfund Cleanups,. OSWER 9345.4-05. August.

APPENDIX A

FOCUSED FEASIBILITY STUDIES FOR OU3 FERRY CREEK ELBOW, OU4 RAYBESTOS MEMORIAL BALLFIELD, AND OU9 STRATFORD LANDFILL AND SHORT BEACH PARK

APPENDIX A-1

FOCUSED FEASIBILITY STUDY

FOR

PARTIAL OPERABLE UNIT 3

APPENDIX A-1

A-1-1.0 INTRODUCTION

This report presents the Focused Feasibility Study (FFS) for operable unit (OU) 3 – Area I, (OU3 Study Area, Figure A-1-1) at the Raymark Industries, Inc. (Raymark) Superfund Site (the Site) located in Stratford, Connecticut. This FFS Report was prepared by Nobis Engineering, Inc. (Nobis) for the United States Environmental Protection Agency (EPA) under Task Order No. 0006-RICO-01H3, Contract No. EP-S1-06-03. This document presents a range of remedial options that address risks to human health that were identified during the Remedial Investigation (RI) Report for the OU3 Study Area (Area I are shown in TtNUS, 1999).

This FFS was prepared consistent with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986; the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) 40 CFR 300; and the *Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (EPA, 1988) (RI/FS Guidance Document).

This FFS Report only addresses source control (soil and sediment) for a portion of the OU3 Study Area. The key features of the OU3 are depicted in Figure 1-1 (site locus) and Figure 1-2 (study area) of the *OU3 Remedial Investigation Report* (TtNUS, October, 1999).

The NCP, under 40 CFR 300.5, defines a source control action as "….The construction or installation and start-up of those actions necessary to prevent the continued release of hazardous substances or pollutants or contaminants (primarily from a source on top of or within the ground, or in building or other structures) into the environment." The remedial options developed in this FFS will be used by EPA to develop and formulate a preferred source control remedy for a portion of the OU3 Study Area soils and sediments. This FFS will address the potential remedial options for only the Raymark waste currently located at a portion of the OU3 Study Area.

Contaminated groundwater associated with the Raymark Site constitutes the Raymark – OU2-Groundwater Operable Unit, which was evaluated under the Remedial Investigation Report (TtNUS, 2005).

APPENDIX A-1

A-1-1.1 Objective of the FFS

The overall objective of this FFS is to develop and evaluate source control remedial alternatives that address contaminated soil and sediment (Raymark waste) at the OU3 Study Area.

A-1-1.2 Background for the FFS

The general process for the preparation of a FS (or FFS) is described in detail in Section 1.2 and Section 2 of Volume 1. Section 1.3 of Volume 1 describes the history of the former Raymark Facility.

This FFS addresses the Ferry Creek portion of the OU3 Study Area that extends from I-95 southward to Broad Street, the wetlands adjacent to Ferry Creek near Housatonic Avenue, and two OU6 parcels (Lot Behind 326 Ferry Boulevard and the Vacant Lot at Housatonic Avenue) that received Raymark waste as fill material. The OU3 Study Area is one of the locations that received Raymark waste as fill material, resulting in chemical contamination (TtNUS, 1999). In Appendix A, Figure A-1-1 depicts the OU3 areas of interest for the FFS. This Study Area was affected by waste from the former Raymark Facility and is further described in Volume I within Section 1.3.

Brief descriptions of the major classes of chemical contaminants detected in the soils of the former Raymark Facility and the common industrial uses of these chemicals are presented in Sections 1.5.2.1 to 1.5.2.7 of Volume 1. Section 1.5.2.8 of Volume 1 provides a reference for the specific chemicals known to have been stored, handled, and/or used at the former Raymark Facility during its operation that may have contributed to contamination of the OU3 Study Area. This background information provides a reference framework for the chemicals identified in the soil and sediments at the OU3 Study Area.

A-1-1.3 Physical Characteristics of the OU3 Study Area

This section describes the physical characteristics of the OU3 Study Area and the region in which the OU3 Study Area is situated. The OU3 Study Area topography and surface geology and fill materials are presented in the OU3 – Area I, RI (TtNUS, 1999). Throughout this report, all elevations are stated in feet with respect to the National Geodetic Vertical Datum (NGVD), 1929.

For the purposes of this FFS, the OU3 Study Area includes Ferry Creek from I-95 southward to Broad Street, the wetlands situated due east of the creek, and the two OU6 properties (Lot Behind 326 Ferry Boulevard and the Vacant Lot behind Housatonic Avenue) along the northeastern end of Ferry Creek in this area (OU6 property; see Section 4.3.4 of Volume 1). The OU3 Study Area is located south of and hydraulically downgradient of the Raymark Facility.

The OU3 Study Area is bounded by: 576 and 600 East Broadway (OU6 property; see Section 4.3.6 of Volume 1) and Ferry Boulevard Properties to the west; commercial and residential properties along Housatonic Avenue to the east; residential properties along Willow Avenue to the north; and Broad Street to the south. The non-functioning flood control barrier/hydraulic sluice gate system is located to the south west of where Ferry Creek and Broad Street intersect.

The wetlands vegetation is dominated by common reed along the upland creek band and wetland area. The upland bank along Ferry Creek has a narrow tree line with a dense understory of shrubs and vines. A small grassland is along present at the north end on the two OU6 properties.

Ferry Creek is located west of and parallel to the Housatonic River. It flows south from the I-95 overpass through the Morgan Francis Property, under East Broadway Street and Ferry Boulevard, through the Lot behind 326 Ferry Boulevard and the Vacant Lot behind Housatonic Avenue, to the non-functioning flood control barrier at Broad Street and discharges to the Housatonic River. The OU3 Study Area also includes “other ecological areas impacted by Raymark Facility areas,” which are defined by the delineated wetland boundaries along Ferry Creek.

A-1-1.4 Nature and Extent of Contamination

This section presents a general summary of the nature and extent of contamination encountered at the OU3 Study Area. A description of the nature and extent of contamination is presented in Section 4.0 of the OU3 – Area I – RI (TtNUS, 1999). Contamination occurred as the result of transport and deposition of Raymark waste materials through discharge of contaminated wastewater and storm water into Ferry Creek, erosion and surface water runoff from contaminated properties, and direct deposition of manufacturing wastes in the OU6 properties and nearby residential properties. Sections 4.3.4 and 4.3.6 of Volume 1 presents the nature and extent of

contamination on the abutting OU6 properties. The irregular nature of the Raymark waste disposal practices is depicted on Figure A-1-1. The estimated volume is shown on Table A-1-1.

The Raymark waste in the OU3 Study Area is composed primarily of materials brought from the former Raymark facility and appears to be present throughout most of the Study Area. Investigations of the Raymark waste have identified numerous contaminants including: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, PCBs, metals, and asbestos. Based on the Raymark waste definition presented in Section 2.2.2.1 of Volume 1, EPA, in consultation with the CTDEP, calculated the area of Raymark waste at OU3.

Contaminant presence within the Raymark waste and throughout the OU3 Study Area is heterogeneous. Raymark waste has been identified throughout the Study Area, both vertically and horizontally. As presented in the OU3 – Area I – RI, (Section 4.0, TtNUS, 1999), contamination is present in the soils, surface water and sediment. Surface water is not directly evaluated in this FFS, but will be affected by any proposed cleanup alternative.

A-1-1.5 Contaminant Fate and Transport

A description of the fate and transport of contamination is presented in Section 5.0 of the OU3 Area I RI (TtNUS, 1999). Within the OU3 Study Area, past direct disposal of contaminated waste materials as fill throughout a large portion of the OU3 Study Area has resulted in the release of contaminants to the soil and sediment. Based on samples collected from this and other Raymark Operable Units, there is a potential for leaching of metals to occur, however groundwater data collected to date has not found this to be occurring at significant levels.

Contaminants are present in the OU3 Study Area in sediment, surface water, groundwater and soils. Inorganic and organic contaminants from the Raymark Facility lagoon were directly discharged into the northern reaches of Ferry Creek. The wastes and contaminants were then transported downstream and were apparent sources of sediment contamination throughout Ferry Creek, until flow was diverted around the lagoon in 1995. Based on historical information, it is assumed that Ferry Creek was rerouted into its present path prior to 1995.

The disposal of Raymark wastes as fill on the properties adjacent to Ferry Creek, and the possible filling of portions of the creek itself with wastes contributed to the contamination of

Ferry Creek sediments, as well as the adjacent wetlands, and to the ditch extending westward from Ferry Creek between 230 and 250 Ferry Boulevard. Elevated levels of PAHs, PCBs, dioxins/furans, metals, and asbestos have been detected in sediment samples collected from OU3. There were also infrequent detections of VOCs.

The evaluation of contaminant fate and transport in the RI were based on existing conditions, identification of chemicals present in the environmental media, the physical state of soil, sediment and surface water contaminants, general fate and transport mechanisms, and the interpretation of geologic and hydrogeologic conditions within the OU3 Study Area (TtNUS, 1999). Contaminant transport is generally attributed to the erosion of Raymark waste, which allows contaminants to migrate to surface water, sediment, and air. Leaching of chemicals from the waste materials could potentially allow migration via groundwater.

A-1-1.6 Summary of OU3 Baseline Risk Assessment

The risk assessment contained in Section 6.0 of the OU3 RI (TtNUS, 1999) focused on current and potential future human health risks for various potential exposures (i.e., residential, frequent user, and commercial worker). A summary of potential risks is presented in Table A-1-1. Contaminants that pose potential human health risks include: polynuclear aromatic hydrocarbons (PAHs), PCBs, metals (arsenic, barium, zinc, lead), and asbestos. Carcinogenic and non-carcinogenic risks may occur from potential exposure to contaminated soil, sediment, and surface water in OU3.

An ecological evaluation was also conducted and is presented in Section 7 of the OU3 RI (TtNUS, 1999). Various compounds and metals pose threats to various biological receptors through elevated tissue concentrations of contaminants, sediment toxicity, and observed degradation of the benthic communities. These effects are summarized in Table A-1-1. The continuing presence of these contaminants poses potential threats to the quality of surface water and sediments, and to the food chain.

A-1-2.0 IDENTIFICATION AND SCREENING OF TECHNOLOGIES

Section 2.0 of Volume 1 discussed the identification and screening of technologies developed for an FS, and also defines the applicable, relevant, and appropriate requirements (ARARs) for

an action by defining the chemical-specific, location-specific and action-specific requirements for each alternative.

A-1-2.1 Development of Remedial Action Objectives (RAOs)

As presented in Section 2.2 of Volume 1, the process for developing a media-specific RAO to protect human health and the environment includes the three major components of the RAO development process: identifying contaminants of concern (COC), determining preliminary remediation goals (PRGs), and formulating the RAO statement. The medium of concern for this FFS is soil based on the definition of Raymark waste (see Section 2.2.2.1 of Volume 1). As such, two RAOs were developed for OU3 based on the results of the RI, the site-specific baseline human health risk assessment, historical information on the constituents present in waste at the former Raymark Facility, and ARARs. The RAO for protection of human health is to prevent direct exposure (inhalation, dermal contact, or ingestion) to soil and sediment meeting the definition of Raymark waste. The second RAO is for the protection of the environment, which is to prevent the continuing erosion and migration of contaminated sediment/materials into and within Ferry Creek. Achieving the RAOs will protect human health and the environment from potential exposure to Raymark waste constituents and the other co-located contaminants.

A-1-2.2 Development of General Response Actions

As discussed in Section 2.3 of Volume 1, general response actions are media-specific measures that may be taken to satisfy the RAOs established for a Site. General response actions may include treatment, containment, removal, disposal, and institutional actions, or a combination of these measures. Several general response actions were identified to provide a wide range of possible options for satisfying the RAO stated above. The potential general response actions identified are: no action, institutional actions, containment, excavation, treatment, and disposal. Table A-1-2 presents a summary of the RAOs and general response actions identified for soil in this FFS, along with an initial identification of the general remedial technology types and process options that correspond to each general response action.

A-1-2.3 Identification and Preliminary Screening of Technologies and Process Options

The preliminary screening and the detailed evaluations of technologies and process options for remediation of contaminated soil and sediment (Raymark waste) at OU3 is presented in this section. The screening of technologies and process options are documented on Tables A-1-3 and A-1-4, respectively. Potential remedial technologies and process options were identified and screened according to their overall applicability (technical implementability) to Raymark waste, the contaminants of concern (lead, asbestos, PCBs, and copper), and the site-specific conditions present at OU3 (i.e., complex mixture of contaminants, large volume of contaminated material, stream channel with multiple inlets, presence of wetlands). The purpose of this screening effort is to investigate available technologies and process options and to eliminate those (obviously) not applicable, based on the established RAO and general response actions provided in Section A-1-2.1. Technology identification considered the demonstrated performance of each technology given the site conditions and contaminants of concern.

Table A-1-3 screens the technologies and process options that may be used to address soil/sediment contamination, grouped by general response action. A brief description of the process option is provided and a determination is made to either retain or eliminate it based on the evaluation of its technical implementability. A brief description of the rationale that was used to eliminate technologies is also provided. The remedial technologies that are retained from this screening are further evaluated as described in Table A-1-4.

A-1-2.4 Evaluation and Selection of Technologies and Process Options

As discussed in Section 2.5.2 of Volume 1, a detailed evaluation of technologies and process options that were retained in the preliminary screening step is conducted to further focus the alternatives development process. In this step, process options are evaluated with respect to other processes in the same technology category. One representative process option is selected, if possible, for each technology type, to simplify the subsequent development and evaluation of alternatives without limiting flexibility during remedy selection or remedial design.

The evaluation of technologies and process options utilizes three criteria: effectiveness, implementability, and relative cost. The RI/FS Guidance Document suggests that this evaluation focus on the effectiveness criterion, with less emphasis directed at the implementability and

relative cost criteria. The evaluation also considers the volume of Raymark waste that will require treatment and the contaminant types and concentrations that are anticipated. The evaluation of technologies and process options is presented on Table A-1-4.

As the result of the preliminary screening, the following process options were retained:

General Response Action	Technology	Process Option
No Action	No Action	No Action
Institutional Actions	Institutional Controls	Deed Restrictions – Local Ordinances
	Access Restrictions	Fencing and Signage
	Monitoring	Environmental Sampling
Containment	Horizontal Barriers	Low permeability cap
		Permeable cover
Excavation	Excavation	Bulk Mechanical Excavation
		Hydraulic excavation
Disposal	Disposal	Out-of-Town Disposal
		On-Site Consolidation

A-1-3.0 DEVELOPMENT AND SCREENING OF ALTERNATIVES

The technologies and process options that were retained were then used to assemble potential remedial alternatives. Institutional actions will be a part of every potential alternative, either as a measure that complements another technology to help maintain the effectiveness of the alternative (institutional controls, access restrictions) or as a measure to ensure that the alternative continues to protect human health in the long term (environmental sampling). The primary components of potential remedial alternatives will include some combination of the containment, removal, disposal and treatment technologies.

As discussed in Section 3.0 of Volume 1, these process options are combined to assemble remedial alternatives that address the RAOs.

A-1-3.1 Development of Alternatives

Using the retained general response actions, technology types and process options, five alternatives were assembled to address the RAOs. Consistent with the NCP, alternatives

assembled that represent a range of actions to encompass: no action, limited action, and containment, and excavation with out-of-town disposal. Treatment was eliminated from consideration due to the volume of wet sediment to be addressed and multi-stage treatment process that would be required. Table A-1-5 presents the matrix depicting the assemblage of process options for each alternative.

A-1-3.2 Remedial Alternative Descriptions

The technologies and process options that were retained from the detailed evaluations were assembled into four alternatives. A detailed summary of each alternative is presented in Table A-1-6. The remedial alternatives are screened for effectiveness, implementability, and cost, as presented in Table A-1-7. After screening, the following alternatives were retained:

- Alternative OU3-1: No Action (baseline);
- Alternative OU3-2: Limited Action;
- Alternative OU3-3: Excavation, Capping, and Institutional Controls (all excavated materials remain in OU3); and
- Alternative OU3-4: Excavation, Capping, and Institutional Controls (a portion of excavated materials will be sent out-of-town; the finished grade in the wetland will remain the same to avoid need for flood storage mitigation).

Alternative OU3-3 represents the containment of the existing OU3 Raymark waste. Contaminated sediment from the Ferry Creek channel (extending from I-95 south to Broad Street) would be dredged (to a 2 foot depth) to facilitate channel construction, dewatered, and graded within the area encompassed by the wetland area and the two OU6 properties (Lot behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue). A low-permeability cover system would be constructed to isolate the contaminated materials. A reinforced concrete culvert would be installed in the Ferry Creek channel to cover the remaining contaminated streambed materials. Raymark waste in the stream banks would be also be graded and covered by an engineered barrier. Loss of the existing wetlands (assume 150,000 SF) will need to compensated for through mitigation. The loss of the flood plain storage capacity will also need

to be mitigated; however, a detailed hydrologic analysis will need to be performed to determine the potential loss, considering the floodplain is in a tidal zone.

Alternative OU3-4 is also a containment option, similar to OU3-3. However, completion of this alternative would require additional excavation prior to cap construction to maintain final grade elevations that are consistent with pre-existing ground surface elevations. This alternative contemplates excavation/dredging of contaminated sediment from the Ferry Creek channel (extending from I-95 south to Broad Street) to a depth of 2 feet followed by dewatering and transport out-of-Town for disposal. Contaminated sediment in the wetlands and two OU6 properties (Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue) would be excavated to a depth of 3 feet and transported out-of-town for disposal. A low-permeability cover system would be constructed to isolate the contaminated material remaining in-place in the wetlands and two OU6 properties. A reinforced concrete culvert would be installed in the Ferry Creek channel to cover the remaining contaminated streambed materials. Raymark waste in the stream banks would be also be graded and covered by an engineered barrier. Loss of the existing wetlands (assume 150,000 SF) will need to compensated for through mitigation. The loss of the flood plain storage capacity would be limited as final grades will be established to mimic pre-existing elevations, however, a detailed hydrologic analysis will need to be performed to determine the potential loss, considering the floodplain is in a tidal zone, and any lost storage capacity will need to be mitigated.

Detailed assessments of the retained alternatives with the evaluation criteria specified in the NCP are summarized in Table A-1-8. The estimated present worth costs, capital costs, and operations and maintenance costs are presented in Tables A-1-9a through A-1-9f.

TABLE A-1-1
IDENTIFICATION OF COCS AND WASTE VOLUMES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU3 – FERRY CREEK
STRATFORD, CONNECTICUT

SELECTION OF COCs – HUMAN HEALTH RISKS				
Receptor	**Human Health Risks**	**Numerical Risk[1]**	**Primary Chemical Risk Drivers**	**Contaminants of Concern (> 1 E-06 or HI > 0.1)**
Child-Frequent User (Area A1, A-3; Residential Properties along Housatonic Avenue)	▪ RME Carcinogenic risk - soil/sediment	▪ Ingestion/Dermal Contact = **8.2 E-05**	▪ TEQ Dioxin = 3.9 E-05 ▪ Aroclors, total = 2.3 E-05 ▪ Benzo(a)pyrene = 1.0 E-05 ▪ Arsenic = 3.2 E-06 ▪ Dibenzo(a,h)anthracene = 2.5 E-06 ▪ Benzo(b)fluoranthene = 2.0 E-06 ▪ Benzo(a)anthracene = 1.0 E-06	▪ TEQ Dioxin ▪ Aroclors, total ▪ Benzo(a)pyrene ▪ Arsenic
	▪ RME Non-Carcinogenic risk - soil/sediment	▪ Ingestion/Dermal Contact HI = 1.1 E+00	▪ Barium – HI = 2.8 E-01 ▪ Chromium – HI = 1.9 E-01 ▪ Arsenic – HI = 1.7 E-01 ▪ Aroclor 1254 – HI = 1.4 E-01	▪ Barium ▪ Chromium ▪ Arsenic ▪ Aroclor 1254
	▪ RME Carcinogenic risk – surface water	▪ Dermal Contact = 2.8 E-06	▪ Aroclor 1262 – 1.9 E-06	▪ Aroclor 1262
	▪ RME Non-Carcinogenic risk – surface water	▪ Dermal Contact HI = 1.3 E-01	▪ Manganese - HI = 7.9 E-02 ▪ Trichloroethene – HI = 2.3 E-02	▪ None
	▪ **RME Total Carcinogenic risk**	▪ **8.5 E-05** (within acceptable risk range)		▪ TEQ Dioxin ▪ Aroclors, total ▪ Benzo(a)pyrene ▪ Arsenic
	▪ **RME Total Non-carcinogenic risk**	▪ **Total HI = 1.2 E+00** (slightly exceeds acceptable risk range)		▪ None

TABLE A-1-1
IDENTIFICATION OF COCS AND WASTE VOLUMES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU3 – FERRY CREEK
STRATFORD, CONNECTICUT

SELECTION OF COCs – HUMAN HEALTH RISKS				
Receptor	**Human Health Risks**	**Numerical Risk[1]**	**Primary Chemical Risk Drivers**	**Contaminants of Concern (> 1 E-06 or HI > 0.1)**
Adult-Frequent User (Area A1, A-3; Residential Properties along Housatonic Avenue)	▪ RME Carcinogenic risk - soil/sediment	▪ Ingestion/Dermal Contact = 8.7 E-05	▪ TEQ Dioxin = 3.9 E-05 ▪ Aroclors, total = 2.6 E-05 ▪ Benzo(a)pyrene = 1.1 E-05 ▪ Arsenic = 3.4 E-06 ▪ dibenzo(a,h)anthracene = 2.8 E-06 ▪ benzo(b)fluoranthene = 2.3 E-06 ▪ benzo(a)anthracene = 1.1 E-06	▪ TEQ Dioxin ▪ Aroclors, total ▪ Benzo(a)pyrene ▪ Arsenic ▪ dibenzo(a,h)anthracene ▪ dibenzo(b)fluoranthene ▪ benzo(a)anthracene
	▪ RME Non-Carcinogenic risk - soil/sediment	▪ Ingestion/Dermal Contact HI = 1.4 E-01	▪ Barium – HI = 3.5 E-02 ▪ Chromium – HI = 2.3 E-02 ▪ Arsenic – HI = 2.3 E-02 ▪ Aroclor 1254 – HI = 2.0 E-02	▪ None
	▪ RME Carcinogenic risk – surface water	▪ Dermal Contact = 2.8 E-06	▪ Aroclor 1262 = 1.1 E-05 ▪ 1,1-dichloroethene = 3.0 E-06 ▪ Vinyl chloride = 1.2 E-06	▪ Aroclor 1262 ▪ 1,1-dichloroethene ▪ Vinyl chloride
	▪ RME Non-Carcinogenic risk – surface water	▪ Dermal Contact HI = 1.3 E-01	▪ Manganese - HI = 5.6 E-02 ▪ Trichloroethene – HI = 1.6 E-02	▪ None
	▪ RME Total Carcinogenic risk	▪ 8.98 E-05 (within acceptable risk range)		▪ TEQ Dioxin ▪ Aroclors, total ▪ Benzo(a)pyrene ▪ Arsenic ▪ dibenzo(a,h)anthracene ▪ dibenzo(b)fluoranthene ▪ benzo(a)anthracene
	▪ RME Total Non-carcinogenic risk	▪ Total HI = 2.7 E-01 (within acceptable risk range)		▪ None

TABLE A-1-1
IDENTIFICATION OF COCS AND WASTE VOLUMES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU3 – FERRY CREEK
STRATFORD, CONNECTICUT

SELECTION OF COCs – HUMAN HEALTH RISKS				
Receptor	**Human Health Risks**	**Numerical Risk[1]**	**Primary Chemical Risk Drivers**	**Contaminants of Concern (> 1 E-06 or HI > 1.0)**
Commercial Worker (Lot Behind 326 Ferry Blvd.)	▪ RME Carcinogenic risk – soil	▪ Ingestion/Dermal Contact - 1.71 E-04 (at high end of acceptable risk range)	▪ Aroclors, total = 1.27 E-04 ▪ TEQ Dioxin = 3.93 E-05 ▪ Arsenic = 2.32 E-06	▪ Aroclors, total ▪ TEQ Dioxin ▪ Arsenic
	▪ RME Non-Carcinogenic risk - soil	▪ Ingestion/Dermal Contact HI = 9 E+00 (exceeds acceptable risk range)	▪ Aroclors, total – HI = 8.91 E+00	▪ Aroclors, total

TABLE A-1-1
IDENTIFICATION OF COCS AND WASTE VOLUMES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU3 – FERRY CREEK
STRATFORD, CONNECTICUT

SELECTION OF COCs – HUMAN HEALTH RISKS				
Receptor	**Human Health Risks**	**Numerical Risk[1]**	**Primary Chemical Risk Drivers**	**Contaminants of Concern (> 1 E-06 or HI > 1.0)**
Adult Resident (Vacant Lot at Housatonic Ave.)	▪ RME Carcinogenic risk - soil	▪ Ingestion/Dermal Contact - 1.98 E-04 (at high end of acceptable risk range)	▪ TEQ Dioxin = 1.51 E-04 ▪ Aroclors, total = 3.09 E-05 ▪ Benzo(a)pyrene = 9.79 E-06 ▪ Arsenic = 1.95 E-06 ▪ dibenzo(a,h)anthracene = 1.68 E-06 ▪ benzo(b)fluoranthene = 1.07 E-06 ▪ benzo(a)anthracene = 1.15 E-06	▪ TEQ Dioxin ▪ Aroclors, total ▪ Benzo(a)pyrene ▪ Arsenic ▪ dibenzo(a,h)anthracene ▪ benzo(b)fluoranthene ▪ benzo(a)anthracene
	▪ RME Non-Carcinogenic risk - soil	▪ Ingestion/Dermal Contact HI = 9 E+00 (exceeds acceptable risk range)	▪ Aroclors, total – HI = 2.25 E+00	▪ Aroclors, total
Child Resident (Vacant Lot at Housatonic Ave.)	▪ RME Carcinogenic risk - soil	▪ Ingestion/Dermal Contact - 4.31 E-04 (at high end of acceptable risk range)	▪ TEQ Dioxin = 3.33 E-04 ▪ Aroclors, total = 6.44 E-05 ▪ Benzo(a)pyrene = 2.05 E-05 ▪ Arsenic = 4.41 E-06 ▪ dibenzo(a,h)anthracene = 3.53 E-06 ▪ benzo(b)fluoranthene = 2.23 E-06 ▪ benzo(a)anthracene = 2.41 E-06	▪ TEQ Dioxin ▪ Aroclors, total ▪ Benzo(a)pyrene ▪ Arsenic ▪ dibenzo(a,h)anthracene ▪ benzo(b)fluoranthene ▪ benzo(a)anthracene
	▪ RME Non-Carcinogenic risk - soil	▪ Ingestion/Dermal Contact HI = 1.88 E+01 (exceeds acceptable risk range)	▪ Aroclors, total – HI = 2.25 E+00	▪ Aroclors, total

TABLE A-1-1
IDENTIFICATION OF COCS AND WASTE VOLUMES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU3 – FERRY CREEK
STRATFORD, CONNECTICUT

SELECTION OF OTHER COCs – HUMAN HEALTH RISKS			
Other Chemicals that Pose Potential Health Risk	▪ Lead average at 455 mg/Kg, which is higher than the 400 mg/Kg acceptable concentration. ▪ Asbestos average at 6%, which exceeds the 1% definition.	▪ Calculated blood lead values exceed levels of concern.	COCs ▪ Lead ▪ Asbestos

SELECTION OF COCs - ECOLOGICAL RISK CONSIDERATIONS

- Various studies were completed including tissue analysis and sediment toxicity testing.
- Elevated cadmium, copper, lead, nickel, and PAHs in mummichog tissue.
- Arsenic, chromium, copper, lead, mercury, nickel, and zinc in surface water may be harmful to aquatic organisms.
- DDT and A1262 > AWQCs.
- Elevated cadmium and PAHs in fiddler crab tissue.
- Insects had elevated dioxin levels.
- Sediment toxicity attributed to PCBs, dioxins, PAHs, and metals (primarily copper).
- Copper and lead pose risk to mammals and birds that feed on fish.

Site-related contaminants include PCBs, lead, and dioxin. Raymark waste co-mingled with wetlands and Ferry Creek sediments. Therefore, it is reasonable to address all contaminated sediment in the channel and in the wetlands.

OTHER ENVIRONMENTAL CONSIDERATIONS

- The stream channel and stream banks of Ferry Creek are contaminated by Raymark waste. Under current conditions, the stream banks are continuing to erode and contaminants are migrating into Ferry Creek and discharging into Long Island Sound.

SELECTION OF COCs – PROTECTION OF GROUNDWATER

- No groundwater samples are available to evaluate quality.
-
- Soil samples collected for SPLP. Leachable lead and copper detected. Leachable barium, nickel and zinc detected.

TABLE A-1-1
IDENTIFICATION OF COCS AND WASTE VOLUMES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU3 – FERRY CREEK
STRATFORD, CONNECTICUT

PRGs		
COC	**Units**	**Limit**
PCBs - Aroclors, total	µg/Kg	**1**
Asbestos	%	**1**
Lead	mg/Kg	**400**
Dioxin as TEQ	µg/Kg	**1**

Definition of Raymark Waste[2]		
RW Indicators	**Units**	**Standard**
PCB – aroclor 1268	µg/Kg	**1**
Asbestos, Chrysotile	%	**1**
Lead	mg/Kg	**400**
Copper	µg/Kg	**288**

WASTE VOLUMES	
Total Volume of Contaminated/Raymark Waste	**Ferry Creek channel sediments:** ▪ From I-95 to Broad Street, ~3033 LF, 102,858 SF. Vol. at 2 FT excavation = 7,600 CY. **OU6 Properties (Lot Behind 326 Ferry Blvd. and Vacant Lot at Housatonic Ave.) soils:** ▪ ~39,000 SF. Vol. at 3 FT excavation ~ 4,300 CY **Wetlands area sediment:** ▪ ~60,000 SF. Vol. at 3 FT excavation ~ 6,700 CY **Tentative total of 18,600 CY**

Notes:
1. Appendix F, Final *Area 1 Remedial Investigation, Raymark-Ferry Creek – Operable Unit 3, Stratford, Connecticut*, TtNUS, October 1999.
2. See Section 2.2.2.1 for the definition of Raymark Waste.

TABLE A-1-2
REMEDIAL ACTION OBJECTIVES, GENERAL RESPONSE ACTIONS, TECHNOLOGY TYPES, AND PROCESS OPTIONS
FOCUSED FEASIBILITY STUDY
RAYMARK – OU3 – FERRY CREEK
STRATFORD, CONNECTICUT

Environmental Medium	Remedial Action Objective (from site characterization)	General Response Action	Remedial Technology Types (for general response actions)	Process Options
Soil/Sediment	Protection of Human Health Prevent direct exposure (inhalation, dermal contact, or ingestion) with soil/sediment meeting the definition of Raymark Waste. Protection of the Environment Prevent continuing erosion and migration of contaminated sediment/materials into Ferry Creek.	No Action	No Action	- not applicable
		Institutional Actions	Institutional Controls	- deed restrictions - local ordinances - access restrictions
			Access Restrictions	- fencing/signage
			Monitoring	- environmental sampling
		Containment	Horizontal Barriers	- impermeable cap - permeable cover
		Excavation	Excavation	- bulk mechanical excavation - vacuum excavation - hydraulic dredging
		Disposal	Disposal	- in-town consolidation - on-site disposal - out-of-town disposal
		Treatment	Immobilization	- solidification/stabilization - microencapsulation
			Thermal Treatment	- incineration - pyrolysis - thermal desorption - supercritical water oxidation - vitrification
			Chemical Treatment	- dehalogenation (dechlorination) - chemical oxidation - solvent extraction
			Biological Treatment	- aerobic biodegradation - anaerobic biodegradation - biopiles - bioventing - phytoremediation

TABLE A-1-3
PRELIMINARY SCREENING OF REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS
FOCUSED FEASIBILITY STUDY
RAYMARK – OU3 – FERRY CREEK
STRATFORD, CONNECTICUT

GENERAL RESPONSE ACTION (GRA)	REMEDIAL TECHNOLOGY	PROCESS OPTION	DESCRIPTION	SCREENING COMMENTS
No Action	No Action	Not Applicable	No activities conducted to address soil contamination.	Retained. Used as baseline for comparison with other options as required by National Contingency Plan.
Institutional Actions	Institutional Controls	Deed Restrictions, Local Ordinances, Periodic Evaluations	Administrative action used to restrict future site activities on individual properties. Restrictions would manage, limit, or prevent activities such as excavation or residential development. Periodic evaluations will be required to ensure institutional controls are implemented and are effective.	Retained. Potentially applicable.
	Access Restrictions	Fencing and Signage	Barrier erected to restrict access to contaminated properties with “No Trespassing” or hazard warning signs posted.	Retained. Potentially applicable.
	Monitoring	Environmental Sampling	Periodic monitoring events that include groundwater sampling to determine whether there is a continuing source of contamination or if contaminants are migrating.	Retained. Potentially applicable.
Containment	Horizontal Barriers	Impermeable Cap	Asphalt, concrete, geosynthetics, or multimedia materials are used to form an impermeable barrier to prevent direct contact with contaminated material and to minimize leaching of contaminants to groundwater.	Retained. Potentially applicable.
		Permeable Cover	Soil, crushed stone, geosynthetics, and vegetative cover may be used to prevent direct contact with contaminated soil and minimize erosion and surface migration of contaminated soil.	Retained. Potentially applicable.
		Subaqueous Cap (Ferry Creek only)	In-place capping with sand, sediment, gravel, stone, and/or geosynthetics to isolate, stabilize, prevent resuspension or transport of contaminated sediment, or to reduce contaminant flux.	Retained. Potentially applicable.

TABLE A-1-3
PRELIMINARY SCREENING OF REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS
FOCUSED FEASIBILITY STUDY
RAYMARK – OU3 – FERRY CREEK
STRATFORD, CONNECTICUT

GENERAL RESPONSE ACTION (GRA)	REMEDIAL TECHNOLOGY	PROCESS OPTION	DESCRIPTION	SCREENING COMMENTS
Excavation	Excavation	Bulk Mechanical Excavation	Use of common construction equipment to remove contaminated soil. Excavation would be a prerequisite to any other process option that is performed ex situ.	Retained. Potentially applicable.
		Vacuum Excavation	A vacuum (suction) is applied to remove surficial and subsurface soil or sediment. The extracted material is stored inside the tank of the vacuum truck. High-pressure water or air used to loosen and dislodge the soil or sediment for easy removal by the vacuum system.	Retained. Potentially applicable.
		Hydraulic Dredging (Ferry Creek only)	Dredging of sediment/water slurries is performed using centrifugal pumps mounted on low-draft barges or submersible pumps. Slurries contain high moisture content (10 to 20% solids by wet weight).	Retained. Potentially applicable.
Disposal	Disposal	Out-of-Town Disposal	Transportation and disposal of treated or untreated soil to an approved, licensed, out-of-town disposal location. Would be used in conjunction with excavation.	Retained. Potentially applicable.
		In-Town Disposal/ Consolidation	Disposal of treated or untreated soil in one or more selected areas within the Town of Stratford.	Retained. Potentially applicable.
Treatment	Immobilization	Solidification/ Stabilization	Soil mixing equipment used to mix reagents with contaminated soil to physically and/or chemically decrease the mobility of contaminants. Potential reagents include cement, pozzolanic material, thermoplastics, polymers and asphalt. Treatment may be performed in situ or ex situ.	Retained. Potentially applicable.
		Micro-encapsulation	Contaminants adsorbed to soil particles are desorbed and then encapsulated by an inert, silica-based solution that will minimize leaching. Treatment would be performed ex situ.	Eliminated. Not feasible in cases involving contaminated heterogeneous material.

TABLE A-1-3
PRELIMINARY SCREENING OF REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS
FOCUSED FEASIBILITY STUDY
RAYMARK – OU3 – FERRY CREEK
STRATFORD, CONNECTICUT

GENERAL RESPONSE ACTION (GRA)	REMEDIAL TECHNOLOGY	PROCESS OPTION	DESCRIPTION	SCREENING COMMENTS
Treatment (cont.)	Thermal Treatment	Incineration	Destruction of organic contaminants by subjecting them to high temperatures under controlled conditions in a combustion chamber. Treatment would be performed ex situ.	Retained. Potentially applicable to treat organic contaminants.
		Pyrolysis	Chemical decomposition of organic contaminants by heating the material in the absence of oxygen. Treatment would be performed ex situ.	Retained. Potentially applicable to treat non-PCB or non-dioxin organic contaminants.
		Thermal Desorption	Air, heat and mechanical agitation are used to volatilize organic contaminants from soil into a vapor stream. Vapor is usually further treated. Treatment would be done ex situ.	Retained. Potentially applicable to treat non-PCB or non-dioxin organic contaminants.
		Supercritical Water Oxidation	Contaminated media is exposed to water in a high temperature, high pressure environment. Under such conditions, organic substances are oxidized. Treatment would be done ex situ.	Retained. Potentially applicable to treat non-PCB or non-dioxin organic contaminants.
		Vitrification	Melting of contaminated material to volatilize or pyrolyze organics and entrain inorganics in a stable vitreous residual. Treatment may be done in situ or ex situ.	Eliminated due to technical implementability issues based on the location and distribution of contaminants at the site. Marsh deposits consist of clays and silts. Likely absence of glass-forming materials (silicon or aluminum oxides) in geologic materials.
	Physical Treatment	Soil Flushing	Contaminants sorbed to soil are mobilized or dissolved in an aqueous flushing solution in situ. The flushing solution is then extracted from the subsurface and treated. Flushing solution may be augmented by chemicals that increase the mobilization or dissolution of organics and some heavy metals from the soil. Treatment would be performed in situ.	Eliminated. Also, difficult to ensure capture of flushing solution due to estimated shallow depth of the water table and proximity to Ferry Creek. Not a reliable method in cases involving multiple types of contaminants.

TABLE A-1-3
PRELIMINARY SCREENING OF REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS
FOCUSED FEASIBILITY STUDY
RAYMARK – OU3 – FERRY CREEK
STRATFORD, CONNECTICUT

GENERAL RESPONSE ACTION (GRA)	REMEDIAL TECHNOLOGY	PROCESS OPTION	DESCRIPTION	SCREENING COMMENTS
Treatment (cont.)	Physical Treatment (cont.)	Soil Washing	Process reduces the amount of contaminated material by two means. Finer particles, which contain the bulk of contaminants, are separated from more coarse material. Contaminants sorbed to soil are dissolved in an aqueous washing solution. The wash water may be augmented by chemicals which increase the leaching of organics and some heavy metals from the soil. Treatment would be performed ex situ.	Eliminated due to presence of fine-grained and humic materials, which would not be easily processed through soil washing.
		Liquefied Gas Solvent Extraction	Liquefied gas solvents, such as propane, are used to extract organics from soil. Treatment would be performed ex situ.	Retained. Potentially applicable to treat non-PCB or non-dioxin organic contaminants.
		Soil Vapor Extraction	In situ technology in which vacuum blowers and extraction wells are used to strip volatile organic compounds from unsaturated soil. Treatment will be done in situ.	Eliminated. Not effective for treatment of site COCs - metals, PCBs, dioxins, PAHs, or asbestos.
		Electrokinetic Separation	A low-intensity direct current is applied to contaminated soil/sediment between electrodes, causing ions to move towards the positive or negative electrode. Once contaminants have been separated from soil particles in this manner, they may be recovered and treated either ex situ or in situ.	Eliminated. Materials to be treated may be too wet, due to location of sediments in a floodplain/wetland. Limited applications to date.
	Chemical Treatment	Dehalogenation	Contaminated soil/sediment is screened, processed with a crusher and pug mill, and mixed with reagents. The mixture is heated in a reactor. Dehalogenation occurs through either replacement of the halogen molecules or the decomposition and partial volatilization of contaminants. Treatment would be done ex situ.	Eliminated. May be able to treat PCBs and dioxins, but materials to be treated are heterogeneous. May be difficult to capture and treat residuals from process, especially if fines have high moisture content.
		Chemical Oxidation	Oxidants are injected or mixed into the subsurface where they react with contaminants to form less toxic or harmless end products. Treatment would be performed in situ.	Eliminated. Materials to be treated are heterogeneous with many potential oxidant sinks, which may reduce effectiveness. Sediments have low permeability, limiting ability to distribute reagents in situ.

TABLE A-1-3
PRELIMINARY SCREENING OF REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS
FOCUSED FEASIBILITY STUDY
RAYMARK – OU3 – FERRY CREEK
STRATFORD, CONNECTICUT

GENERAL RESPONSE ACTION (GRA)	REMEDIAL TECHNOLOGY	PROCESS OPTION	DESCRIPTION	SCREENING COMMENTS
Treatment (cont.)	Chemical Treatment (cont.)	Solvent Extraction	Chemical desorption and dissolution of organic and some inorganic contaminants by washing soil with a solvent solution. Treatment would be done ex situ.	Eliminated. Presence of fines, humic materials, and high moisture content reduces effectiveness of process. Solvent residuals in treated materials may be a problem.
	Biological Treatment	Aerobic Biodegradation	Microorganisms degrade organic contaminants to carbon dioxide and water. Oxygen is used as an electron acceptor in the degradation process. Treatment may be done in situ or ex situ.	Eliminated. Inorganic contaminants, PCBs, and dioxins generally not amenable to aerobic biological treatment.
		Anaerobic Biodegradation	An electron acceptor other than oxygen is used in the process in which microorganisms degrade organic contaminants. Treatment may be done in situ or ex situ.	Eliminated. Not likely to be effective at treating inorganic site contaminants.
		Biopiles	Excavated soils are mixed with soil amendments and placed on a treatment area that includes leachate collection systems and some form of aeration. Moisture, heat, nutrient, and oxygen levels are controlled to enhance the biodegradation of contaminants.	Eliminated. Not easily implementable for anaerobic degradation due to treatment in above ground conditions and exposure to air.
		Bioventing	Oxygen is directly injected into unsaturated subsurface soils via a network of air injection wells at air flow rates adequate to sustain microbial activity. Volatile contaminants are desorbed from soil and biodegraded as vapors move through the biologically active soil.	Eliminated. Not applicable to site contaminants.
		Phytoremedia-tion	Plants are used to naturally remediate contaminants via three mechanisms: direct uptake and accumulation of contaminants in plant tissue, release of enzymes that stimulate microbial activity and biochemical transformation, and enhancement of mineralization in plants' roots. Treatment would be done in situ.	Eliminated. Effectiveness limited to soil within the reach of plant root systems. Plants would require harvesting, proper disposal, and replanting. Not effective for certain site contaminants. Reliable cost information not available.

Notes:
1. General response actions, remedial technologies, and process options for soil were adapted from Table A-1-1.
2. Process options were retained or eliminated based on an evaluation of their technical implementability given the contaminant types and concentrations in soil, and other relevant site characteristics such as the location and distribution of contaminated soil throughout Stratford.

Eliminated process option (see screening comment)

TABLE A-1-4
EVALUATION OF PROCESS OPTIONS FOR SOIL
FOCUSED FEASIBILITY STUDY
RAYMARK – OU3 – FERRY CREEK

GENERAL RESPONSE ACTION (GRA)	TECHNOLOGY TYPE	PROCESS OPTION	EFFECTIVENESS[1]	IMPLEMENTABILITY[2]	COST[3]	CONCLUSION
No Action	No Action	Not Applicable	Would not achieve the human health or protection of the environment remedial action objectives (RAOs).	No permits required. No treatment, storage, or disposal involved. No equipment or services required.	Capital: None O&M: None	Retain (as baseline)
Institutional Actions	Institutional Controls	Deed Restrictions Local Ordinances	Would not achieve RAOs without other actions. No human health or environmental impacts from implementation. Reliable to the extent that restrictions can be enforced.	Deed restrictions and local ordinances would require legal and/or political actions from others. No treatment, storage, or disposal involved. Services readily available to implement institutional controls.	Capital: Low O&M: Low	Retain
	Access Restrictions	Fencing/Signage	Would not achieve RAOs without other actions. No human health or environmental impacts from implementation. Reliable to the extent that barriers are maintained and warnings are heeded.	No treatment, storage, or disposal involved. Conventional construction, readily available skilled labor and services from several sources.	Capital: Low O&M: Low	Retain
	Monitoring	Environmental Sampling	Would not achieve RAOs without other actions. Very low potential for impacts to human health and environment during implementation. Reliable process for the evaluation of contaminant migration trends and to monitor the progress of remediation.	No permits required for implementation. No treatment, storage, or disposal involved. Labor and services readily available from several sources.	Capital: None O&M: Medium	Retain
Containment	Horizontal Barriers	Low-Permeability Cap	Would be applicable to capping of contaminated soil/sediment in wetland area. Would achieve human health RAO by preventing direct contact with contaminated soils/sediments, and reducing contaminant leaching and erosion. Some adverse impacts during construction or implementation beyond typical earth-moving construction activities because of contaminated soil/sediment presence, which can be mitigated through engineering and air pollution controls, and proper decontamination and H&S measures. Wetlands would be destroyed during mitigation and flood storage capacity could be reduced. Cap materials with a low-permeability layer, if inundated, could be disturbed or damaged during flood events or during daily rise and fall of the water table with the tides. Reliability is uncertain.	Will need to comply with substantive requirements of ARARs for on-site activities (potential impacts to wetlands and floodplains). No treatment or disposal involved. Temporary storage may be problematic because of limited access and staging areas. Materials, labor, and services for implementation readily available from several sources.	Capital: Medium O&M: Medium	Eliminated. A low-permeability cover, if inundated, would be subjected to erosion and will not likely be reliable.
		Permeable Cover	Would be applicable to capping of contaminated soil/sediment in wetland area. Would achieve human health RAO by preventing direct contact with contaminated soils/sediments and reducing erosion. Some adverse impacts during construction or implementation beyond typical earth-moving construction activities because of contaminated soil/sediment presence, which can be mitigated through engineering and air pollution controls, and proper decontamination and H&S measures. Wetlands would be destroyed during mitigation and flood storage capacity could be reduced. Cap materials that constitute a permeable cover, if inundated, would be less likely disturbed or damaged during flood events or during daily rise and fall of the water table with the tides than for a low-permeability cover. Reliability is greater than the low-permeability cover. Process option can be reliable when properly designed, constructed, and maintained.	Will need to comply with substantive requirements ARARs for on-site activities (potential impacts to wetlands and floodplains). No treatment or disposal involved. Temporary storage may be problematic because of limited access and staging areas Materials, labor, and services for implementation readily available from several sources.	Capital: Medium O&M: Medium	Retain

TABLE A-1-4
EVALUATION OF PROCESS OPTIONS FOR SOIL
FOCUSED FEASIBILITY STUDY
RAYMARK – OU3 – FERRY CREEK

GENERAL RESPONSE ACTION (GRA)	TECHNOLOGY TYPE	PROCESS OPTION	EFFECTIVENESS[1]	IMPLEMENTABILITY[2]	COST[3]	CONCLUSION
Containment (cont.)	Horizontal Barriers (cont.)	Subaqueous Cap (Ferry Creek only)	Would be applicable to address contaminated sediment and materials in the Ferry Creek stream channel. Could achieve protection of the environment RAO by covering contaminated materials and sediment. However, longevity of the cap materials is uncertain because of possible erosion by high velocity daily tides. Some adverse impacts during construction or implementation beyond typical construction activities because of contaminated sediment presence, which can be mitigated through engineering controls, and proper decontamination and H&S measures. Potential mobilization of silt and contaminants may occur during construction. Subaqueous cap may not be reliable under site-specific conditions.	Will need to comply with substantive requirements of ARARs for on-site activities (potential impacts during dredging the stream channel). Extensive presence of highly compressible peat in the stream channel may make placement and durability of subaqueous cap materials difficult. Cap materials, when placed, will likely sink into the peat. If a cap is constructed, differential compression of underlying peat over time will impair the integrity of the barrier materials. Treatment may be required to reduce liquid volume. Temporary storage may be problematic because of limited access and staging areas. Materials, labor, and services for implementation readily available from several sources. Subaqueous cap may not be technically feasible under site-specific conditions.	Capital: Medium O&M: Medium	Eliminated. Sub-aqueous cap would be difficult to build due to presence of highly compressible underlying materials. Would be difficult to maintain due to potential tidal erosion and possible differential settlement, and will not likely to be reliable.
Excavation	Excavation	Bulk Mechanical Excavation	Would be required to move and grade contaminated soil/sediment in the wetland area. This process is typically used in conjunction with other remediation options. Would help achieve RAO by removing all soil/sediment with concentrations exceeding remedial goals (for out-of-Town disposal or on-site consolidation). Some adverse impacts during construction or implementation beyond typical earth-moving construction activities because of contaminated soil presence, which can be mitigated through engineering and air pollution controls, and proper decontamination and H&S procedures to prevent the spread of contamination during excavation. Very reliable process for the removal contaminated soil/sediment.	Will need to comply with substantive requirements of ARARs for on-site activities. Limited on-site capacity available for temporary storage of excavated material. Location to be determined. No treatment or disposal involved. Conventional construction process that can be implemented in wetland area with equipment and services that are readily available from several sources. Excavation in wetland areas poses some technical implementability issues.	Capital: Low O&M: None <u>Note</u>: Includes cost of excavating only. Transport, treatment, or disposal of soil/sediment not included.	Retain
		Vacuum Excavation	Would be required to move contaminated soil/sediment in the wetland area. This process can be used in conjunction with other remediation options. Would help achieve RAO by removing all soil/sediment with concentrations exceeding remedial goals (for out-of-Town disposal or on-site consolidation). However, rate of materials excavation would be slower than bulk excavation. Some adverse impacts during construction or implementation beyond typical earth-moving construction activities because of contaminated soil presence, which can be mitigated through engineering and air pollution controls, and proper decontamination and H&S procedures to prevent the spread of contamination during excavation. Very reliable process for the removal contaminated soil/sediment.	Will need to comply with substantive requirements of ARARs for on-site activities. Limited on-site capacity available for temporary storage of excavated material. Location to be determined. Separation processes may be required to segregate excess water from contaminated materials. Contaminated waste stream may be generated that require disposal off site. Conventional construction process that can be implemented in wetland area with equipment and services that are available from several sources. Excavation in wetland areas poses some technical implementability issues.	Capital: Low O&M: None <u>Note</u>: Includes cost of excavating only. Transport, treatment, or disposal of soil/ sediment not included	Retain

TABLE A-1-4
EVALUATION OF PROCESS OPTIONS FOR SOIL
FOCUSED FEASIBILITY STUDY
RAYMARK – OU3 – FERRY CREEK

GENERAL RESPONSE ACTION (GRA)	TECHNOLOGY TYPE	PROCESS OPTION	EFFECTIVENESS[1]	IMPLEMENTABILITY[2]	COST[3]	CONCLUSION
Excavation (cont.)	Excavation (cont.)	Hydraulic Dredging (Ferry Creek, only)	Would be required to dredge the stream channel. This process may be used in conjunction with other remediation options. Would achieve RAO by removing contaminated sediment with concentrations exceeding remedial goals (for out-of-Town disposal). Heterogeneous materials may cause difficulty hydraulic dredging (i.e., manufacturing seconds, oversized materials, etc.) Some adverse impacts during construction or implementation can mobilize contaminated sediments, which can be mitigated through engineering controls, and proper decontamination and H&S procedures to prevent the spread of contamination during excavation. Reliable process for the removal sediments.	Will need to comply with substantive requirements of ARARs for on-site activities. Limited on-site capacity available for temporary storage of dredged material. Location to be determined. Separation processes will be required to segregate excess water from contaminated materials. Large volumes of water with suspended solids will need to be discharged, which may require treatment. Contaminated waste stream may be generated that require disposal off site. Dredging best for quiescent water rather than in a tidally influenced water body. However, flow can be managed. Access for entry into stream channel by a barge may be difficult; amphibious unit use possible. At least 2 feet of water required. Specialty construction process that can be implemented in a stream channel with equipment and services that are available from limited sources. Potentially implementable when used in conjunction with other measures.	Capital: Low O&M: None <u>Note</u>: Includes cost of excavating only. Transport, treatment, or disposal of soil/ sediment not included	Retain
Disposal	Disposal	Out-of-Town Disposal	Could address anticipated volume of contaminated soil/sediment. RAOs would be achieved because all contamination would be removed from OU3. Some adverse impacts may occur during implementation beyond typical construction activities because of contaminated soil/sediment presence, which can be mitigated through engineering and air pollution controls, and proper decontamination and H&S procedures to prevent the spread of contamination during excavation and loading. Potential for release of contaminants during transport due to accidents. Proven and reliable for site contaminants.	Permits for transport of contaminated materials to an out-of-Town landfill can be obtained. Out-of-Town disposal capacity for the anticipated volume of contaminated soil may be available. Will require transport, as disposal facilities are located > 500 miles away. Technically implementable.	Capital: High O&M: None	Retain
		On-Site Disposal/ Consolidation	RAOs would be achieved for contaminated soil that is consolidated and isolated beneath low-permeability cap to eliminate direct contact risks by isolating wastes from human and environmental contact. Potential impacts to human health and the environment from excavation, placement, and grading of contaminated soil and transportation to consolidation areas could be mitigated using engineering and air pollution controls, and proper decontamination and H&S procedures. Proven and reliable for site contaminants.	Disposal capacity for the anticipated volume of contaminated soil/sediment and temporary storage of stockpiles may be available. Materials and services required to implement technology are readily available. No technical implementability concerns identified.	Capital: Medium O&M: Medium	Retain
Treatment	Immobilization	Solidification/ Stabilization (S/S)[4]	May be difficult to achieve remedial action objective due to debris presence and extensive clays, silts, and humic materials in contaminated soil/sediment volume. Heterogeneous contaminants (organic and inorganic) present. Treatment for metals may interfere with treatment for organics, and vice versa. High moisture content may impede treatment processes. Could be effective if one type of contaminant removed by another process first. Potential impacts to human health and the environment from excavation, temporary stockpiling, loading, transport, implementation of S/S process can be mitigated using engineering and air pollution controls, and proper decontamination and H&S procedures. S/S would be implemented on site. Reliable process for the treatment of soil contaminated with inorganic or inorganic contaminants, but not both simultaneously.	If untreatable fraction needs to be sent for out-of-Town disposal, permits can be obtained. Temporary storage and post-treatment disposal capacity are very limited on site. Difficult to implement on-site treatment. Equipment and skilled labor required for treatment readily available from several vendors. Can be difficult to implement because different types of contaminants (organics and metals) with heterogeneous materials require treatment. However, if one contaminant type is removed by pre-treatment, this process is implementable to address the remaining contaminant type. Extensive screening required to segregate debris from contaminated soil/sediment that require treatment.	Capital: Medium O&M: None	Eliminated. Heterogeneous composition and high moisture content may render treatment difficult. Would not destroy PCBs. Limited available on-site storage.

TABLE A-1-4
EVALUATION OF PROCESS OPTIONS FOR SOIL
FOCUSED FEASIBILITY STUDY
RAYMARK – OU3 – FERRY CREEK

GENERAL RESPONSE ACTION (GRA)	TECHNOLOGY TYPE	PROCESS OPTION	EFFECTIVENESS[1]	IMPLEMENTABILITY[2]	COST[3]	CONCLUSION
Treatment (cont.)	Thermal Treatment	Incineration[5]	Would achieve RAOs for the organic contaminants, but would be ineffective for treating soil contaminated with metals and asbestos. High moisture content may pose treatment issues. Potential impacts to human health and the environment from excavation, temporary stockpiling, loading, transport, and on-site incineration. Effects could be mitigated using engineering and air pollution controls, and proper decontamination and H&S procedures to prevent the spread of contamination during implementation. Incineration would be performed at on-site or off-site location. Very reliable process for the treatment of soil contaminated with organic contaminants.	Permits or approvals required to incinerate site soils off site should be obtainable. Temporary storage and working area capacity are limited and are not readily available on site. Difficult to implement on-site treatment. Equipment/facilities required for treatment are available. Extensive screening required to segregate debris from contaminated soil/sediment that require treatment. Distance to incineration facility greater than 500 miles from site.	Capital: High O&M: None	Eliminated. Heterogeneous composition and high moisture content may render treatment difficult. Would not destroy PCBs. Limited available on-site storage.
		Pyrolysis[5]	Would not achieve RAOs for the principal COCs (Aroclor 1268 and dioxin). Not effective for treating soil contaminated with inorganic contaminants. Potential impacts to human health and the environment from excavation, temporary stockpiling, loading, and transport. Effects could be mitigated using engineering and air pollution controls, and proper decontamination and H&S procedures to prevent the spread of contamination during implementation. Treatment would be performed on site or at an off-site location. High moisture content may require more treatment. Reliable for the treatment of soil contaminated with non-PCB organic contaminants. Not as established as other thermal treatment technologies such as incineration or thermal desorption.	Permits or approvals required to treat soils off site should be obtainable. On-site treatment may not be possible due to limited availability of mobile systems and lack of work areas on site. Difficult to implement on-site treatment. Availability of equipment/facilities required for off-site treatment would be limited. High moisture content may require more treatment. Extensive screening required to segregate debris from contaminated soil that require treatment. Distance to treatment facility greater than 500 miles from site.	Capital: High O&M: None	Eliminated. Heterogeneous composition and high moisture content may render treatment difficult. Would not destroy PCBs. Limited available on-site storage.
		Thermal Desorption[5]	Would not achieve RAO for the principal COCs (Aroclor 1268 and dioxin). Not effective for treating soil contaminated with inorganic contaminants. Potential impacts to human health and the environment from excavation, temporary stockpiling, loading, transportation, and on-site thermal desorption. Effects could be mitigated using engineering and air pollution controls, and proper decontamination and H&S procedures. Treatment would be performed on-site or at an off-site location. Reliable process for the treatment of soil contaminated with non-PCB organic contaminants.	Permits or approvals required to treat site soils off site should be obtainable. Temporary storage and post-treatment disposal capacity are very limited on site. Difficult to implement on-site treatment. On-site treatment may not be possible due to limited availability of mobile systems and lack of work areas on site. High moisture content may require more treatment. Equipment/facilities required for off-site treatment are available. Extensive screening required to segregate debris from contaminated soil that require treatment. Distance to treatment facility greater than 500 miles from site.	Capital: High O&M: None	Eliminated. Heterogeneous composition and high moisture content may render treatment difficult. Would not destroy PCBs. Limited available on-site storage.
		Supercritical Water Oxidation	Would not achieve remedial action objective for the principal COC (Aroclor 1268 and dioxin). Process not effective for treating soil/sediment contaminated with inorganic contaminants. Potential impacts to human health and the environment from excavation, temporary stockpiling, loading, and transport. High moisture content may require more treatment. Effects could be mitigated using engineering and air pollution controls, and proper decontamination procedures, and H&S procedures. Treatment would be performed at an off-site location. Technology still emerging. Not yet proven to be reliable for treatment at full scale.	Permits or approvals required to treat site soils off site should be obtainable. Temporary storage and post-treatment disposal capacity are very limited on site. Difficult to implement on-site treatment. On-site treatment may not be possible due to limited availability of mobile system and lack of on-site work areas. Equipment/facilities required for treatment are limited. Extensive screening required to segregate debris from contaminated soil that require treatment. May be difficult to implement due to heterogeneous nature of waste materials.	Capital: High O&M: None	Eliminated. Heterogeneous composition and high moisture content may render treatment difficult. Would not destroy PCBs. Limited available on-site storage.
		Liquefied Gas Solvent Extraction	Would not achieve remedial action objective for the principal COCs (Aroclor 1268 and dioxin). Not effective for treating soil contaminated with inorganic contaminants. High moisture content and high fines content can limit effectiveness of process. Potential impacts to human health and the environment from excavation, temporary stockpiling, loading, and transport. Effects could be mitigated using engineering and air pollution controls, and proper decontamination and H&S procedures. Treatment could be performed at an off-site location. Technology still emerging. Not yet proven to be reliable for treatment of heterogeneous waste.	Permits or approvals required to treat site soils off site should be obtainable. Temporary storage and post-treatment disposal capacity are very limited on site. Difficult to implement on-site treatment. Equipment/facilities required for treatment are limited. Temporary storage and work areas are limited on site. Extensive screening required to segregate debris from contaminated soil that require treatment. May be difficult to implement due to heterogeneous nature of waste materials.	Capital: High O&M: None	Eliminated. Heterogeneous composition and high moisture content may render treatment difficult. Would not destroy PCBs. Limited available on-site storage.

TABLE A-1-4
EVALUATION OF PROCESS OPTIONS FOR SOIL
FOCUSED FEASIBILITY STUDY
RAYMARK – OU3 – FERRY CREEK

GENERAL RESPONSE ACTION (GRA)	TECHNOLOGY TYPE	PROCESS OPTION	EFFECTIVENESS[1]	IMPLEMENTABILITY[2]	COST[3]	CONCLUSION
Treatment (cont.)	Thermal Treatment (cont.)	Solvent Extraction	Multiple solvents required to address organic and inorganic contaminants. Additional processing may be required to remove residual solvents from treated soils. High moisture content and high fines content can limit effectiveness of process. Potential impacts to human health and the environment from excavation, temporary stockpiling, loading, and transport. Effects could be mitigated using proper engineering controls, and decontamination and H&S procedures. Treatment would be performed at an off-site location. Technology still emerging. Not yet proven to be reliable for treatment at full scale.	Permits or approvals required to treat site soils off site should be obtainable. Temporary storage and work areas are limited on site. Difficult to implement on-site treatment. Equipment/facilities required for treatment are limited. Extensive screening required to segregate debris from contaminated soil that require treatment. May be difficult to implement due to heterogeneous nature of waste materials.	Capital: High O&M: None	Eliminated. Heterogeneous composition and high moisture content may render treatment difficult. Would not destroy PCBs. Limited available on-site storage.

Notes:

1. Effectiveness is evaluated relative to other processes within the same technology type using the following criteria:
   A. Potential effectiveness of process option in handling the estimated volume of contaminated soil and meeting the preliminary remediation goals.
   B. Potential impacts to human health and the environment during the construction and implementation phase.
   C. Reliability of the process with respect to the contaminants and conditions at the site.
2. Implementability is evaluated relative to other processes within the same technology type using the following criteria:
   A. Ability to obtain necessary permits for off-site actions.
   B. Availability of treatment, storage, and disposal services (including capacity).
   C. Availability of necessary equipment and skilled workers to implement the technology.
   D. Potential technical implementability concerns.
3. Cost plays a limited role in the screening of process options. Relative capital and operations and maintenance (O&M) costs are used at this stage rather than detailed cost estimates. Cost analysis is made on the basis of engineering judgment, and each process is evaluated as to whether costs are high, medium, or low relative to other process options in the same technology type.
4. Solidification of metal-contaminated soil was demonstrated to be effective based on results treatability study using Raymark soil-waste materials (*Treatability Study Report for Bench-Scale Solidification and Stabilization,* Halliburton NUS Corp., August 1994) .
5. Low-temperature thermal treatment methods were determined to be ineffective in removing Aroclor 1268 from contaminated Raymark soil-waste materials, while incineration was effective based on results of a second treatability study (*Bench-Scale Treatability Study Report for Thermal Treatment*, Halliburton NUS Corp., October 1994).

TABLE A-1-5
ASSEMBLY OF ALTERNATIVES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU3 – FERRY CREEK
STRATFORD, CONNECTICUT

GENERAL RESPONSE ACTION (GRA)	TECHNOLOGY TYPE	PROCESS OPTION	OU3-1 No Action	OU3-2 Limited Action	OU3-3 Excavation, Capping, and Institutional Controls	OU3-4 Excavation, Capping, Out-of-Town Disposal, and Institutional Controls	OU3-5 Out-of-Town Disposal and Institutional Controls
No Action	No Action	Not Applicable	✶				
Institutional Actions	Institutional Controls	Deed Restrictions Local Ordinances		✶	✶	✶	✶
	Access Restrictions	Fencing/Signage		✶	✶	✶	✶
	Monitoring	Environmental Sampling		✶	✶	✶	✶
Containment	Horizontal Barriers	Permeable Cap			✶	✶	✶
Excavation	Excavation	Bulk Mechanical or Vacuum Excavation			✶	✶	✶
Disposal	Disposal	In-Town Disposal/ Consolidation			✶		
		Out-of-Town Disposal				✶	✶

Notes:
✶ - Process option is a component of this alternative

TABLE A-1-6
DESCRIPTION OF POTENTIAL REMEDIAL ALTERNATIVES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU3 – FERRY CREEK
STRATFORD, CONNECTICUT

Alternative OU3-1 – No Action

- No actions taken to address Raymark waste at the property.
- Five-year reviews to assess site conditions.

Alternative OU3-2 – Limited Action

- No actions taken to address Raymark waste at the property.
- Institutional controls will be placed on property to prohibit certain types of activities, such as excavations, without written authorization from EPA and DEP and to prohibit groundwater use of any kind.
- Fencing and signage installed to discourage access and limit potential exposures.
- Monthly inspections to verify effectiveness of institutional controls.
- Annual reporting of institutional controls.
- Long-term monitoring of groundwater and surface water.
- Five-year reviews to assess site conditions.

Alternative OU3-3 – Excavation, Capping, and Institutional Controls

Site Preparation

- Clearing and grubbing.
- Establish utilities.
- Property boundary and topographic survey.
- Decontamination station establishment.

Excavation of Ferry Creek contaminated sediments

- Isolation and diversion of flow for sections of Ferry Creek from (I-95 to Broad St).
- Installation of temporary groundwater dewatering well points or dewatering sumps.
- Treatment and/or disposal of contaminated water.
- Hydraulic excavation of Raymark waste from Ferry Creek (to 2 feet depth), approximately 7,600 CY.
- Discharge of sediment/water slurry to geotextile tubes (“geotubes”) emplaced at wetland area.
- Dewatering of excavated sediments via gravity drainage and flocculation/clarification using polymers (4 to 6 months).
- Management of drained water from geotubes.

Open-channel Culvert Construction

- Pre-design investigation to evaluate geotechnical constraints.
- Perform additional excavation of Ferry Creek channel to allow installation of installation of open-channel culvert in streambed.
- Install geotextile and perform surcharge/preload testing to compress underlying stream bed materials.
- Installation of piles in Ferry Creek (to support culvert).
- Removal of surcharge (if necessary).
- Backfilling and grading of sidewalls.

- Installation of reinforced concrete, trapezoidal, open-channel culverts in Ferry Creek stream channel. Anchoring of each 10-feet section to piles and connection of culvert to preceding section.

Stream Bank Stabilization

- Grading and compaction of approximately 6600 linear feet of stream banks (2 sides each of 3300 linear feet).
- Placement of 18 inches of sub grade materials.
- Placement of concrete slabs that are joined with the open-channel culverts.

Capping of Consolidated Materials

- Grading of excavated materials into non-wetland and wetland areas of OU-3.
- Surcharging consolidated soil and sediment for several months, if required. Removal of surcharge.
- Capping consolidated materials with a 3-foot thick low-permeability cover system.

Compensatory Wetlands and Floodplains Mitigation

- Compensatory wetlands mitigation at offsite location.
- Compensatory flood storage mitigation, as needed.

Monitoring Wells Installation

- Installation of up to 5 new monitoring wells.

Long-Term Response Actions

- Monthly inspections with annual repairs and reporting of capped area and culvert for 30 years.

Institutional Controls

- Implementation of access and use restrictions (signs, fencing, and other institutional controls).
- Long-term monitoring of groundwater and surface water.
- Five-year reviews to assess site conditions.

Alternative OU3-4 - Excavation, Capping, Out-of-Town Disposal, and Institutional Controls (maintain existing site grades)

Site Preparation

- Clearing and grubbing.
- Establish utilities.
- Property boundary and topographic survey.
- Decontamination station establishment.

Excavation of Ferry Creek contaminated sediments

- Isolation and diversion of flow for sections of Ferry Creek from (I-95 to Broad St).
- Installation of temporary groundwater dewatering well points or dewatering sumps.
- Treatment and/or disposal of contaminated water.
- Hydraulic excavation of Raymark waste from Ferry Creek (to 2 feet depth), approximately 7,600 CY.
- Discharge of sediment/water slurry to geotextile tubes (“geotubes”) emplaced at wetland area.

- Dewatering of excavated sediments via gravity drainage and flocculation/clarification using polymers (4 to 6 months).
- Management of drained water from geotubes.

Open-channel Culvert Construction

- Pre-design investigation to evaluate geotechnical constraints.
- Perform additional excavation of Ferry Creek channel to allow installation of installation of open-channel culvert in streambed.
- Install geotextile and perform surcharge/preload testing to compress underlying stream bed materials.
- Installation of piles in Ferry Creek (to support culvert).
- Removal of surcharge (if necessary).
- Backfilling and grading of sidewalls.
- Installation of reinforced concrete, trapezoidal, open-channel culverts in Ferry Creek stream channel. Anchoring of each 10-feet section to piles and connection of culvert to preceding section.

Stream Bank Stabilization

- Grading and compaction of approximately 6600 linear feet of stream banks (2 sides each of 3300 linear feet).
- Placement of 18 inches of sub grade materials.
- Placement of concrete slabs that are joined with the open-channel culverts.

Excavation of RW from two OU6 properties (Lot behind 326 Ferry Blvd. and Vacant Lot at Housatonic Ave)

- Excavate approximately 4,300 CY from these two properties to depth of 3 feet.

Excavation of Ferry Creek Wetlands

- Excavate 3 feet of wetland sediments (approximately 6,700 CY).

Out-of-Town Disposal

- Load and transport approximately 18,600 CY to an out-of-Town disposal facility

Capping of Raymark Waste Materials

- Surcharging consolidated soil and sediment for several months, if required. Removal of surcharge.
- Capping consolidated materials with a 3-foot thick low-permeability cover system.

Compensatory Wetlands and Floodplains Mitigation

- Compensatory wetlands mitigation at offsite location.
- Compensatory flood storage mitigation, as needed.

Monitoring Wells Installation

- Installation of up to 5 new monitoring wells.

Long-Term Response Actions

- Monthly inspections with annual repairs and reporting of capped area and culvert for 30 years.

Institutional Controls

- Implementation of access and use restrictions (signs, fencing, and other institutional controls).
- Long-term monitoring of groundwater and surface water.

- Five-year reviews to assess site conditions.

Alternative OU3-5 - Excavation, Out-of-Town Disposal, and Institutional Controls

Site Preparation

- Clearing and grubbing.
- Establish utilities.
- Property boundary and topographic survey.
- Decontamination station establishment.

Excavation of Ferry Creek contaminated sediments

- Isolation and diversion of flow for sections of Ferry Creek from (I-95 to Broad St).
- Installation of temporary groundwater dewatering well points or dewatering sumps.
- Treatment and/or disposal of contaminated water.
- Hydraulic excavation of all Raymark waste from Ferry Creek (to an assumed depth of 4 feet), approximately 15,200 CY.
- Backfill with clean, subbase materials (i.e.; gravel) to enhance stability of creek bed.
- Discharge of sediment/water slurry to geotextile tubes ("geotubes") emplaced at wetland area.
- Dewatering of excavated sediments via gravity drainage and flocculation/clarification using polymers (4 to 6 months).
- Management of drained water from geotubes.

Open-channel Culvert Construction

- Pre-design investigation to evaluate geotechnical constraints.
- Perform additional excavation of Ferry Creek channel to allow installation of installation of open-channel culvert in streambed.
- Install geotextile and perform surcharge/preload testing to compress underlying stream bed materials.
- Installation of piles in Ferry Creek (to support culvert).
- Removal of surcharge (if necessary).
- Backfilling and grading of sidewalls.
- Installation of reinforced concrete, trapezoidal, open-channel culverts in Ferry Creek stream channel. Anchoring of each 10-feet section to piles and connection of culvert to preceding section.

Stream Bank Stabilization

- Grading and compaction of approximately 6,600 linear feet of stream banks (2 sides each of 3,300 linear feet).
- Placement of 18 inches of subgrade materials.
- Placement of concrete slabs that are joined with the open-channel culverts.

Excavation of RW from two OU6 properties (Lot behind 326 Ferry Blvd. and Vacant Lot at Housatonic Ave)

- Excavate approximately 6,500 CY from these two properties to the seasonal high groundwater depth of 4.5 FT below ground surface.
- Confirmation testing of excavation.
- Backfill with clean fill.

Excavation of Ferry Creek wetlands

- Excavate all Raymark waste from wetlands (assume depth of 4 feet), approximately 8,900 CY.
- Confirmation testing of excavation.

Wetlands Restoration

- Reconstruct wetlands – assume 150,000 SF.

Out-of-Town Disposal

- Load and transport approximately 30,600 CY to an out-of-Town disposal facility.

Long-Term Response Actions

- Annual inspections with repairs, and reporting of restored wetlands and culvert for 30 years.

Institutional Controls

- Implementation of use restrictions (institutional controls).
- Long-term monitoring of groundwater and surface water for first two years only, pending confirmation of remedial action effectiveness and concurrence from the State.
- Five-year reviews to assess site conditions.

TABLE A-1-7
SCREENING OF ALTERNATIVES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU3 – FERRY CREEK
STRATFORD, CONNECTICUT

ALTERNATIVE	DESCRIPTION	SCREENING CRITERIA			COMMENTS
		EFFECTIVENESS	IMPLEMENTABILITY	COST	
OU3-1 **No Action**	**Implementation Period** No Action **Post-Implementation Period** 5-Year Reviews	Would not achieve remedial action objectives. Any reduction in toxicity or volume would be the result of natural attenuation or degradation processes. However, PCBs will only attenuate very gradually. Asbestos will not attenuate at all. Current and future human health risks would remain as quantified in the baseline risk assessment. Contaminated sediment will continue to migrate in Ferry Creek.	No permits required; no treatment, storage or disposal involved; no equipment or services required. Performance of 5-year reviews is required.	Capital: None O&M: Low (for 5-yr reviews)	Retain (as baseline).
OU3-2 **Limited Action**	**Implementation Period** Institutional controls Fencing and signs **Post-Implementation Period** Periodic inspections and repairs 5-Year Reviews	Would not achieve remedial action objectives without other actions. Any reduction in toxicity or volume would be the result of natural attenuation or degradation processes. However, PCBs and metal COCs will only attenuate very gradually. Asbestos will not attenuate at all. No human health or environmental impacts from implementation; institutional controls may mitigate human health risks posed by Raymark Waste, if controls are enforced. Contaminated sediment will continue to migrate in Ferry Creek. Reliable to the extent those restrictions can be enforced.	No treatment, storage, or disposal involved. Services readily available to implement institutional controls (i.e., signs, fencing, use limitations). Institutional controls and local ordinances would require legal and/or actions by others. Can be a standalone action or part of other alternatives. Performance of 5-year reviews is required.	Capital: Low O&M: Low	Retain.
OU3-3 **Excavation, Capping, and** **Institutional Controls**	**Implementation Period** Excavation of Ferry Creek sediments (to 2 ft) with consolidation on property over wetland area and/or OU6 properties. Culvert construction Cap construction Compensatory wetlands and floodplains mitigation Land use and access restrictions **Post-Implementation Period** Cap maintenance Institutional controls Long-term monitoring 5-Year Reviews	Containment achieves remedial action objectives by preventing direct contact with contaminated soil/sediment. Excavation and culvert construction would prevent further erosion of waste into Ferry Creek. No reduction in toxicity or volume through treatment is anticipated. Some adverse impacts on human health and environment for both consolidation and containment activities during construction beyond typical earthmoving construction activities because of contaminated soil presence, which can be mitigated through engineering and air pollution controls, and proper decontamination and H&S measures. Institutional controls can also mitigate some impacts to human health risks posed by Raymark waste during remediation activities. Reliable when excavation and containment are properly designed, constructed and maintained; deed restrictions and an O&M plan are integral parts of the alternative. Reliable to the extent that use restrictions can be enforced.	Will need to comply with substantive requirements of ARARs for on-site activities. Adequate on-site storage capacity required for temporary handling and storage of clean and contaminated materials. Conventional construction processes can be implemented with equipment and services that are readily available from several sources. Dewatering and excavation of Ferry Creek pose some technical implementability issues. Water management and sediment management can be addressed. Community impacts from construction activities are mainly short term including large numbers of vehicles moving clean and contaminated materials. Performance of 5-year reviews is required. Services readily available to implement institutional controls (signs, fencing, O&M). Institutional controls and local ordinances would require legal and/or actions by others.	Cost: Medium O&M: Medium	Retain.

TABLE A-1-7
SCREENING OF ALTERNATIVES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU3– FERRY CREEK
STRATFORD, CONNECTICUT

ALTERNATIVE	DESCRIPTION	SCREENING CRITERIA			COMMENTS
		EFFECTIVENESS	IMPLEMENTABILITY	COST	
OU3-4 **Excavation, Capping, Out-of-Town Disposal, and Institutional Controls**	**<u>Implementation Period</u>** Excavation of Ferry Creek sediments (to 2 ft) and Raymark waste from two OU6 properties (3 ft). Excavation of wetlands sediments (to 3 ft depth) Culvert construction Cap construction Out-of-Town disposal of excess soil/sediment volume Compensatory wetlands mitigation Land use and access restrictions **<u>Post-Implementation Period</u>** Cap maintenance Institutional controls Long-term monitoring 5-Year Reviews	Containment achieves remedial action objectives by preventing direct contact with contaminated soil/sediment. Excavation and culvert construction would prevent further erosion of waste into Ferry Creek. No reduction in toxicity or volume through treatment is anticipated. Some adverse impacts on human health and environment for both consolidation and containment activities during construction beyond typical earthmoving construction activities because of contaminated soil presence, which can be mitigated through engineering and air pollution controls, and proper decontamination and H&S measures. Flood storage capacity would be limited as final grades will mimic pre-existing elevations to the extent practical. Institutional controls can also mitigate some impacts to human health risks posed by Raymark Waste during remediation activities. Reliable when excavation and containment are properly designed, constructed and maintained; deed restrictions and an O&M plan are integral parts of the alternative. Reliable to the extent that use restrictions can be enforced.	Will need to comply with substantive requirements of ARARs for on-site activities. Adequate on-site storage capacity required for temporary handling and storage of clean and contaminated materials. Conventional construction processes can be implemented with equipment and services that are readily available from several sources. Dewatering and excavation of Ferry Creek pose some technical implementability issues. Water management and sediment management can be addressed. Out of-Town capacity available to receive excess OU3 soil/sediment volume (18,600 CY) that will not be capped on site. Community impacts from construction activities are mainly short term including large numbers of vehicles moving clean and contaminated materials. Performance of 5-year reviews is required. Services readily available to implement institutional controls (signs, fencing, O&M). Institutional controls and local ordinances would require legal and/or actions by others.	Cost: Medium O&M: Medium	Retain.
OU3-5 **Out-of-Town Disposal and Institutional Controls**	**<u>Implementation Period</u>** Excavation of Ferry Creek sediments (4 ft) and Raymark waste from two OU6 properties (4 ft). Excavation of wetlands sediments (4 ft) Culvert construction Out-of-Town disposal of all excavated materials On-site wetlands recreation Land use and access restrictions **<u>Post-Implementation Period</u>** Institutional controls Long-term monitoring 5-Year Reviews	Excavation and out-of-Town disposal achieves remedial action objectives by preventing direct contact with contaminated soil/sediment. Excavation and culvert construction would prevent further erosion of waste into Ferry Creek. No reduction in toxicity or volume through treatment is anticipated. Treatment may occur at the TSDF. Some adverse impacts on human health and environment for both consolidation and containment activities during construction beyond typical earthmoving construction activities because of contaminated soil presence, which can be mitigated through engineering and air pollution controls, and proper decontamination and H&S measures. Flood storage capacity would be unaffected. Institutional controls can also mitigate some impacts to human health risks posed by Raymark Waste during remediation activities. Reliable when excavation and containment are properly designed, constructed and maintained; deed restrictions and an O&M plan are integral parts of the alternative. Reliable to the extent that use restrictions can be enforced.	Out-of-Town disposal capacity for the anticipated volume of contaminated soil that would be excavated (30,600 CY) and/or the entire volume of Raymark waste (38,600 CY) may be available. Will require transport, as disposal facilities are located > 500 miles away. Adequate on-site storage capacity required for temporary handling and storage of clean and contaminated materials. Conventional construction processes can be implemented with equipment and services that are readily available from several sources. Dewatering and excavation of Ferry Creek pose some technical implementability issues. Water management and sediment dewatering requirements may be high. Community impacts from construction activities are mainly short term including large numbers of vehicles moving clean and contaminated materials. Not readily implemented. Services readily available to implement institutional controls (signs, fencing, O&M). Performance of 5-year reviews is required.	Cost: High O&M: Low	Eliminated. Excessive materials handling and dewatering of sediments may be required. Extensive out–of-Town transport required and high capital costs associated with disposal.

TABLE A-1-8
COMPARATIVE ANALYSIS OF OU3 ALTERNATIVES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU3 – FERRY CREEK
STRATFORD, CONNECTICUT

EVALUATION CRITERIA[1]	ALTERNATIVE OU3-1 No Action	ALTERNATIVE OU3-2 Limited Action	ALTERNATIVE OU3-3 Capping and Institutional Controls
Overall Protection of Human Health and the Environment			
Overall assessment of long-term protectiveness and short-term impacts	▪ Developed as a baseline per NCP for comparison purposes. ▪ Would not be protective of human health or environment in the long term. ▪ Contaminants will continue to pose potential health risks through direct exposure (dermal, ingestion, inhalation). ▪ Contaminated sediment will continue to migrate in Ferry Creek. ▪ Unacceptable blood lead levels in children, if no action taken.	▪ Offers very limited protection to human health, and no protection for the environment. ▪ Contaminants will continue to pose potential risks through direct exposure (dermal, ingestion, inhalation), depending on effectiveness of the deterrent (fencing and signage). ▪ Contaminated sediment will continue to migrate in Ferry Creek. ▪ Unacceptable blood lead levels in children, if no action taken.	▪ Offers protection to human health by preventing direct exposure (dermal contact, incidental ingestion, and inhalation). ▪ Contaminated sediment erosion in Ferry Creek will be greatly limited or stopped. ▪ Institutional controls could limit potential intrusion/damage of cover system and culvert, if enforced. ▪ Periodic maintenance would sustain effectiveness of the cap and the culvert.
Compliance with ARARs[2]			
Compliance with chemical-specific ARARs	▪ No applicable chemical-specific ARARs because no response action will be taken.	▪ No applicable chemical-specific ARARs because only limited actions will be taken.	▪ This alternative would comply with chemical-specific ARARs presented in Appendix C, ARAR Table A.
Compliance with location-specific ARARs	▪ No applicable location-specific ARARs because no response action will be taken.	▪ No applicable location-specific ARARs because only limited actions will be taken.	▪ This alternative would comply with location-specific ARARs presented in Appendix C, ARAR Tables B and C.
Compliance with action-specific ARARs	▪ Exceeds federal risk criteria. ▪ Would not comply with CT RCSA RSRs because no actions will be taken. See Appendix C, ARAR Table A.	▪ Exceeds federal risk criteria. ▪ Would not comply with CT RCSA RSRs. See Appendix C, ARAR Table A.	▪ This alternative would comply with the action-specific ARARs listed in Appendix C, ARAR Tables A and D.
Long-Term Effectiveness and Permanence			
Magnitude of residual risks	▪ Carcinogenic risks will remain at 1.71 E-04, which is at high end of EPA's acceptable risk range, due to potential unrestricted use of OU3. ▪ Non-carcinogenic risk will remain at 9 E+00, which exceeds the EPA's acceptable risk range. ▪ Contaminated Raymark waste totaling 38,600 CY would remain unaddressed. ▪ 5-year reviews will be required because waste remains on site.	▪ Carcinogenic risks may be lower than 1.71 E-04, which is at high end of EPA's acceptable risk range, because entry into OU3 would be limited by access restrictions (fencing). ▪ Non-carcinogenic risks may be lower than at 9 E+00, because entry into OU4 would be limited by access restrictions (fencing). ▪ Contaminated Raymark waste totaling 38,600 CY would remain unaddressed. ▪ 5-year reviews will be required because waste remains on site.	▪ Potential carcinogenic risks will not occur because direct exposure to contaminants will be eliminated by capping. ▪ Potential non-carcinogenic risks will not occur because direct exposure to contaminants will be eliminated by capping. ▪ Contaminated Raymark waste totaling 38,600 CY would remain on site, but will be controlled and contained. ▪ 5-year reviews will be required because waste remains on site.
Adequacy and reliability of controls	▪ No controls are used. Therefore, no protection for human health or the environment from potential exposure to contaminants.	▪ Access and land use restrictions may be effective if these controls are enforced and monitored.	▪ Capping is effective and protective, as long as the cover system is maintained. ▪ Access and land use restrictions are effective if these controls are enforced and monitored.
Reduction of Toxicity, Mobility, or Volume Through Treatment			
Treatment process used	▪ No treatment will be used.	▪ No treatment used.	▪ No treatment used.
Reduction in toxicity, mobility, or volume	▪ No reduction of toxicity, mobility, or volume through treatment.	▪ No reduction of toxicity, mobility, or volume through treatment.	▪ No reduction of toxicity, mobility, or volume through treatment.
Type and quantity of treatment residuals	▪ No treatment, therefore no residuals.	▪ No treatment, therefore no residuals.	▪ No treatment, therefore, no residuals.

TABLE A-1-8
COMPARATIVE ANALYSIS OF OU3 ALTERNATIVES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU3 – FERRY CREEK
STRATFORD, CONNECTICUT

EVALUATION CRITERIA[1]	ALTERNATIVE OU3-1 No Action	ALTERNATIVE OU3-2 Limited Action	ALTERNATIVE OU3-3 Capping and Institutional Controls
Satisfies statutory preference for treatment	▪ Would not satisfy statutory preference for treatment.	▪ Would not satisfy statutory preference for treatment.	▪ Would not satisfy statutory preference for treatment.
Short-Term Effectiveness			
Risks to community during implementation of remedial action	▪ No additional risks to community as no actions would be taken.	▪ No additional risks to community as no actions would be taken.	▪ Limited impacts to community are anticipated. Increased truck and vehicular traffic would occur during site preparation, decontamination, and soils/sediments excavation/consolidation. ▪ Increased vehicular traffic on public roads will need to be coordinated and scheduled to minimize impacts to the local community. ▪ Fugitive dust emissions from demolition, soil/sediment excavation/consolidation, cap system construction could be minimized or eliminated by applying proper engineering controls (for example, dust suppressants, enclosures, etc.) and monitoring.
Risks to workers during implementation of remedial action	▪ No additional risks to workers as no actions would be taken.	▪ No additional risks to workers as no actions would be taken.	▪ Risks to workers during the remedial action can be minimized or eliminated through the use of proper personal protective equipment to prevent exposures to contaminant-laden dusts (i.e., metals, asbestos fibers, and PCBs).
Environmental impacts	▪ No additional risks to environment as no actions would be taken.	▪ No additional risks to environment as no actions would be taken.	▪ No permanent adverse impacts to the environment are anticipated as the result of the remedial action. ▪ Wetlands and flood storage capacity will be impaired during the remedial action. Compensatory mitigation actions will be required.
Time until remedial action is achieved	▪ RAO will not be achieved.	▪ Limited actions will be taken, RAO could be achieved if institutional controls are effectively enforced.	▪ Approximately 3 years required to achieve the RAOs, including pre-design, design, and construction activities.
Implementability			
Constructable	▪ Not applicable.	▪ Fencing (access restrictions) and signage easily constructed. ▪ Institutional controls can be prepared to restrict land use.	▪ No anticipated difficulties or uncertainties associated with excavation, consolidation and construction of a cap. ▪ Handling of hazardous and asbestos-contaminated materials will require specially trained workers and supervisors. ▪ Limited difficulty in removing Ferry Creek sediments. Limited difficulty in installing piles in very compressible stream channel materials.
Technology reliability	▪ Not applicable.	▪ Access and land use restrictions can be effective if enforced and maintained.	▪ Containment is a reliable technology, if properly maintained.
Ease of implementing additional actions, if necessary	▪ Easily implemented.	▪ Easily implemented.	▪ Should additional actions be warranted, these can be implemented. ▪ However, repairs may be required to ensure cap integrity after additional actions are completed.
Monitoring effectiveness	▪ Can be monitored.	▪ Monitoring can be effective in evaluating site conditions and potential changes.	▪ Effectiveness of the cover system and culvert can be monitored through periodic inspections and maintenance. ▪ Effectiveness of the institutional controls can also be monitored through periodic inspections.
Coordination with other agencies	▪ Not applicable.	▪ Coordination with other agencies can be readily implemented.	▪ Coordination with other agencies can be readily implemented.

TABLE A-1-8
COMPARATIVE ANALYSIS OF OU3 ALTERNATIVES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU3 – FERRY CREEK
STRATFORD, CONNECTICUT

EVALUATION CRITERIA[1]	ALTERNATIVE OU3-1 No Action	ALTERNATIVE OU3-2 Limited Action	ALTERNATIVE OU3-3 Capping and Institutional Controls
Availability of treatment, storage, and disposal services	▪ Not applicable.	▪ Not applicable.	▪ Not applicable.
Availability of equipment and specialists	▪ Not applicable.	▪ Specialty equipment is not required. Equipment and personnel to install fencing and signage are readily available. Specialists that prepare institutional controls are available.	▪ Some specialty equipment will be required to control dust emissions, dewater, and dredge or excavate sediments during construction. ▪ Standard construction equipment will be required install piles and the reinforced culvert. ▪ Equipment and personnel to excavate, consolidate, and cap contaminated soil/sediment are available. Equipment and personnel to install fencing and signage are readily available. ▪ Some lead time will be required to order the necessary quantities of cover system materials. ▪ Specialists that prepare institutional controls are available.
Availability of prospective technologies	▪ Not applicable.	▪ Access and land use restrictions are readily available.	▪ Capping is well demonstrated technology to contain contaminated materials. ▪ A variety of companies are available that have the experience and capability to implement the consolidation and capping of contaminated materials.
Cost			
Capital Costs	**0**	**$195,000**	**$23,767,000**
O&M Costs (Present Worth)[3]	**$43,200**	**$1,017,500**	**$3,026,400**
Total Present Worth Costs[3]	**$43,200**	**$1,212,500**	**$26,793,300**

TABLE A-1-8
COMPARATIVE ANALYSIS OF OU3 ALTERNATIVES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU3 – FERRY CREEK
STRATFORD, CONNECTICUT

EVALUATION CRITERIA[1]	ALTERNATIVE OU3-4 Excavation, Capping, Out-of-Town Disposal, and Institutional Controls
Overall Protection of Human Health and the Environment	
Overall assessment of long-term protectiveness and short-term impacts	▪ Same as Alternative OU3-3
Compliance with ARARs[2]	
Compliance with chemical-specific ARARs	▪ Same as Alternative OU3-3
Compliance with location-specific ARARs	▪ Same as Alternative OU3-3
Compliance with action-specific ARARs	▪ Same as Alternative OU3-3
Long-Term Effectiveness and Permanence	
Magnitude of residual risks	▪ Same as Alternative OU3-3, except for the following: ▪ Contaminated Raymark waste totaling 7,700 CY would remain on site, but will be controlled and contained. ▪ Contaminated Raymark waste totaling 12,300 CY would remain on site, but would be a depths greater than 4 feet below ground surface. ▪ Contaminated Raymark waste totaling 18,600 CY would transported out-of-Town for disposal at a licensed disposal facility.
Adequacy and reliability of controls	▪ Same as Alternative OU3-3

TABLE A-1-8
COMPARATIVE ANALYSIS OF OU3 ALTERNATIVES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU3 – FERRY CREEK
STRATFORD, CONNECTICUT

EVALUATION CRITERIA[1]	ALTERNATIVE OU3-4 Excavation, Capping, Out-of-Town Disposal, and Institutional Controls
Reduction of Toxicity, Mobility, or Volume through Treatment	
Treatment process used	▪ Same as Alternative OU3-3
Reduction in toxicity, mobility, or volume	▪ Same as Alternative OU3-3
Type and quantity of treatment residuals	▪ Same as Alternative OU3-3
Satisfies statutory preference for treatment	▪ Same as Alternative OU3-3
Short-Term Effectiveness	
Risks to community during implementation of remedial action	▪ Same as Alternative OU3-3; however, volume of Raymark waste that would require handling and transport would be increased both on and off-site.
Risks to workers during implementation of remedial action	▪ Same as Alternative OU3-3; however, volume of Raymark waste that would require handling would be increased.
Environmental impacts	▪ Same as Alternative OU3-3; however, less floodplain mitigation would be required as final grades will mimic pre-existing elevations to the extent practical.
Time until remedial action is achieved	▪ Same as Alternative OU3-3
Implementability	
Constructible	▪ Same as Alternative OU3-3
Technology reliability	▪ Same as Alternative OU3-3

TABLE A-1-8
COMPARATIVE ANALYSIS OF OU3 ALTERNATIVES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU3 – FERRY CREEK
STRATFORD, CONNECTICUT

EVALUATION CRITERIA[1]	**ALTERNATIVE OU3-4** **Excavation, Capping, Out-of-Town Disposal, and Institutional Controls**
Ease of implementing additional actions, if necessary	▪ Same as Alternative OU3-3
Implementability (cont.)	
Monitoring effectiveness	▪ Same as Alternative OU3-3
Coordination with other agencies	▪ Same as Alternative OU3-3
Availability of treatment, storage, and disposal services	▪ Same as Alternative OU3-3
Availability of equipment and specialists	▪ Same as Alternative OU3-3
Availability of prospective technologies	▪ Same as Alternative OU3-3
Cost	
Capital Costs	**$37,940,600**
O&M Costs (Present Worth)[2]	**$3,026,400**
Total Present Worth Costs[2]	**$40,967,000**

Notes:
1. Evaluation criteria from *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final*, EPA/540/G-89/004, OSWER Directive 9355.3-01, October 1988.
2. Chemical-specific , location –specific, and action-specific ARARs are presented in Appendix C.
3. Present Worth calculated based on 7% discount rate per *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*, EPA 540-R-00-002, OSWER 9355.0-75, July 2000.

TABLE A-1-9a
PRESENT VALUE ANALYSIS
ALTERNATIVE OU3-1
FOCUSED FEASIBILITY STUDY
RAYMARK - OU3 - FERRY CREEK
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$20,000	$20,000	7.0%	$14,260
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$20,000	$20,000	7.0%	$10,167
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$20,000	$20,000	7.0%	$7,249
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$20,000	$20,000	7.0%	$5,168
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$20,000	$20,000	7.0%	$3,685
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$20,000	$20,000	7.0%	$2,627
TOTAL	**$0**					**$43,156**
					PV O&M	**$43,156**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE A-1-9b
PRESENT VALUE ANALYSIS
ALTERNATIVE OU3-2
FOCUSED FEASIBILITY STUDY
RAYMARK - OU3 - FERRY CREEK
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$194,999	$0	$0	$194,999	7.0%	$194,999
1	$0	$127,137	$0	$127,137	7.0%	$118,819
2	$0	$127,137	$0	$127,137	7.0%	$111,046
3	$0	$70,224	$0	$70,224	7.0%	$57,323
4	$0	$70,224	$0	$70,224	7.0%	$53,573
5	$0	$70,224	$20,000	$90,224	7.0%	$64,328
6	$0	$70,224	$0	$70,224	7.0%	$46,793
7	$0	$70,224	$0	$70,224	7.0%	$43,732
8	$0	$70,224	$0	$70,224	7.0%	$40,871
9	$0	$70,224	$0	$70,224	7.0%	$38,197
10	$0	$70,224	$20,000	$90,224	7.0%	$45,865
11	$0	$70,224	$0	$70,224	7.0%	$33,363
12	$0	$70,224	$0	$70,224	7.0%	$31,180
13	$0	$70,224	$0	$70,224	7.0%	$29,140
14	$0	$70,224	$0	$70,224	7.0%	$27,234
15	$0	$70,224	$20,000	$90,224	7.0%	$32,701
16	$0	$70,224	$0	$70,224	7.0%	$23,787
17	$0	$70,224	$0	$70,224	7.0%	$22,231
18	$0	$70,224	$0	$70,224	7.0%	$20,777
19	$0	$70,224	$0	$70,224	7.0%	$19,417
20	$0	$70,224	$20,000	$90,224	7.0%	$23,316
21	$0	$70,224	$0	$70,224	7.0%	$16,960
22	$0	$70,224	$0	$70,224	7.0%	$15,850
23	$0	$70,224	$0	$70,224	7.0%	$14,813
24	$0	$70,224	$0	$70,224	7.0%	$13,844
25	$0	$70,224	$20,000	$90,224	7.0%	$16,624
26	$0	$70,224	$0	$70,224	7.0%	$12,092
27	$0	$70,224	$0	$70,224	7.0%	$11,301
28	$0	$70,224	$0	$70,224	7.0%	$10,562
29	$0	$70,224	$0	$70,224	7.0%	$9,871
30	$0	$70,224	$20,000	$90,224	7.0%	$11,852
TOTAL	**$194,999**					**$1,212,464**
					PV O&M	**$1,017,465**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE A-1-9c
PRESENT VALUE ANALYSIS
ALTERNATIVE OU3-3
FOCUSED FEASIBILITY STUDY
RAYMARK - OU3 - FERRY CREEK
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$23,766,932	$0	$0	$23,766,932	7.0%	$23,766,932
1	$0	$289,031	$0	$289,031	7.0%	$270,122
2	$0	$289,031	$0	$289,031	7.0%	$252,451
3	$0	$232,118	$0	$232,118	7.0%	$189,477
4	$0	$232,118	$0	$232,118	7.0%	$177,082
5	$0	$232,118	$20,000	$252,118	7.0%	$179,757
6	$0	$232,118	$0	$232,118	7.0%	$154,670
7	$0	$232,118	$0	$232,118	7.0%	$144,551
8	$0	$232,118	$0	$232,118	7.0%	$135,095
9	$0	$232,118	$0	$232,118	7.0%	$126,257
10	$0	$232,118	$20,000	$252,118	7.0%	$128,164
11	$0	$232,118	$0	$232,118	7.0%	$110,278
12	$0	$232,118	$0	$232,118	7.0%	$103,063
13	$0	$232,118	$0	$232,118	7.0%	$96,321
14	$0	$232,118	$0	$232,118	7.0%	$90,019
15	$0	$232,118	$20,000	$252,118	7.0%	$91,379
16	$0	$232,118	$0	$232,118	7.0%	$78,626
17	$0	$232,118	$0	$232,118	7.0%	$73,483
18	$0	$232,118	$0	$232,118	7.0%	$68,675
19	$0	$232,118	$0	$232,118	7.0%	$64,183
20	$0	$232,118	$20,000	$252,118	7.0%	$65,152
21	$0	$232,118	$0	$232,118	7.0%	$56,060
22	$0	$232,118	$0	$232,118	7.0%	$52,392
23	$0	$232,118	$0	$232,118	7.0%	$48,965
24	$0	$232,118	$0	$232,118	7.0%	$45,761
25	$0	$232,118	$20,000	$252,118	7.0%	$46,453
26	$0	$232,118	$0	$232,118	7.0%	$39,970
27	$0	$232,118	$0	$232,118	7.0%	$37,355
28	$0	$232,118	$0	$232,118	7.0%	$34,911
29	$0	$232,118	$0	$232,118	7.0%	$32,627
30	$0	$232,118	$20,000	$252,118	7.0%	$33,120
TOTAL	**$23,766,932**					**$26,793,349**
					PV O&M	**$3,026,416**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE A-1-9d
PRESENT VALUE ANALYSIS
ALTERNATIVE OU3-4
FOCUSED FEASIBILITY STUDY
RAYMARK - OU3- FERRY CREEK
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$37,940,606	$0	$0	$37,940,606	7.0%	$37,940,606
1	$0	$289,031	$0	$289,031	7.0%	$270,122
2	$0	$289,031	$0	$289,031	7.0%	$252,451
3	$0	$232,118	$0	$232,118	7.0%	$189,477
4	$0	$232,118	$0	$232,118	7.0%	$177,082
5	$0	$232,118	$20,000	$252,118	7.0%	$179,757
6	$0	$232,118	$0	$232,118	7.0%	$154,670
7	$0	$232,118	$0	$232,118	7.0%	$144,551
8	$0	$232,118	$0	$232,118	7.0%	$135,095
9	$0	$232,118	$0	$232,118	7.0%	$126,257
10	$0	$232,118	$20,000	$252,118	7.0%	$128,164
11	$0	$232,118	$0	$232,118	7.0%	$110,278
12	$0	$232,118	$0	$232,118	7.0%	$103,063
13	$0	$232,118	$0	$232,118	7.0%	$96,321
14	$0	$232,118	$0	$232,118	7.0%	$90,019
15	$0	$232,118	$20,000	$252,118	7.0%	$91,379
16	$0	$232,118	$0	$232,118	7.0%	$78,626
17	$0	$232,118	$0	$232,118	7.0%	$73,483
18	$0	$232,118	$0	$232,118	7.0%	$68,675
19	$0	$232,118	$0	$232,118	7.0%	$64,183
20	$0	$232,118	$20,000	$252,118	7.0%	$65,152
21	$0	$232,118	$0	$232,118	7.0%	$56,060
22	$0	$232,118	$0	$232,118	7.0%	$52,392
23	$0	$232,118	$0	$232,118	7.0%	$48,965
24	$0	$232,118	$0	$232,118	7.0%	$45,761
25	$0	$232,118	$20,000	$252,118	7.0%	$46,453
26	$0	$232,118	$0	$232,118	7.0%	$39,970
27	$0	$232,118	$0	$232,118	7.0%	$37,355
28	$0	$232,118	$0	$232,118	7.0%	$34,911
29	$0	$232,118	$0	$232,118	7.0%	$32,627
30	$0	$232,118	$20,000	$252,118	7.0%	$33,120
TOTAL	**$37,940,606**					**$40,967,023**
					PV O&M	**$3,026,416**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE A-1-9e
CAPITAL COSTS
OU3 ALTERNATIVES (OU3-1, OU3-2, OU3-3)
FOCUSED FEASIBILITY STUDY
RAYMARK - OU3 - FERRY CREEK
STRATFORD, CONNECTICUT

	DESCRIPTION	UNIT	UNIT COST[1]	QUANTITY				TOTAL COST				SOURCE
				OU3 - 1	OU3 - 2	OU3 - 3	OU3-4	OU3 - 1	OU3 - 2	OU3 - 3	OU3-4	
1.0	**Mobilization/Demobilization**											
1.1	Equipment/Personnel Mobilization	LS	$100,000	0	0	1	1	$0	$0	$100,000	$100,000	see cost assumptions (2010) in Appendix G
1.2	Field Support Facilities	LS	$35,000	0	0	1	1	$0	$0	$35,000	$35,000	see cost assumptions (2010) in Appendix G
1.3	Monthly Costs associated with Field Support	MONTH	$48,000	0	0	12	12	$0	$0	$576,000	$576,000	see cost assumptions (2010) in Appendix G
1.4	Site access fees/costs	LS	$1,500,000	0	0	1	1	$0	$0	$1,500,000	$1,500,000	see Appendix A cost assumptions
	Subtotal							**$0**	**$0**	**$2,211,000**	**$2,211,000**	
2.0	**Site Preparation**											
2.1	Site Access/Haul Road Construction	SY	$23.06	0	0	3,000	3,000	$0	$0	$69,177	$69,177	Means 2008 HC, 32 11 23.23 0300
2.2	Clear and Grub	EA	$3,968	0	0	2	2	$0	$0	$7,937	$7,937	Means 2008 HC, 31 11 10.10 0020
2.3	Site Survey	LS	$5,945	0	0	1	1	$0	$0	$5,945	$5,945	TtNUS, 2005
2.4	Decontamination Facilities & Services	LS	$350,000	0	0	1	1	$0	$0	$350,000	$350,000	see Appendix A cost assumptions
2.5	Install Erosion and Sedimentation Controls	LF	$8.97	0	0	3000	3,000	$0	$0	$26,899	$26,899	Means 2008 HC, 31 25 13.10 1100, 1250
2.6	Install Fence and signage[2]	LF	$28.31	0	3,000	3,000	3,000	$0	$84,929	$84,929	$84,929	see cost assumptions (2010) in Appendix G
	Subtotal							**$0**	**$84,929**	**$544,886**	**$544,886**	
3.0	**Ferry Creek Diversion**											
3.1	Perform hydrologic study of Ferry Creek	LS	$144,789	0	0	1	1	$0	$0	$144,789	$144,789	Estimated
3.2	Repair Broad Street flood gates	LS	$58,988	0	0	1	1	$0	$0	$58,988	$58,988	Estimated
3.3	Install temporary water pumping stations	MONTH	$12,662.67	0	0	12	12	$0	$0	$151,952	$151,952	Vendor estimate Oct. 2007
3.4	Temporary water pumping stations operations	MONTH	$6,435.07	0	0	6	6	$0	$0	$38,610	$38,610	
3.5	Install temporary bypass piping	LF	$21.45	0	0	2,500	2,500	$0	$0	$53,626	$53,626	Estimated
3.8	Water management labor and materials	MONTH	$5,362.56	0	0	12	12	$0	$0	$64,351	$64,351	
	Subtotal							**$0**	**$0**	**$512,316**	**$512,316**	
4.0	**Ferry Creek Sediment Excavation & Dewatering**											
4.1	Amphibious hydraulic dredge mobilization	LS	$21,450.22	0	0	1	1	$0	$0	$21,450	$21,450	Estimated
4.2	Hydraulic dredge	LS	$241,315.02	0	0	1	1	$0	$0	$241,315	$241,315	Vendor quote
4.3	Bench- and field-test coagulation polymer selection/addition	LS	$21,450.22	0	0	1	1	$0	$0	$21,450	$21,450	
4.4	Sediment dewatering - Geotubes, polymers	CY	$34.32	0	0	7,620	7,620	$0	$0	$261,521	$261,521	Estimated
4.5	Water Treatment (filtration & GAC)	CY	$32.18	0	0	7,620	7,620	$0	$0	$245,176	$245,176	
4.6	Misc. pumps, pipes, valves, parts.	LS	$53,625.56	0	0	1	1	$0	$0	$53,626	$53,626	
4.8	Labor (6 crew)	MONTH	$77,220.81	0	0	12	12	$0	$0	$926,650	$926,650	
4.9	Transfer to wetlands area[4]	CY	$4.28	0	0	9,144	0	$0	$0	$39,109	$0	Means 2007 SW&L, 31 23 23.18 0310
	Subtotal							**$0**	**$0**	**$1,810,297**	**$1,771,188**	
5.0	**Ferry Creek Channel Construction**											
5.1	Pre-Design Investigation	LS	$123,338.79	0	0	1	1	$0	$0	$123,339	$123,339	Estimated
5.2	Overexcavate streambed for culvert installation[3]	CY	$14.36	0	0	7,620	7,620	$0	$0	$109,430	$109,430	
5.3	Install surcharge to compress stream bottom	CY	$54.70	0	0	11,429	11,429	$0	$0	$625,119	$625,119	Means 2005 SW&L, 02300 520 1300
5.4	Grade sidewalls	SY	$2.38	0	0	11,429	11,429	$0	$0	$27,179	$27,179	Means 2005 SW&L, 02305 100 1050
5.5	Piles installation - precast concrete (30 ft lengths, 4 per channel section @ 2100 ft)	EA	$697	0	0	840	840	$0	$0	$585,810	$585,810	Means 2005 SW&L, 02455 450 3100
5.6	Pre-cast, reinforced, pre-stressed concrete channels (2100 LF)	EA	$13,213	0	0	210	210	$0	$0	$2,774,776	$2,774,776	Vendor estimate Oct. 2007
5.7	Concrete channel installation (crane & crew)	DAY	$1,434	0	0	105	105	$0	$0	$150,573	$150,573	Means 2005 SW&L, 01590 600 1000
5.8	Piles installation - precast concrete (30 ft lengths) - Lower Ferry Creek (900 LF)	EA	$697	0	0	720	720	$0	$0	$502,123	$502,123	Means 2005 SW&L, 02455 450 3100
5.9	Pre-cast, reinforced, pre-stressed concrete channels, Lower Ferry Creek (900 LF x 2)	EA	$13,213	0	0	180	180	$0	$0	$2,378,379	$2,378,379	Vendor estimate Oct. 2007
5.10	Concrete channel installation (crane & crew) (Lower Ferry Creek)	DAY	$1,434	0	0	90	90	$0	$0	$129,062	$129,062	Means 2005 SW&L, 01590 600 1000
	Subtotal							**$0**	**$0**	**$7,405,789**	**$7,405,789**	
	Streambank Stabilization											
5.11	Grade and compact streambank	SY	$2.58	0	0	6,600	6,600	$0	$0	$17,030	$17,030	Means 2005 SW&L, 02305 100 1050
5.12	Install geotextile	SY	$1.41	0	0	6,600	6,600	$0	$0	$9,312	$9,312	Means 2005 ER, 17 03 0430
5.13	Install 6 inch gravel	CY	$5.18	0	0	1,100	1,100	$0	$0	$5,703	$5,703	Means 2005 SW&L, 02720 200 0370
5.14	Install 12 inch sand	CY	$0.94	0	0	2,200	2,200	$0	$0	$2,067	$2,067	Means 2005 SW&L, G1030 815
5.15	Install 9 inch slabs	SF	$14	0	0	59,400	59,400	$0	$0	$810,491	$810,491	Means 2005 SW&L, 03400 620 0150
5.16	Seal joints	LF	$2	0	0	19,800	19,800	$0	$0	$32,490	$32,490	Means 2005 SW&L, 03300 325 0320
	Subtotal							**$0**	**$0**	**$877,092**	**$877,092**	

TABLE A-1-9e
CAPITAL COSTS
OU3 ALTERNATIVES (OU3-1, OU3-2, OU3-3)
FOCUSED FEASIBILITY STUDY
RAYMARK - OU3 - FERRY CREEK
STRATFORD, CONNECTICUT

	DESCRIPTION	UNIT	UNIT COST[1]	QUANTITY				TOTAL COST				SOURCE
				OU3 - 1	OU3 - 2	OU3 - 3	OU3-4	OU3 - 1	OU3 - 2	OU3 - 3	OU3-4	
6.0	**OU6 Properties and Wetland Area Excavation**											
	OU6 Properties - Lot Behind 326 Ferry Boulevard and Vacant Lot Behind Housatonic Avenue											
6.1	Excavate Raymark Waste[3]	CY	$2.12	0	0	0	4,300	$0	$0	$0	$9,131	Means 2008 HC, 31 23 16.42 0200
6.2	Confirmation sampling and analysis	EA	$500	0	0	0	0	$0	$0	$0	$0	
6.3	Transfer to wetlands area[4]	CY	$4.28	0	0	0	5,160	$0	$0	$0	$22,069	Means 2007 SW&L, 31 23 23.18 0310
6.4	Backfill excavation	CY	$12	0	0	0	0	$0	$0	$0	$0	see cost assumptions (2010) in Appendix G
6.5	Compaction and grading	SY	$1	0	0	0	0	$0	$0	$0	$0	Means 2005 SW&L, 02315 310 5620
6.6	Hydroseeding	MSF	$43.97	0	0	0	0	$0	$0	$0	$0	Means 2008 HC, 32 92 19.14 3500
	Subtotal							**$0**	**$0**	**$0**	**$31,201**	
	OU3 Wetland Area											
6.1	Excavate Raymark Waste[3]	CY	$2.12	0	0	0	6,700	$0	$0	$0	$14,228	Means 2008 HC, 31 23 16.42 0200
6.2	Confirmation sampling and analysis	EA	$500	0	0	0	0	$0	$0	$0	$0	
6.3	Transfer to wetlands area[4]	CY	$4.28	0	0	0	8,040	$0	$0	$0	$34,387	Means 2007 SW&L, 31 23 23.18 0310
6.4	Backfill excavation	CY	$12	0	0	0	0	$0	$0	$0	$0	see cost assumptions (2010) in Appendix G
6.5	Compaction and grading	SY	$1	0	0	0	0	$0	$0	$0	$0	Means 2005 SW&L, 02315 310 5620
6.6	Hydroseeding	MSF	$43.97	0	0	0	0	$0	$0	$0	$0	Means 2008 HC, 32 92 19.14 3500
	Subtotal							**$0**	**$0**	**$0**	**$48,615**	
7.0	**Spread/Compact Raymark Waste**											
7.1	Spread Raymark Waste	CY	$2.40	0	0	7,620	0	$0	$0	$18,306	$0	Means 2008 HC, 31 23 23.17 0400, 31 23 23.23 5000
7.2	Compact Raymark Waste	CY	$0.32	0	0	7,620	0	$0	$0	$2,444	$0	Means 2008 HC, 31 23 23.23 5060
7.3	Watering with 3,000 gallon Tank truck	ACRE	$168.43	0	0	96	0	$0	$0	$16,170	$0	Means 2005 ER, 318 05 0413
7.4	Dust suppressant - tree resin	ACRE	$11,452	0	0	0	0	$0	$0	$0	$0	Means 2005 ER, 33 08 0576
7.5	Perimeter Air Sampling	EA	$243.76	0	0	30	0	$0	$0	$7,430	$0	Aero-Tech, 2005
7.6	Equipment Decontamination	HR	$54.56	0	0	318	0	$0	$0	$17,324	$0	Means 2004 ER, 33 17 0823
	Subtotal							**$0**	**$0**	**$61,674**	**$0**	
8.0	**Construct Low-Permeability Cap**											
8.1	Deliver, Dump, Spread, and Compact Sand Subbase (6")[5]	CY	$27.00	0	0	2,184	2,184	$0	$0	$58,947	$58,947	Means 2008 HC (multiple items)
8.2	Install Geosynthetic Clay Liner (bottom layer)	SF	$2.86	0	0	107,195	107,195	$0	$0	$306,842	$306,842	Means 2009 FC, 33.46.26.10 0180
8.3	Install 60 mil HDPE liner	SF	$2.84	0	0	107,195	107,195	$0	$0	$304,636	$304,636	Means 2005 ER, 33 08 0572
8.4	Install Geosynthetic Drainage Layer	SF	$0.65	0	0	107,195	107,195	$0	$0	$70,105	$70,105	Means 2005 ER, 33 08 0513
8.5	Furnish, Spread, and Compact Soil Layer (24")[5]	CY	$11.83	0	0	8,734	8,734	$0	$0	$103,326	$103,326	see cost assumptions (2008)
8.6	Install Nonwoven Geotextile Delineation/Warning Layer	SF	$1.29	0	0	107,195	107,195	$0	$0	$138,282	$138,282	Means 2010 SW, 31.32.19.16.1550
8.7	Furnish, Place, and Spread Topsoil (6")[5]	CY	$34.65	0	0	2,184	2,184	$0	$0	$75,661	$75,661	Means 2005 ER, 18 05 0301
8.8	Hydroseeding with Mulch and Fertilizer	MSF	$43.97	0	0	107	107	$0	$0	$4,714	$4,714	Means 2008 HC, 32 92 19.14 3500
8.9	Site Cleanup	HR	$405.12	0	0	64	64	$0	$0	$25,928	$25,928	Means 2004, 17 04 0101
8.10	Clean Fill, Delivered, Dumped, Spread, and Compacted[5]	CY	$11.83	0	0	0	0	$0	$0	$0	$0	see cost assumptions (2008)
8.11	Install Geotextile Fabric Layer	SY	$2.21	0	0	11,911	11,911	$0	$0	$26,322	$26,322	Means 2010 SW, 31.32.19.16 1500
8.12	As-Built Survey, with monuments, etc.	LS	$50,000	0	0	1	1	$0	$0	$50,000	$50,000	Estimated
	Subtotal							**$0**	**$0**	**$1,164,762**	**$1,164,762**	
9.0	**Off-Site Raymark Waste Disposal**											
9.1	Load Raymark Waste into Trucks (Out-of-Town T&D)	CY	$2.44	0	0	0	22,344	$0	$0	$0	$54,566	Means 2008 HC, 31 23 16.42 0200
9.2	Equipment Decontamination (30 min per 12 cy truck)	HR	$54.56	0	0	0	931	$0	$0	$0	$50,800	Means 2004 ER, 33 17 0823
9.3	Out-of-Town Transportation of Waste[6]	TON	$170.00	0	0	0	33,516	$0	$0	$0	$5,697,720	see cost assumptions (2010) in Appendix G
9.4	Out-of-Town Disposal of Waste (no treatment) (Subtitle C)[6, 7]	TON	$107.10	0	0	0	30,164	$0	$0	$0	$3,230,607	see cost assumptions (2010) in Appendix G
9.5	Out-of-Town Disposal of Waste (treatment) (Subtitle C)[6, 7]	TON	$192.00	0	0	0	3,352	$0	$0	$0	$643,507	see cost assumptions (2010) in Appendix G
	Subtotal							**$0**	**$0**	**$0**	**$9,677,201**	

TABLE A-1-9e
CAPITAL COSTS
OU3 ALTERNATIVES (OU3-1, OU3-2, OU3-3)
FOCUSED FEASIBILITY STUDY
RAYMARK - OU3 - FERRY CREEK
STRATFORD, CONNECTICUT

DESCRIPTION		UNIT	UNIT COST[1]	QUANTITY				TOTAL COST				SOURCE
				OU3 - 1	OU3 - 2	OU3 - 3	OU3-4	OU3 - 1	OU3 - 2	OU3 - 3	OU3-4	
10.0 Monitoring Wells Installation												
10.1	Wells Installation	EA	$5,000.00	0	5	5	5	$0	$25,000	$25,000	$25,000	see Appendix A cost assumptions
	Subtotal							**$0**	**$25,000**	**$25,000**	**$25,000**	
11.0 Interim Construction Monitoring												
11.1	Stormwater	LS	$19,500.00	0	0	1	1	$0	$0	$19,500	$19,500	see Appendix A cost assumptions
11.2	Air	LS	$61,800.00	0	0	1	1	$0	$0	$61,800	$61,800	see Appendix A cost assumptions
	Subtotal							**$0**	**$0**	**$81,300**	**$81,300**	
12.0 Wetlands & Floodplains Mitigation[8]												
12.1	Purchase land for Flood Storage Mitigation	ACRE	$200,000.00	0	0	1	1	$0	$0	$200,000	$200,000	TtNUS, 2006
12.2	Flood storage mitigation	LS	$225,000.00	0	0	1	0.5	$0	$0	$225,000	$112,500	TtNUS, 2006
12.3	Purchase land for Wetlands Mitigation	ACRE	$200,000.00	0	0	2.4	2.4	$0	$0	$480,000	$480,000	TtNUS, 2006
12.4	Construct compensatory wetlands	LS	$325,000.00	0	0	1	1	$0	$0	$325,000	$325,000	TtNUS, 2006
	Subtotal							**$0**	**$0**	**$1,230,000**	**$1,117,500**	
TOTAL DIRECT COSTS								**$0**	**$109,929**	**$15,924,116**	**$25,436,649**	
13.0 Other Costs												
13.1	Project Management (5% of direct costs)							$0	$5,496	$796,206	$1,271,832	OSWER 9355.0-75
13.2	Engineering and Design (8% direct costs)							$0	$0	$1,273,929	$2,034,932	OSWER 9355.0-75
13.3	Construction management (6% of direct costs)							$0	$6,596	$955,447	$1,526,199	OSWER 9355.0-75
13.4	Location Adjustment (9%)							$0	$9,894	$1,433,170	$2,289,298	Means 2004 ER
13.5	Contingency (15%)							$0	$16,489	$2,388,617	$3,815,497	OSWER 9355.0-75
13.6	Health and Safety Monitoring (6% of direct costs)							$0	$6,596	$955,447	$1,526,199	TtNUS 1999 Report
13.7	Deed Restriction Transactional Fees (2 properties)							$0	$40,000	$40,000	$40,000	
TOTAL OTHER COSTS								**$0**	**$85,071**	**$7,842,817**	**$12,503,958**	
TOTAL CAPITAL COST								**$0**	**$194,999**	**$23,766,932**	**$37,940,606**	

Notes:
[1] For source information regarding unit pricing - refer to cost assumptions provided in Appendix A and G; rates asjusted to reflect 2010 price increases.
[2] Assume fencing and signage to be maintained for Alt. OU3-2 only - all other fencing and signage would be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated.
[4] Volume for hauling RW includes a bulking factor of 1.2.
[5] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[6] A conversion factor of 1.5 was used to convery CY to TON.
[7] Assume that up 10% of RW may be hazardous requiring treatment prior to disposal (out-of-Town).
[8] Impacts to floodplains will evaluated during Remedial Design and will require compensation (off-property) to ensure no loss of flood storage capacity will be incurred; impacted wetlands would be restored to pre-existing conditions to the extent practical.

RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation

TABLE A-1-9f
OPERATIONS AND MAINTENANCE COSTS
OU3 ALTERNATIVES (OU3-1, OU3-2, OU3-3, AND OU3-4)
FOCUSED FEASIBILITY STUDY
RAYMARK - OU3- FERRY CREEK
STRATFORD, CONNECTICUT

DESCRIPTION		UNIT	UNIT COST[1]	QUANTITY				TOTAL COST			
				OU3 - 1	OU3 - 2	OU3- 3	OU3-4	OU3 - 1	OU3 - 2	OU3- 3	OU3-4
OM.1.0	**Groundwater Monitoring (per event)**										
OM.1.1	Sampling Equipment Rental	LS	$1,073	0	1	1	1	$0	$1,073	$1,073	$1,073
OM.1.2	Sampling Labor - FOL	HR	$110	0	44	44	44	$0	$4,840	$4,840	$4,840
OM.1.3	Sampling Labor - Sampler	HR	$90	0	22	22	22	$0	$1,980	$1,980	$1,980
OM.1.4	Analytical Costs	EA	$697	0	11	11	11	$0	$7,668	$7,668	$7,668
OM.1.5	Data Validation	HR	$110	0	11	11	11	$0	$1,210	$1,210	$1,210
OM.1.6	Report Preparation	LS	$2,200	0	1	1	1	$0	$2,200	$2,200	$2,200
	Subtotal							**$0**	**$18,971**	**$18,971**	**$18,971**
OM.2.0	**Ground Surface Inspections, Maintenance, and Repairs (per year)**										
OM.2.1	Inspections	HR	$110.00	0	120	120	120	$0	$13,200	$13,200	$13,200
OM.2.2	Mowing (twice per year)	MSF	$7.34	0	0	214	214	$0	$0	$1,570	$1,570
OM.2.3	Revegetation[2]	MSF	$56.31	0	0	1	1	$0	$0	$60	$60
OM.2.4	Asphalt Repairs	SF	$1.81	0	0	0	0	$0	$0	$0	$0
OM 2.5	Fence Repair[3]	LF	$27.57	0	100	0	0	$0	$2,757	$0	$0
OM 2.6	Sign Replacement[4]	EA	$73.95	0	120	0	0	$0	$8,874	$0	$0
OM.2.7	Reporting (annual)	LS	$10,000.00	0	1	1	1	$0	$10,000	$10,000	$10,000
OM.2.8	Contractor mobilizations	LS	$321.75	0	1	3	3	$0	$322	$965	$965
OM.2.9	Cap/Culvert/Streambank Repairs - (2% per year of capital costs)	LS	$171,252	0	0	1	1	$0	$0	$171,252	$171,252
	Subtotal							**$0**	**$35,153**	**$197,047**	**$197,047**
OM.3.0	**Deed Restrictions**										
OM.3.1	Inspection (annual)	LS	$1,100.00	0	1	1	1	$0	$1,100	$1,100	$1,100
OM.3.2	Deed Restriction Reporting (annual)	EA	$5,000.00	0	3	3	3	$0	$15,000	$15,000	$15,000
	Subtotal							**$0**	**$16,100**	**$16,100**	**$16,100**
ANNAUL O&M COSTS ALT. OU3-2 (YEARS 1-2)[5]								**--**	**$127,137**	**--**	**--**
ANNUAL O&M COSTS ALT. 0U3-2 (YEARS 3-30)[6]								**--**	**$70,224**	**--**	**--**
ANNUAL O&M COSTS ALT. OU3-3 / OU-4 (YEARS 1-2)[7]								**--**	**--**	**$289,031**	**$289,031**
ANNUAL O&M COSTS ALT. OU3-3 / OU-4 (YEARS 3-30)[8]								**--**	**--**	**$232,118**	**$232,118**

Notes:
[1] For source information regarding unit pricing - refer to cost assumptions provided in Appendix G.
[2] Assumed that 1% of vegetated surfaces will require repair annually
[3] Assume fencing will not be required following remedial action and would be maintained for Alternative OU3-2 only.
[4] Assume signage will not be required following remedial action and would be maintained for Alternative OU3-2 only.
[5] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface and fence/sign inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.
[6] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface and fence/sign inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.
[7] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.
[8] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

COST ASSUMPTIONS
FOCUSED FEASIBILITY STUDY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		RATIONALE
General Assumptions		
The costs shown in these tables reflect those that would be expected for implementation of remedial actions at one property or property group at a time. Performing actions on more than one property or property group during the same mobilization could potentially result in cost savings.		
Other Costs presented in Section 7.0 of the cost estimate are based on recommended percentages contained in *A Guide to Developing and Documenting Cost Estimates During the Feasibility* (OSWER 9355.0-75), July 2000. Location adjustment based on value published in Means 2005 ER. Contingency line items based on typical values presented in OSWER 9355.0-75		
OU3 - FERRY CREEK		
1.0 Mobilization/Demobilization		
1.1	Equipment/Personnel/Materials Mobilization	Assume less than 25 mile haul distance for all heavy equipment.
		Heavy equipment would be mobilized and demobilized to and from the site once
		Assume $500 for mob, $500 for demob per piece of heavy equipment.
		The following pieces of heavy equipment would be mobilized to the property at various points of the project: excavator(s), FE loader(s), dozer(s), dump truck(s), roller(s), grader(s), paver(s), chipping machine(s), water truck(s). Mobilization/demobilization costs vary based on size and scope of excavation required. Assume 20 pieces required.
		600 hours @ $100/HR for planning, procurement, contracts management, and mobilization/demobilization of personnel, equipment, and materials.
		Assume $20,000 to provide mobilization of personnel, equipment, and materials to
1.2	Field Support Facilities	Field support facilities will be mobilized and demobilized to and from the property once during the course of the remedial action.
		The following items are included in this cost line item: office & shower trailers @ $1,000, storage trailers @ $600, site utilities setup @ $15,000, dumpsters @ $200, sanitary facilities @ $400, sampling equip @ $4,000, Misc. items - $4,000. Limited prep. of storage/laydown areas - $10,000. Costs may vary based on size and scope of excavation required.
1.3	Monthly Costs associated with Field Support	Monthly rental costs for duration of project for the following: office trailers @ $1,000, storage trailers @ $500, utilities @ $3,000, dumpster @ $500, PPE - $1,000, sampling materials @ $4,000, frac. tanks @ $1000, water storage tanks @$1,000, rolloffs @ $1,000, air sampling equipment (PIDs, air pumps) @ $5,000. Vehicle leases - $3,000. Fuel - $2,000. Office equip (PCs/fax, etc.) - $3000. Travel and M&IE expenses ~ $22,000.
1.4	Site Access Fees/Costs	Estimate of potential costs to acquire occupied properties/businesses along Ferry Blvd. to facilitate access into work areas, remediation, and construction activities. Includes permits, insurance, licenses, fees.
2.0 Site Preparation		
Site preparation will be performed.		
2.1	Site Access Road Construction	Aggregate base course, 12" deep, daily output 5,000 S.Y.
		Crew B-36C: 1 labor foreman, 3 equip operators, 1 truck driver; 1 dozer, 1 roller, 1 grader, 1 water tanker.
2.2	Clear and Grub	Cut & chip light trees to 6" diameter.
		Crew B-7: 1 labor foreman, 4 laborers, 1 equipment operator.
		1 chipping machine, 1 front-end loader, 2 chainsaws.

COST ASSUMPTIONS
FOCUSED FEASIBILITY STUDY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		RATIONALE
General Assumptions		
The costs shown in these tables reflect those that would be expected for implementation of remedial actions at one property or property group at a time. Performing actions on more than one property or property group during the same mobilization could potentially result in cost savings.		
Other Costs presented in Section 7.0 of the cost estimate are based on recommended percentages contained in *A Guide to Developing and Documenting Cost Estimates During the Feasibility* (OSWER 9355.0-75), July 2000. Location adjustment based on value published in Means 2005 ER. Contingency line items based on typical values presented in OSWER 9355.0-75		
OU3 - FERRY CREEK		
2.3	Site survey	Survey of site area, for ~ 10 acres, 2 FT contours.
	Pre-construction survey	Topographic survey, conventional, max. [Means 2008 HC, 02 21 13.09 0020 & 0100]
	Interim-construction topo survey	Post excavation. Topographic survey, conventional, min. [Means 2008 HC, 02 21 13.09 0020]
	As constructed survey	Post construction. Topographic survey, conventional, average of min. [Means 2008 HC, 02 21 13.09 0020]
		Site survey would serve to identify the delineated Raymark waste footprints prior to construction of site.
2.4	Construct Enclosed Equipment Decontamination Pad	Assumes construction of an enclosed, heavy equipment decontamination pad at the site. Decontaminate trucks and heavy equipment.
		Equipment decontamination pads assumed assumed 20' x 40' in size with 6" gravel base, 60-mil high density polyethylene liner, and 4" crushed stone, graded to divert decontamination fluids into a water collection sump.
		Enclosed structure - 60' W x 80' L x 30' H - vendor quote - Big Top Mfg. [$50k enclosure; $17k installation; $3k shipping; $13k dismantle; $17k reinstall; crew rate $2200/day @ 2 days]
		See OU3 FFS Cost Estimate Details
2.5	Install Erosion and Sedimentation Controls	Erosion and sedimentation controls will consist of hay/straw bales and silt fence installed at the perimeter of work areas, including stockpiling/staging areas and excavation area (if needed).
2.6	Install Fence and signage	Installed along perimeter of site.
3.0 Ferry Creek Diversion		
3.1	Perform hydrologic study of Ferry Creek	Estimate 1,000 hours @ $125/HR for field and report, $10,000 expenses
3.2	Repair Broad Street flood gates	Assume 100 hours @$200 + 200 hours @ $125/HR, $10,000 ODCs
3.3	Temporary water pumping equipment	Vendor quote. Oct. 2007. Lease per month for lines, controllers, pipes, diesel pumps. 3 3-in diesel pumps, 1 10-in deisel pump, control boxes and floats, straight and angled hard pipe. 800 cfs pumping capacity.
3.4	Temporary water pumping stations operations	Vendor quote. Oct. 2007. Estimate of utilities and O&M.
3.5	Install temporary bypass piping	Estimated 2500 LF to isolate channel section.
3.6	Water management labor and materials	15 hours @ $100/HR, $600 materials
4.0 Ferry Creek Sediment Excavation & Dewatering		
4.1	Amphibious hydraulic dredge mobilization	Estimated mob. Cost for dredging unit.
4.2	Hydraulic dredge	Keene Eng. Model 6DX cutterhead dredge (or equiv.) w/ lift trailer, for narrow, shallow channel. 25 to 50 CY/HR. Vendor quote 2007.
4.3	Bench- and field-test coagulation polymer selection/addition	Required for flocculation of fines/sediment of dredged materials in Geotubes. Labor: @ 100 hours @ $150/HR, ODCs/expenses: $5000.
4.4	Sediment dewatering - Geotubes, polymers	Miratech Geotube, vendor budgetary estimate.

COST ASSUMPTIONS
FOCUSED FEASIBILITY STUDY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		RATIONALE
General Assumptions		
The costs shown in these tables reflect those that would be expected for implementation of remedial actions at one property or property group at a time. Performing actions on more than one property or property group during the same mobilization could potentially result in cost savings.		
Other Costs presented in Section 7.0 of the cost estimate are based on recommended percentages contained in *A Guide to Developing and Documenting Cost Estimates During the Feasibility* (OSWER 9355.0-75), July 2000. Location adjustment based on value published in Means 2005 ER. Contingency line items based on typical values presented in OSWER 9355.0-75		
OU3 - FERRY CREEK		
4.5	Water Treatment (filtration & GAC)	Miratech Geotube, vendor budgetary estimate.
4.6	Misc. pumps, pipes, valves, parts.	Assume materials and supplies for duration.
4.8	Labor (6 crew)	Crew to perform dredging, dewaterig, and Geotube management. 6 @ 8 HR/DAY @ $75/HR @ 20 DAY/MON
5.0 Ferry Creek Channel Construction		
5.1	Pre-Design Investigation	400 hours field @ $100/HR, 230 hours engineering @ $150, $30,000 Subs, $10,000 ODCs
5.2	Piles installation - precast concrete (30 ft lengths, 4 per channel section @ 2100 ft)	precast concrete (30 ft lengths, 4 per channel section @ 2100 ft) installed to top of rock.
5.3	Pre-cast, reinforced, pre-stressed concrete channels (2100 LF)	Vendor estimate. Oct. 2007 for 10 FT long channel sections.
5.4	Concrete channel installation (crane & crew)	Assuming installation of 2 channel sections per day.
5.5	Piles installation - precast concrete (30 ft lengths) - Lower Ferry Creek (900 LF)	To support twin sections in lower portion of Ferry Creek.
5.6	Pre-cast, reinforced, pre-stressed concrete channels, Lower Ferry Creek (900 LF x 2)	Twin parallel concrete channel sections to accommodate width of channel in lower portion of Ferry Creek.
5.7	Concrete channel installation (crane & crew) (Lower Ferry Creek)	Assuming installation of 2 channel sections per day.
Streambank Stabilization		
5.8	Grade and compact streambank	Prepare streambank to accept slabs to cover exposed, contaminated soil/sediment, that would mate with the channel section edges.
5.9	Install geotextile	Same as above.
5.10	Install 6 inch gravel	Same as above.
5.11	Install 12 inch sand	Same as above.
5.12	Install 8-inch thick slabs	Pre-fabricated sections.
5.13	Seal joints	Seal gaps between channel sections and slabs.
6.0 OU6 Properties Excavation		
6.1	Excavate Raymark Waste (wet)	For OU3-4, excavate 40000 SF to 6 FT depth.
6.2	Confirmation sampling and analysis	Assume confirmatory samples from bottom and sidewalls of excavations. Bottom, 1 per 25 FT x 25 area, 3 samples along vertical profile at 25 FT intervals for sidewall samples.
6.3	Transfer to wetlands area	not applicable.
6.4	Backfill excavation	Backfill excavation with clean fill.
6.5	Compaction and grading	3 passes.
6.6	Hydroseeding	Reseed 40000 SF.

COST ASSUMPTIONS
FOCUSED FEASIBILITY STUDY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		RATIONALE
General Assumptions		
The costs shown in these tables reflect those that would be expected for implementation of remedial actions at one property or property group at a time. Performing actions on more than one property or property group during the same mobilization could potentially result in cost savings.		
Other Costs presented in Section 7.0 of the cost estimate are based on recommended percentages contained in *A Guide to Developing and Documenting Cost Estimates During the Feasibility* (OSWER 9355.0-75), July 2000. Location adjustment based on value published in Means 2005 ER. Contingency line items based on typical values presented in OSWER 9355.0-75		
OU3 - FERRY CREEK		
7.0 Spread/Compact Raymark Waste		
7.1	Excavate Raymark Waste in Ferry Creek Wetlands	OU3-4A and B: Excavate 45200 SF to 2.5 FT depth, estimated 300 FT haul.
7.2	Haul Raymark Waste (2 miles round trip)	If used for in-town consolidation.
7.3	Spread Raymark Waste	As described.
7.4	Compact Raymark Waste	As described.
7.5	Watering with 3,000 gallon Tank truck, per Pass	Assume 4 passes per acre for dust suppression.
7.6	Dust suppressant - tree resin based	Use tackfier to minimize fugitive dust generation. Two applications - once after clear and grub, and once after excavation/backfilling/compaction.
7.7	Perimeter Air Sampling	Monitoring of air at perimeter of site during excavation activities to confirm the effectiveness of engineering controls at preventing releases of contaminants to the environment. Sampling stations to be located at perimeter of excavation areas.
		Assume 4 samples (one at north, south, east, and west borders of work area) at $205/SAMPLE (PCBs @ $160/SAMPLE; asbestos @ $20/SAMPLE; lead @$25/SAMPLE). Sample analysis costs based on costs provided by Aero-Tech Environmental Laboratories via email, April 2005.
7.8	Equipment Decontamination	Assume decontamination of heavy vehicles as they leave excavation area to transport excavated soil. Operate 1,800 PSI pressure washer . Includes water, soap, electricity, and labor. Assume operation during entire duration of excavation activities.
8.0 Construct Low-Permeability Cap		
Construct 2.5 FT thick cap over wetland and OU6 properties. Work performed under Level C respiratory protection due to quantity and volume of materials to be excavated, handled, placed, etc.		
8.1	Install Warning Layer	OU3-3: 45250 SF for Wetland Area + 40000 SF for OU6 Properties, 15% excess; for OU3-4A and B: 45250 SF +15% excess.
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (12")	Volume based on area to be filled.
8.3	Install geosynthetic gas vent layer	OU3-3: 45250 SF for Wetland Area + 40000 SF for OU6 Properties, 15% excess; for OU3-4A and B: 45250 SF +15% excess.
8.4	Install gas vents (4/acre, Sch. 40 PVC, 4 in dia., welded)	Assume up to 4 per acre.
8.5	Install geosynthetic clay liner	OU3-3: 45250 SF for Wetland Area + 40000 SF for OU6 Properties, 15% excess; for OU3-4A and B: 45250 SF +15% excess.
8.6	Install 60 mil HDPE liner	OU3-3: 45250 SF for Wetland Area + 40000 SF for OU6 Properties, 15% excess; for OU3-4A and B: 45250 SF +15% excess.
8.7	Install geosynthetic drainage layer	OU3-3: 45250 SF for Wetland Area + 40000 SF for OU6 Properties, 15% excess; for OU3-4A and B: 45250 SF +15% excess.
8.8	Place, Spread, and Compact Soil Layer (12")	As described.

COST ASSUMPTIONS
FOCUSED FEASIBILITY STUDY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		RATIONALE
General Assumptions		
The costs shown in these tables reflect those that would be expected for implementation of remedial actions at one property or property group at a time. Performing actions on more than one property or property group during the same mobilization could potentially result in cost savings.		
Other Costs presented in Section 7.0 of the cost estimate are based on recommended percentages contained in *A Guide to Developing and Documenting Cost Estimates During the Feasibility* (OSWER 9355.0-75), July 2000. Location adjustment based on value published in Means 2005 ER. Contingency line items based on typical values presented in OSWER 9355.0-75		
OU3 - FERRY CREEK		
8.9	Furnish, Place, and Spread Topsoil (6")	As described.
8.10	Hydroseeding with Mulch and Fertilizer	As described.
8.11	As-Built Survey, with monuments, etc.	Estimated for completed wetland area and OU6 properties.
9.0 Off-Site Raymark Waste Disposal		
9.1	Load excavated materials	For OU3-4A and OU3-4B All excavated materials (from channel, wetland areas, and OU6 properties)
9.2	Transfer to in-Town consolidation locati	90% of OU3-4A materials sent for in-town consolidation. 90% of OU3-4B materials sent for out-of-town disposal.
9.3	Transport and Disposal at Off-site RCRA/TSCA TSDF	As described.
9.4	Off-site Disposal	Based on excavated volumes for OU3-4S and OU3-4B. Estimated per CY disposal costs based on multiple vendor quotes.
10.0 Monitoring Wells Installation		
10.1	Wells Installation	Estimated $4000/well for 5 wells.
11.0 Interim Construction Monitoring		
11.1	Groundwater	Assumes 15 samples per month for 12 months @ $600/sample (VOCs - $150, SVOCs - $125, PCBs - $125, Metals - $100, asbestos - $75, misc. - $150); Labor - 2 hours/sample @ $100/sample. ODCs - $10000.
11.2	Stormwater	VOCs, SVOCs, PCBs, metals, asbestos, total oil & grease, pH, COD, TSS, total P, total Kjedahl N, fecal coliform, aquatic tox. - $1600/sample. 6 samples. Labor - $9000, ODCs.
11.3	Air	Monitor for 12 months. Use of monitoring station, dust samplers, and gas monitors.
12.0 Wetlands & Floodplains Mitigation		
12.1	Purchase land for Flood Storage Mitigation	Based on TtNUS 2006 OU6 FS report cost assumptions.
12.2	Flood storage mitigation	Based on TtNUS 2006 OU6 FS report cost assumptions.
12.3	Purchase land for Wetlands Mitigation	Based on TtNUS 2006 OU6 FS report cost assumptions.
12.4	Construct compensatory wetlands	Based on TtNUS 2006 OU6 FS report cost assumptions.

COST ASSUMPTIONS
FOCUSED FEASIBILITY STUDY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		RATIONALE
General Assumptions		
The costs shown in these tables reflect those that would be expected for implementation of remedial actions at one property or property group at a time. Performing actions on more than one property or property group during the same mobilization could potentially result in cost savings.		
Other Costs presented in Section 7.0 of the cost estimate are based on recommended percentages contained in *A Guide to Developing and Documenting Cost Estimates During the Feasibility* (OSWER 9355.0-75), July 2000. Location adjustment based on value published in Means 2005 ER. Contingency line items based on typical values presented in OSWER 9355.0-75		
OU3 - FERRY CREEK		
Operations and Maintenance Cost Assumptions		
OM.1.0 Groundwater Monitoring (per event)		
Groundwater monitoring costs were estimated for a single monitoring event. For long-term O&M, it was assumed that monitoring would occur quarterly for the first 2 years after construction, and semiannually thereafter.		
OM.1.1	Sampling Equipment Rental	Includes groundwater pumps (2), water quality monitoring instruments (2), water level indicators
OM.1.2	Sampling Labor (FOL)	Labor hours assume 4 hours per monitoring well.
OM.1.3	Sampling Labor (sampler)	Labor hours assume 2 hours per monitoring well.
OM.1.4	Analytical Costs	Assume samples collected from 10 wells plus 3 samples for QA/QC.
		Samples analyzed for VOCs ($150), SVOCs ($250), pesticides/PCBs ($150), and metals ($100).
OM.1.5	Data Validation	Assume 1 HR per sample analysis for data validation.
OM.1.6	Report Preparation	Assume 70 HR for report preparation at $100/HR. Other costs (copying/printing/delivery) at $1000.
OM.2.0 Cap Inspections, Maintenance, and Repairs (per year)		
Cap inspections, maintenance, and repairs were estimated per year.		
OM.2.1	Cap Inspections (twice per year)	24 hours per event
OM.2.2	Fence Inspections (Once a year)	12 hours per event
OM.2.3	Mowing (twice per year)	MSF twice per year.
OM.2.4	Revegetation (10% per year)	SF * 0.04 = SF = MSF
OM.2.5	Topsoil replacement (1% per year)	SF * 0.01 = SF = MSF
OM.2.6	Cap/Culvert/Streambank Repairs	(2% per year of capital costs)
OM.2.7	Reporting	One report per year.
FY.1.0 Five-Year Review		
FY.1.1	Labor	325 technical hours @ $85/HR for reviews.
FY.1.2	ODCs	$2,375 ODCs

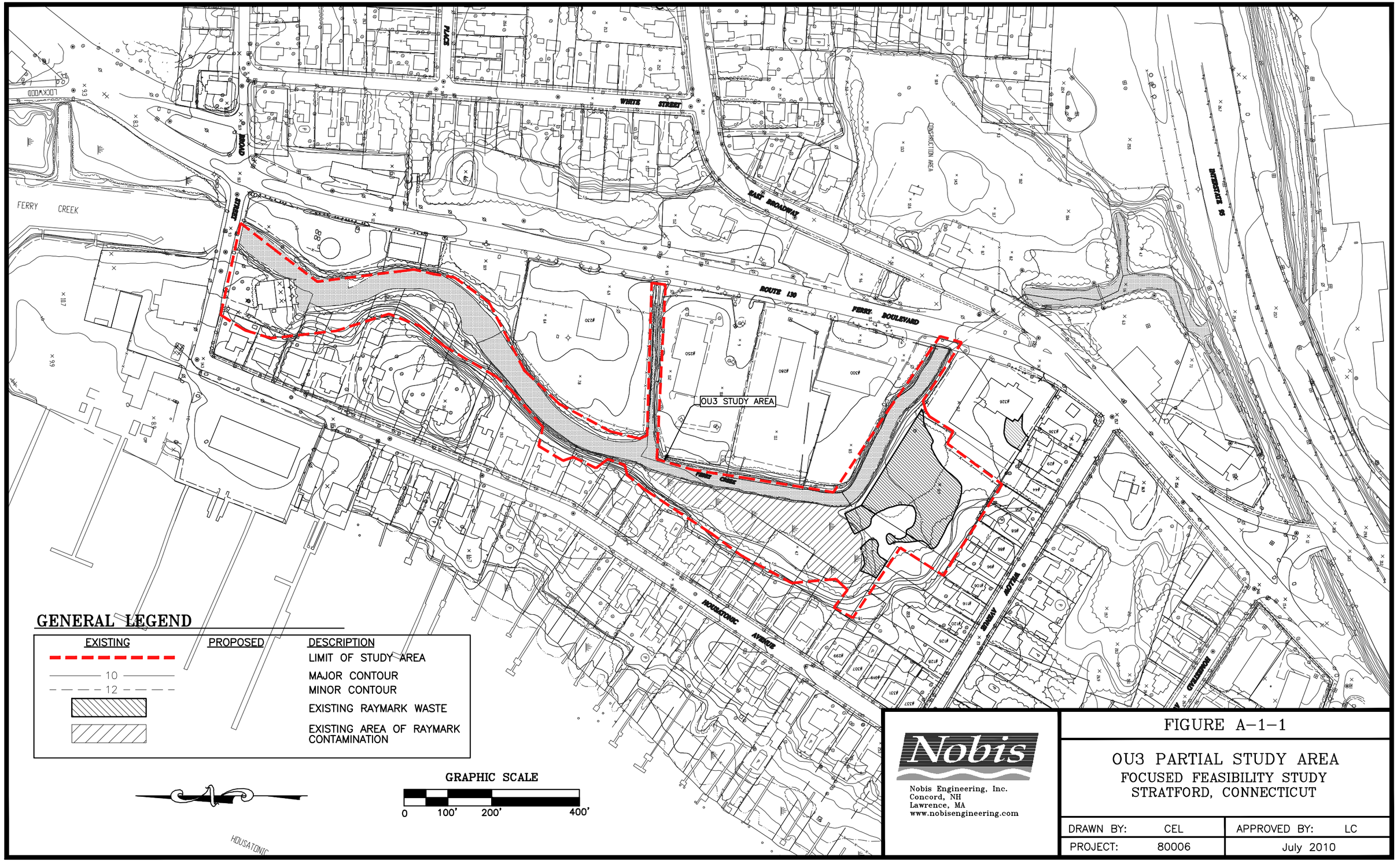


FIGURE A-1-1

OU3 PARTIAL STUDY AREA
FOCUSED FEASIBILITY STUDY
STRATFORD, CONNECTICUT

DRAWN BY:	CEL	APPROVED BY:	LC
PROJECT:	80006	July 2010	

K:\80006 Task Orders\80006 Raymark\Raymark CAD\FS Figures\Final_FS\FS-OU3.dwg

APPENDIX A-2

FOCUSED FEASIBILITY STUDY

FOR

OPERABLE UNIT 4

APPENDIX A-2

A-2-1.0 INTRODUCTION

This report presents the Focused Feasibility Study (FFS) for Operable Unit (OU) 4 of the Raymark Industries, Inc. (Raymark) Superfund Site (the Site) located in Stratford, Connecticut. This FFS Report was prepared by Nobis Engineering, Inc. (Nobis) for the United States Environmental Protection Agency (EPA) under Task Order No. 0006-RICO-01H3, Contract No. EP-S1-06-03. This document presents a range of remedial options that address risks to human health that were identified during the Remedial Investigation (RI) Report for OU4 (TtNUS, 1999).

This FFS was prepared consistent with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986; the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) 40 CFR 300; and the *Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (EPA, 1988) (RI/FS Guidance Document).

This FFS only addresses source control for the OU4 Study Area. Figure 1-1 and Figure 1-2 of the *OU4 Remedial Investigation Report* (TtNUS, August 1999) depict the Site Locus and Study Areas, respectively.

The NCP, under 40 CFR 300.5, defines a source control action as "….The construction or installation and start-up of those actions necessary to prevent the continued release of hazardous substances or pollutants or contaminants (primarily from a source on top of or within the ground, or in building or other structures) into the environment." The remedial options developed in this report will be used by EPA to develop and formulate a preferred remedy for the OU4 Study Area soils. This FFS will address the potential remedial options for only the Raymark waste currently located at the OU4 Study Area.

Contaminated groundwater associated with the Raymark Site constitutes the Raymark – OU2 – Groundwater Operable Unit, which was evaluated under the Remedial Investigation Report (TtNUS, 2005).

APPENDIX A-2

A-2-1.1 Objective of the FFS

The overall objective of this FFS is to develop and evaluate source control remedial alternatives that address contaminated soil (Raymark waste) at the OU4 Study Area.

A-2-1.2 Background for the FFS

The general FS (or FFS) process is described in detail in Section 1.2 of Volume 1 and Section 2 of Volume 1. Section 1.3 of Volume 1 describes the history of the former Raymark Facility. OU4 is one of the locations that received Raymark waste as fill material, resulting in chemical contamination (TtNUS, 1999).

Brief descriptions of the major classes of chemical contaminants detected in the soils of the former Raymark Facility and the common industrial uses of these chemicals are presented in Sections 1.5.2.1 to 1.5.2.7 of Volume I. Section 1.5.2.8 of Volume I provides a reference for the specific chemicals known to have been stored, handled, and/or used at the former Raymark Facility during its operation that may have contributed to contamination of the OU4 Study Area. This background information provides a reference framework for the chemicals identified in the soil at the OU4 Study Area.

A-2-1.3 Physical Characteristics of the OU4 Study Area

This section describes the physical characteristics of the OU4 Study Area and the region in which the OU4 Study Area is situated. The OU4 Study Area topography and surface geology and fill materials are described in the OU4 RI (TtNUS, 1999). Throughout this report, all elevations are stated in feet with respect to the National Geodetic Vertical Datum (NGVD), 1929.

The OU4 Study Area is located adjacent to the Raymark Facility property (OU1), separated only by railroad tracks. As detailed in the RI Report (TtNUS, 1999), the OU4 Study Area encompasses a total area of 13.5 acres and includes the 3-acre former Raybestos Memorial Ballfield, an 8.5-acre vacant field, and a 2-acre densely wooded area. Residential properties border the northern/northwestern sides of the OU4 Study Area along Clinton Avenue. Town, commercial, and industrial properties are located along Frog Pond Lane to the northeast. Railroad tracks and the former Raymark Facility border the OU4 Study Area to the east/southeast, and an inactive industrial property, Contract Plating, abuts the OU4 Study Area to the south/southwest.

Aerial photographs indicate that the Raybestos Memorial Field was built between 1940 and 1949. The ballfield area was used by the Raybestos women's softball team from the 1940s until the 1980s. The OU4 Study Area currently contains the bleachers, fencing, lighting, parking area, and playing field outline that were used during team play; these features are currently extremely dilapidated.

The vacant area outside the ballfield was used as a source of sand and gravel in the 1940s. A large pond (Frog Pond) is visible in the 1940 photograph and is located in the southern portion of the field. Apparent filling of the pond occurred in the years that followed, since the pond appears to significantly diminish in size from 1949 through 1960 in aerial photographs. Frog Pond appears to have been almost completely filled by the 1971 photograph and is not present in the 1990 aerial photographs. Currently, the OU4 Study Area does not contain any wetlands and is not located in an area subject to flooding; therefore wetland and floodplain requirements do not apply to OU4.

Evaluation of test borings, geophysical surveys and analytical data indicates that the pond was filled with Raymark-type waste materials. It is unclear whether Frog Pond was formed as a result of excavation activities associated with sand and gravel operations mentioned above. A peat layer of unknown thickness was encountered in the vicinity of the pond during test borings. Depending on the thickness of the peat layer, this peat could be indicative of the pond's existence prior to excavation activities. The pond may have been formed in association with regional deglaciation during the last ice age. It appears the historical pond (1940s) outlet drained south toward the railroad tracks and eventually discharged to Long Brook or Ferry Creek.

The wooded area in the southwest corner of the OU4 Study Area was the proposed location of Lafayette Road, which was to be developed near the property boundary. The road was never built, and the property was abandoned by the Town and divided and deeded to abutting landowners and the Daley Development Corporation. The wooded area is the portion of the land deeded to Daley Construction Corporation, the present owner of the OU4 Study Area.

On-site sand and gravel removal activities ceased during approximately 1940, and the excavated area was used for disposal purposes. The former Raymark Industries, Inc. company disposed of asbestos and non-asbestos materials, metals, phenol-formaldehyde resins, and

various adhesives within this Study Area. As a result of the disposal activities, soils at the OU4 Study Area are known to be contaminated with asbestos, lead, polychlorinated biphenyls (PCBs), and other pollutants, disposed of from the early 1940s to 1977 (US EPA, 1992). Reportedly, the Town of Stratford also used the OU4 Study Area as a dumping and temporary storage area for asphalt, road salt, dirt, and trash (EAI, 1990).

In the 1970s, Raymark Industries, Inc. performed two cleanup activities to place a 2-foot soil cover over identified areas of surficial asbestos contamination. The OU4 Study Area was purchased by the Daley Development Corporation of Stratford in 1986.

In 1989, the U.S. Environmental Protection Agency (EPA) conducted a Preliminary Assessment of the OU4 Study Area. In 1990, EPA issued an Administrative Order for a Removal Action to the Daley Development Corporation. In 1992, as a result of Daley's failure to implement the removal action, EPA assumed responsibility for the Study Area actions. The removal action implemented by EPA included installation of a site security fence, clearing of vegetation that would interfere with cap/cover placement, grading and capping areas of the OU4 Study Area with approximately 6 to 11 inches of clean soil, and sampling and removal of onsite drums. Other OU4 Study Area investigations were performed during the period from 1988 through 1992 including soil boring installation, soil sampling, and test pitting (EPA, 1992).

A-2-1.4 Nature and Extent of Contamination

This section presents a general summary of the nature and extent of contamination encountered at the OU4 Study Area. A description of the nature and extent of contamination is presented in Section 4.0 of the OU4 RI (TtNUS, 1999). The Raymark waste dumped at the OU4 Study Area is the contamination source. The irregular nature of the Raymark waste disposal is depicted on Figure A-2-1 (as the Raymark waste area). The estimated volume is shown on Table A-2-1.

The Raymark waste in the OU4 Study Area is composed primarily of materials brought from the former Raymark facility and appears to be present throughout most of the Study Area. The presence of the Raymark waste throughout the OU4 Study Area is heterogeneous and is probably the result of irregular disposal. Raymark waste has been identified throughout the Study Area, both vertically and horizontally. Contamination has been found up to 16 feet deep; the deepest contamination in the area of the former pond. Minimal contamination (no/minimal

Raymark waste) is present in the actual former ball field playing area; most filling took place near the railroad and former pond portions of the property. Investigations of the Raymark waste have identified numerous contaminants including: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, PCBs, metals, and asbestos.

Field investigation borings and test pits at the OU4 Study Area show an intermittent clean soil cover that ranges from 0 to 18 inches in thickness (TtNUS, 1999). The results differ from the information presented in past studies that indicated clean soil would be approximately 6 to 11 inches in thickness. It is assumed that the differences occurred due to variable soil dumping patterns and overall long-term erosion patterns on the property.

A-2-1.5 Contaminant Fate and Transport

A description of the fate and transport of contamination is presented in Section 5.0 of the OU4 RI (TtNUS, 1999). Within the OU4 Study Area, past direct disposal of contaminated waste materials as fill throughout a large portion of the OU4 Study Area has resulted in the release of contaminants to the soil. Contaminants present in the Raymark waste have been detected in the underlying overburden and bedrock groundwater. However, based on groundwater samples collected from the OU4 Study Area, Raymark waste does not appear to be a significant source of groundwater contamination.

The evaluation of contaminant fate and transport in the RI was based on existing property conditions, identification of chemicals present in the environmental media, the physical state of soil and groundwater contaminants, general fate and transport mechanisms, and the interpretation of geologic and hydrogeologic conditions within the OU4 Study Area (TtNUS, 1999). Waste movement at OU4 is generally from the leachate of contaminants into the groundwater or the exposure to Raymark waste from erosion that allows movement of the wastes into the air or soils.

A-2-1.6 Summary of OU4 Baseline Risk Assessment

The risk assessment contained in Section 6.0 of the OU4 RI (TtNUS, 1999) focused on current and potential future human health risks. A summary of potential risks is presented in the OU4 RI Table 6-1 and is summarized here on Table A-2-1. Contaminants that pose potential human health risks include: polynuclear aromatic hydrocarbons (PAHs), PCBs, metals (arsenic, barium,

zinc, lead) and asbestos. A qualitative ecological evaluation was also conducted and is presented in the OU4 RI (TtNUS, 1999). The findings indicate that there are currently no wetlands identified within the OU4 Study Area, the area is substantially disturbed by the filling of Raymark waste, and the Study Area does not show any unique habitats.

A-2-2.0 IDENTIFICATION AND SCREENING OF TECHNOLOGIES

Section 2.0 presents the general approach for the identification and screening of technologies for an FS and the potential action-specific, location-specific, and chemical-specific applicable, relevant and appropriate requirements (ARARs).

A-2-2.1 Development of Remedial Action Objectives (RAOs)

As presented in Section 2.2 of Volume 1, the process for developing a medium-specific RAO to protect human health and the environment includes the three major components of the RAO development process: identifying contaminants of concern (COCs), determining preliminary remediation goals (PRGs), and formulating the RAO statement. The medium of concern for this FFS is soil based on the definition of Raymark waste (see Section 2.2.2.1 of Volume 1). As such, a single RAO for soil was developed for OU4 based on the results of the RI, the site-specific baseline human health risk assessment, historical information on the constituents present in waste at the former Raymark Facility, and ARARs. The soil RAO for protection of human health is to prevent direct exposure (inhalation, dermal contact, or ingestion) to soil meeting the definition of Raymark waste. Achieving this RAO will also protect human health from potential exposure to Raymark waste constituents and co-located contaminants.

This FFS does not include an RAO for the protection of the environment. Based on ecological risk evaluations performed for OU4, there are few, if any, known ecological impacts from the Site contaminants.

A-2-2.2 Development of General Response Actions

As discussed in Section 2.3 of Volume 1, general response actions are media-specific measures that may be taken to satisfy the RAOs established for a Site. General response actions may include treatment, containment, removal, disposal, and institutional actions, or a combination of these measures. Several general response actions were identified to provide a

wide range of possible options for satisfying the RAO stated above. The potential general response actions identified are: no action, institutional actions, containment, excavation, treatment, and disposal. Table A-2-2 presents a summary of the RAO and general response actions identified for soil, along with an initial identification of the general remedial technology types and process options that correspond to each general response action.

A-2-2.3 Identification and Preliminary Screening of Technologies and Process Options

This section presents a description of the preliminary screening and the detailed evaluations of technologies and process options for remediation of soil (Raymark waste) at OU4. The screening of technologies and process options are documented on Table A-2-3. Potential remedial technologies and process options were identified and screened according to their overall applicability (technical implementability) to Raymark waste, the contaminants of concern (lead, asbestos, PCBs, and copper), and the site-specific conditions present at OU4 (i.e., complex mixture of contaminants, large volume of contaminated material). The purpose of this screening effort is to investigate available technologies and process options and to eliminate those (obviously) not applicable to the OU4, based on the established RAO and general response actions provided in Section A-2-2.2 of this report. Technology identification considered the demonstrated performance of each technology type for similar site conditions and COCs.

The preliminary screening of technologies is presented on Table A-2-3. This table presents the technology types available to address soil contamination, grouped by general response action. A brief description of the technology type is provided and a determination is made to either retain or eliminate the technology based on the evaluation of its technical implementability. The rationale used to eliminate or retain technology types is also summarized. The remedial technologies that are retained from this screening are further evaluated as described in Section A-2-2.4.

A-2-2.4 Evaluation and Selection of Technologies and Process Options

As discussed in Section 2.5.2 of Volume 1, detailed evaluations of technologies and process options retained in the preliminary screening step are conducted to further focus the alternatives development process. In this step, process options are evaluated with respect to other processes in the same technology category. One or two representative process options are

selected, if possible, for each technology type, to simplify the subsequent development and evaluation of alternatives without limiting flexibility during remedy selection or remedial design.

The evaluation of technologies and process options utilizes three criteria: effectiveness, implementability, and relative cost. The RI/FS Guidance Document suggests that this evaluation focus on the effectiveness criterion, with less emphasis directed at the implementability and relative cost criteria. The evaluation also considers the volume of Raymark waste that would require treatment and the contaminant type and concentrations that are anticipated. The evaluation of technologies and process options is presented on Table A-2-4.

The following process options were retained after the preliminary screening:

General Response Action	Technology	Process Option
No Action	No Action	No Action
Institutional Actions	Institutional Controls	Deed Restrictions – Local Ordinances
	Access Restrictions	Fencing and Signage
	Monitoring	Environmental Sampling
Containment	Horizontal Barriers	Low Permeability Cap
Excavation	Excavation	Bulk Mechanical Excavation
Disposal	Disposal	Out-of-Town Disposal
		On-Site Consolidation
Treatment	Immobilization	Solidification/Stabilization
	Thermal Treatment	Incineration

A-2-3.0 DEVELOPMENT AND SCREENING OF ALTERNATIVES

The technologies and process options that were retained were then used to assemble potential remedial alternatives. Institutional actions will be a part of every potential alternative, either as a measure that complements another technology to help maintain the effectiveness of the alternative (institutional controls, access restrictions) or as a measure to ensure that the alternative continues to protect human health in the long-term (monitoring). The primary components of potential remedial alternatives will include some combination of the containment, excavation, disposal and treatment technologies.

As discussed in Section 3.0 of Volume 1, these process options are combined to assemble remedial alternatives that address the RAOs.

A-2-3.1 Development of Alternatives

Using the retained general response actions, technology types and process options, five alternatives were assembled to address the RAO. Consistent with the NCP, alternatives were assembled that represent a range of actions that encompass: no action, limited action, containment, and excavation with off-site disposal. Table A-2-5 presents the matrix depicting the assemblage of process options for each alternative.

A-2-3.2 Remedial Alternative Descriptions

The technologies and process options that were retained were assembled into three alternatives. A detailed summary of each alternative is presented in Table A-2-6. The remedial alternatives are screened for effectiveness, implementability, and cost, as presented in Table A-2-7.

After screening, the following alternatives were retained:

- Alternative OU4-1: No Action (baseline);
- Alternative OU4-2: Limited Action; and
- Alternative OU4-3: Consolidation, Capping and Institutional Controls.

Alternative OU4-3 represents excavation, consolidation and capping of contaminated materials that are currently located in OU4. An evaluation of OU4 as a location for consolidation of Raymark waste removed from other properties within Stratford is presented in Appendix F.

Detailed assessments of the retained alternatives with the evaluation criteria specified in the NCP are summarized in Table A-2-8. The estimated present worth costs, capital costs, and operations and maintenance costs are presented in Tables A-2-9a through A-2-9e.

TABLE A-2-1
IDENTIFICATION OF COCS AND WASTE VOLUMES
FOCUSED FEASIBILITY STUDY
RAYMARK - OU4 – BALLFIELD
STRATFORD, CONNECTICUT

SELECTION OF COCs – HUMAN HEALTH RISKS				
Receptor	**Human Health Risks**	**Numerical Risk**	**Primary Chemical Risk Drivers**	**Contaminants of Concern (> 1 E-06 or HI > 1.0)**
Child-Resident	RME Total Carcinogenic risk	Carc. Risk = **2.0 E-04** (at high end of acceptable risk range)	▪ PCBs (A1268) - 1.69 E-04 ▪ Arsenic – 2.22 E-05 ▪ Benzo(a)pyrene – 1.05 E-05 ▪ Dibenz(a,h)anthracene – 6.16 E-05	▪ PCBs (A1268) ▪ Arsenic ▪ Benzo(a)pyrene ▪ Dibenz(a,h)anthracene
Child-Resident	RME Total Non-carcinogenic risk	Total HI = **5.3 E+01** (exceeds acceptable risk range)	▪ PCBs (A1268) – 4.95 E+01 ▪ Barium – 1.72 E+00 ▪ Zinc – 1.00 E+00 ▪ Arsenic – 3.99 E-01	▪ PCBs (A1268) ▪ Barium ▪ Zinc

SELECTION OF OTHER COCs – HUMAN HEALTH RISKS			
Other Chemical that Pose Health Risk	▪ Lead average at 17,200 mg/Kg, which is higher than the 400 mg/Kg acceptable concentration. ▪ Asbestos average at 22%, which exceeds the 1% definition.	▪ Not quantifiable health risks, but detected concentrations pose potential risks.	▪ Lead ▪ Asbestos

SELECTION OF COCs - ECOLOGICAL RISK CONSIDERATIONS
▪ An ecological evaluation was performed, which indicated significant past disturbance at OU4. ▪ No unique habitat or wetlands identified in OU4. OU4 is surrounded by developed area, isolated from other habitats, lack of a perennial water source, and contaminated subsurface limit quality of current habitat. ▪ No ecological COCs identified.

SELECTION OF COCs - PROTECTION OF GROUNDWATER
▪ SPLP tests indicated that some COCs (VOCs and SVOCs) may leach from Raymark Wastes in excess of the RSR Pollutant Mobility Criteria for GB aquifer. ▪ However, no VOCs or SVOCs detected in groundwater that exceed drinking water criteria.[1]

TABLE A-2-1
IDENTIFICATION OF COCS AND WASTE VOLUMES
FOCUSED FEASIBILITY STUDY
RAYMARK - OU4 – BALLFIELD
STRATFORD, CONNECTICUT

RISK-BASED PRGs			
COC	**Units**	**Carcinogenic PRG**	**Non-Carcinogenic PRG**
Benzo(a)pyrene	µg/Kg	**61.6**	**--**
Dibenz(a,h)anthracene	µg/Kg	**61.7**	**--**
PCBs (A1268)	µg/Kg	**220**	**111**
Arsenic	mg/Kg	**0.388**	**2.16**
Asbestos	--	**--**	
Barium	mg/Kg	**--**	**547**
Lead	mg/Kg	**--**	
Zinc	mg/Kg	**--**	**2350**

WASTE VOLUMES	
Total Volume of Contaminated Wastes	**274,000 CY**
Total Volume of Raymark Waste	**190,000 CY**

Notes:
1. *Final Remedial Investigation Report, Raymark - OU4 – Ballfield, Stratford, Connecticut*, TtNUS, August 1999.

TABLE A-2-2
REMEDIAL ACTION OBJECTIVES, GENERAL RESPONSE ACTIONS, TECHNOLOGY TYPES, AND PROCESS OPTIONS
FOCUSED FEASIBILITY STUDY
RAYMARK – OU4 – BALLFIELD
STRATFORD, CONNECTICUT

Environmental Medium	Remedial Action Objective (from site characterization)	General Response Action	Remedial Technology Types (for general response actions)	Process Options
Soil	Protection of Human Health Prevent direct exposure (inhalation, dermal contact, or ingestion) with soil meeting the definition of Raymark Waste.	No Action	No Action	- not applicable
		Institutional Actions	Institutional Controls	- deed restrictions - local ordinances - access restrictions
			Access Restrictions	- fencing/signage
			Monitoring	- environmental sampling
		Containment	Horizontal Barriers	- low permeability cap - permeable cover
		Excavation	Excavation	- bulk mechanical excavation
		Disposal	Disposal	- out-of-town disposal - on-site consolidation
		Treatment	Immobilization	- solidification/stabilization - microencapsulation
			Thermal Treatment	- incineration - pyrolysis - thermal desorption - supercritical water oxidation - vitrification
			Physical Treatment	- soil flushing - soil washing - liquefied gas solvent extract - soil vapor extraction - electrokinetic separation
			Chemical Treatment	- dehalogenation - chemical oxidation - solvent extraction
			Biological Treatment	- aerobic biodegradation - anaerobic biodegradation - biopiles - bioventing - phytoremediation

TABLE A-2-3
PRELIMINARY SCREENING OF REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS
FOCUSED FEASIBILITY STUDY
RAYMARK – OU4 – BALLFIELD
STRATFORD, CONNECTICUT

GENERAL RESPONSE ACTION (GRA)	REMEDIAL TECHNOLOGY	PROCESS OPTION	DESCRIPTION	SCREENING COMMENTS
No Action	No Action	Not Applicable	No activities conducted to address soil contamination.	Retained. Used as baseline for comparison with other options as required by National Contingency Plan.
Institutional Actions	Institutional Controls	Deed Restrictions, Local Ordinances, Periodic Evaluations	Administrative action used to restrict future site activities on individual properties. Restrictions would manage, limit, or prevent activities such as excavation or residential development. Periodic evaluations will be required to ensure institutional controls are implemented and are effective.	Retained. Potentially applicable.
	Access Restrictions	Fencing and Signage	Barrier erected to restrict access to contaminated properties with “No Trespassing” or hazard warning signs posted.	Retained. Potentially applicable.
	Monitoring	Environmental Sampling	Periodic monitoring events that include groundwater sampling to determine whether there is a continuing source of contamination or if contaminants are migrating.	Retained. Potentially applicable.
Containment	Horizontal Barriers	Low Permeability Cap	Asphalt, concrete, geosynthetics, or multimedia materials are used to form an impermeable barrier to prevent direct contact with contaminated material and to minimize leaching of contaminants to groundwater.	Retained. Potentially applicable.
		Permeable Cover	Soil, crushed stone, geosynthetics, and vegetative cover used to prevent direct contact with contaminated soil and minimize erosion and surface migration of contaminated soil.	Retained. Potentially applicable.
Excavation	Excavation	Bulk Mechanical Excavation	Use of common construction equipment to remove contaminated soil. Excavation would be a prerequisite to any other process option that is performed ex situ.	Retained. Potentially applicable.
Disposal	Disposal	Out-of-Town Disposal	Transportation and disposal of treated or untreated soil to an approved, licensed, out-of-town disposal location. Would be used in conjunction with excavation. Could also be used as an ultimate disposal location after an ex situ treatment process.	Retained. Potentially applicable.
		On-site Consolidation	Assumes consolidation of Raymark waste already present within OU4.	Retained. Potentially applicable.

TABLE A-2-3
PRELIMINARY SCREENING OF REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS
FOCUSED FEASIBILITY STUDY
RAYMARK – OU4 – BALLFIELD
STRATFORD, CONNECTICUT

GENERAL RESPONSE ACTION (GRA)	REMEDIAL TECHNOLOGY	PROCESS OPTION	DESCRIPTION	SCREENING COMMENTS
Treatment	Immobilization	Solidification/ Stabilization	Soil mixing equipment used to mix reagents with contaminated soil to physically and/or chemically decrease the mobility of contaminants. Potential reagents include cement, pozzolanic material, thermoplastics, polymers and asphalt. Treatment may be performed in situ or ex situ.	Retained. Potentially applicable.
		Micro-encapsulation	Contaminants adsorbed to soil particles are desorbed and then encapsulated by an inert, silica-based solution that will minimize leaching. Treatment would be performed ex situ.	Eliminated. Not feasible in cases involving large quantities of contaminated, heterogeneous material.
	Thermal Treatment	Incineration	Destruction of organic contaminants by subjecting them to high temperatures under controlled conditions in a combustion chamber. Treatment would be performed ex situ.	Retained. Potentially applicable to treat organic contaminants.
		Pyrolysis	Chemical decomposition of organic contaminants by heating the material in the absence of oxygen. Treatment would be performed ex situ.	Retained. Potentially applicable to treat non-PCB organic contaminants.
		Thermal Desorption	Air, heat and mechanical agitation are used to volatilize organic contaminants from soil into a vapor stream. Vapor is usually further treated. Treatment would be done ex situ.	Retained. Potentially applicable to treat non-PCB organic contaminants.
		Supercritical Water Oxidation	Contaminated media is exposed to water in a high temperature, high pressure environment. Under such conditions, organic substances are oxidized. Treatment would be done ex situ.	Retained. Potentially applicable to treat non-PCB organic contaminants.
		Vitrification	Melting of contaminated material to volatilize or pyrolyze organics and entrain inorganics in a stable vitreous residual. Treatment may be done in situ or ex situ.	Eliminated due to technical implementability issues based on the variability and distribution of contaminants at the site, and possible absence of glass-forming materials (silicon or aluminum oxides) in geologic materials.

TABLE A-2-3
PRELIMINARY SCREENING OF REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS
FOCUSED FEASIBILITY STUDY
RAYMARK – OU4 – BALLFIELD
STRATFORD, CONNECTICUT

GENERAL RESPONSE ACTION (GRA)	REMEDIAL TECHNOLOGY	PROCESS OPTION	DESCRIPTION	SCREENING COMMENTS
Treatment (cont.)	Physical Treatment	Soil Flushing	Contaminants sorbed to soil are mobilized or dissolved in an aqueous flushing solution in situ. The flushing solution is then extracted from the subsurface and treated. Flushing solution may be augmented by chemicals that increase the mobilization or dissolution of organics and some heavy metals from the soil. Treatment would be performed in situ.	Eliminated. Also, difficult to ensure capture of flushing solution due to shallow water table. Not a reliable method in cases involving multiple types of contaminants.
		Soil Washing	Process reduces the amount of contaminated material by two means. Finer particles, which contain the bulk of contaminants, are separated from more coarse material. Contaminants sorbed to soil are dissolved in an aqueous washing solution. The wash water may be augmented by chemicals which increase the leaching of organics and some heavy metals from the soil. Treatment would be performed ex situ.	Eliminated due to technical implementability issues related to the feasibility of washing the anticipated volume of contaminated soil.
		Liquefied Gas Solvent Extraction	Liquefied gas solvents, such as propane, are used to extract organics from soil. Treatment would be performed ex situ.	Retained. Potentially applicable to treat organic contaminants.
		Soil Vapor Extraction	In situ technology in which vacuum blowers and extraction wells are used to strip volatile organic compounds from unsaturated soil. Treatment will be done in situ.	Eliminated. Not effective for treatment of metals, PCBs, or asbestos.
		Electrokinetic Separation	A low-intensity direct current is applied to contaminated soil between electrodes, causing ions to move towards the positive or negative electrode. Once contaminants have been separated from soil particles in this manner, they may be recovered and treated either ex situ or in situ.	Eliminated. Materials to be treated are too heterogeneous. Technical implementability low.
	Chemical Treatment	Dehalogenation	Contaminated soil is screened, processed with a crusher and pug mill, and mixed with reagents. The mixture is heated in a reactor. Dehalogenation occurs through either replacement of the halogen molecules or the decomposition and partial volatilization of contaminants. Treatment would be done ex situ.	Eliminated. May be able to treat PCBs, but materials are too heterogeneous.
		Chemical Oxidation	Oxidants are injected or mixed into the subsurface where they react with contaminants to form less toxic or harmless end products. Treatment would be performed in situ.	Eliminated. Generally more effective for treatment of aqueous wastes.

TABLE A-2-3
PRELIMINARY SCREENING OF REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS
FOCUSED FEASIBILITY STUDY
RAYMARK – OU4 – BALLFIELD
STRATFORD, CONNECTICUT

GENERAL RESPONSE ACTION (GRA)	REMEDIAL TECHNOLOGY	PROCESS OPTION	DESCRIPTION	SCREENING COMMENTS
Treatment (cont.)	Chemical Treatment (cont.)	Solvent Extraction	Chemical desorption and dissolution of organic and some inorganic contaminants by washing soil with a solvent solution. Treatment would be done ex situ.	Retained. Potentially applicable. However, multiple solvent formulations will be required.
	Biological Treatment	Aerobic Biodegradation	Microorganisms degrade organic contaminants to carbon dioxide and water. Oxygen is used as an electron acceptor in the degradation process. Treatment may be done in situ or ex situ.	Eliminated. Inorganic contaminants and PCBs generally not amenable to biological treatment.
		Anaerobic Biodegradation	An electron acceptor other than oxygen is used in the process in which microorganisms degrade organic contaminants. Treatment may be done in situ or ex situ.	Eliminated. Not likely to be effective at treating site contaminants.
		Biopiles	Excavated soils are mixed with soil amendments and placed on a treatment area that includes leachate collection systems and some form of aeration. Moisture, heat, nutrient, and oxygen levels are controlled to enhance the biodegradation of contaminants.	Eliminated. Not implementable at this site.
		Bioventing	Oxygen is directly injected into unsaturated subsurface soils via a network of air injection wells at air flow rates adequate to sustain microbial activity. Volatile contaminants are desorbed from soil and biodegraded as vapors move through the biologically active soil.	Eliminated. Not applicable to site contaminants.
		Phytoremedia-tion	Plants are used to naturally remediate contaminants via three mechanisms: direct uptake and accumulation of contaminants in plant tissue, release of enzymes that stimulate microbial activity and biochemical transformation, and enhancement of mineralization in plants' roots. Treatment would be done in situ.	Eliminated. Effectiveness limited to soil within the reach of plant root systems. Plants would require harvesting, proper disposal, and replanting. Not effective for certain site contaminants. Reliable cost information not available.

Notes:
1. General response actions, remedial technologies, and process options for soil were adapted from Table A-2-1.
2. 2. Process options were retained or eliminated based on an evaluation of their technical implementability given the contaminant types and concentrations in soil, and other relevant site characteristics such as the location and distribution of contaminated soil throughout Stratford.

Eliminated process option (see screening comment).

TABLE A-2-4
EVALUATION OF PROCESS OPTIONS FOR SOIL
FOCUSED FEASIBILITY STUDY
RAYMARK – OU4 – BALLFIELD
STRATFORD, CONNECTICUT

GENERAL RESPONSE ACTION (GRA)	TECHNOLOGY TYPE	PROCESS OPTION	EFFECTIVENESS[1]	IMPLEMENTABILITY[2]	COST[3]	CONCLUSION
No Action	No Action	Not Applicable	Would not achieve remedial action objective.	No permits required; no treatment, storage, or disposal involved; no equipment or services required.	Capital: None O&M: None	Retain (as baseline)
Institutional Actions	Institutional Controls	Deed Restrictions Local Ordinances	Would not achieve remedial action objective without other actions. No human health or environmental impacts from implementation. Reliable to the extent that restrictions can be enforced.	Institutional controls would require legal and/or political actions from others. No treatment, storage, or disposal involved. Services readily available to implement institutional controls.	Capital: Low O&M: Low	Retain
	Access Restrictions	Fencing/Signage	Would not achieve remedial action objective without other actions. No human health or environmental impacts from implementation. Reliable to the extent that barriers are maintained and warnings are heeded.	No treatment, storage, or disposal involved. Conventional construction, readily available skilled labor and services from several sources.	Capital: Low O&M: Low	Retain
	Monitoring	Environmental Sampling	Would not achieve remedial action objective without other actions. Very low potential for impacts to human health and environment during implementation. Reliable process for the evaluation of contaminant migration trends and to monitor the progress of remediation.	No permits required for implementation. No treatment, storage, or disposal involved. Labor and services readily available from several sources.	Capital: None O&M: Medium	Retain
Containment	Horizontal Barriers	Low-Permeability Cap	Would achieve remedial action objectives by preventing direct contact with contaminated soils. Some potential adverse impacts during construction or implementation beyond typical earth-moving construction activities because of contaminated soil presence, which can be mitigated through engineering and air pollution controls, and proper decontamination and H&S measures. Reliable technology when properly designed, constructed, and maintained.	Will need to comply with substantive requirements of ARARs for on-site activities. No treatment, storage, or disposal involved. Materials, labor, and services for implementation readily available from several sources.	Capital: Medium O&M: Medium	Retain
		Permeable Cover	Would achieve remedial action objectives by preventing direct contact with contaminated soils. May not comply with CT RSR requirements for pollutant mobility. Some potential adverse impacts during construction or implementation beyond typical earth-moving construction activities because of contaminated soil presence, which can be mitigated through engineering and air pollution controls, and proper decontamination and H&S measures. Reliable technology when properly designed, constructed, and maintained.	Will need to comply with substantive requirements of ARARs for on-site activities. No treatment, storage, or disposal involved. Materials, labor, and services for implementation readily available from several sources. A permeable cover is not consistent with the CAMU regulations and is inappropriate in this situation to cover a large amount of consolidated Raymark waste.	Capital: Low O&M: Medium	Eliminate
Excavation	Excavation	Bulk Mechanical Excavation	Would be required to consolidate and grade contaminated soil. This process is typically used in conjunction with other remediation options. Would achieve remedial action objective by removing all soil with concentrations exceeding remedial goals (for off-site disposal). Some potential adverse impacts during construction or implementation beyond typical earth-moving construction activities because of contaminated soil presence, which can be mitigated through engineering and air pollution controls, and proper decontamination and H&S procedures to prevent the spread of contamination during excavation. Very reliable process for the removal contaminated soil.	Will need to comply with substantive requirements of ARARs for on-site activities. Adequate on-site capacity available for temporary storage of excavated material. Location to be determined. No treatment or disposal involved. Conventional construction process that is easily implemented with equipment and services that are readily available from several sources.	Capital: Low O&M: None <u>Note</u>: Includes cost of excavating only. Transport, treatment, or disposal of soil not included.	Retain

TABLE A-2-4 (cont.)
EVALUATION OF PROCESS OPTIONS FOR SOIL
FOCUSED FEASIBILITY STUDY
RAYMARK – OU4 – BALLFIELD
STRATFORD, CONNECTICUT

GENERAL RESPONSE ACTION (GRA)	TECHNOLOGY TYPE	PROCESS OPTION	EFFECTIVENESS[1]	IMPLEMENTABILITY[2]	COST[3]	CONCLUSION
Disposal	Disposal	Out-of-Town Disposal	May be difficult to accommodate anticipated volume of contaminated soil. Remedial action objectives would be achieved since all contamination would be removed from site. Some potential adverse impacts may occur during implementation beyond typical earth-moving construction activities because of contaminated soil presence, which can be mitigated through engineering and air pollution controls, and proper decontamination and H&S procedures to prevent the spread of contamination during excavation and loading. Potential for release of contaminants during transport due to accidents. Proven and reliable for site contaminants.	Permits for off-site landfill disposal could be obtained. Off-site disposal capacity for the anticipated volume of contaminated soil above the water table (130,500 CY) may be available, although out-of-town disposal of the entire volume of Raymark waste (190,000 CY) may be difficult. Will require transport, as disposal facilities are located > 500 miles away. Not readily implemented.	Capital: High O&M: None	Retain
		On-Site Disposal	Remedial action objective would be achieved for contaminated soil that is consolidated and isolated beneath low-permeability cap to eliminate direct contact risks by isolating wastes from human and environmental contact. Potential impacts to human health and the environment from excavation, placement, and grading of contaminated soil and transportation to consolidation areas could be mitigated using engineering and air pollution controls, and proper decontamination and H&S procedures. Proven and reliable for site contaminants.	Disposal capacity for the anticipated volume of contaminated soil and temporary storage of stockpiles would be available on site. Materials and services required to implement technology readily available. No technical implementability concerns identified.	Capital: Medium O&M: Medium	Retain
Treatment	Immobilization	Solidification/ Stabilization (S/S)[4]	Could achieve remedial action objective for the volume of contaminated soil. Heterogeneous contaminants (organic and inorganic). Treatment for metals may interfere with treatment for organics, and vice versa. Could be effective if one type of contaminant removed by another process first. Potential impacts to human health and the environment from excavation, temporary stockpiling, loading, transport, implementation of S/S process can be mitigated using engineering and air pollution controls, and proper decontamination and H&S procedures. S/S would be implemented on site. Reliable process for the treatment of soil contaminated with inorganic or inorganic contaminants, but not both simultaneously.	If untreatable fraction needs to be sent for off-site disposal, permits can be obtained. Temporary storage and disposal capacity available on site. Equipment and skilled labor required for treatment readily available from several vendors. Can be difficult to implement because two different (and incompatible) types of contaminants require treatment. However, if one contaminant type is removed by pre-treatment, this process is implementable to address the remaining contaminant type.	Capital: Medium O&M: None	Retain
	Thermal Treatment	Incineration[5]	Would achieve remedial action objective for the organic contaminants, but would be ineffective for treating soil contaminated with metals and asbestos. Potential impacts to human health and the environment from excavation, temporary stockpiling, loading, transport, and on-site incineration. Effects could be mitigated using engineering and air pollution controls, and proper decontamination and H&S procedures to prevent the spread of contamination during implementation. Incineration would be performed at on-site or off-site location. Very reliable process for the treatment of soil contaminated with organic contaminants.	Permits or approvals required to incinerate site soils off site should be obtainable. Temporary storage and disposal capacity available on site. Equipment/facilities required for treatment are available. Distance to incineration facility greater than 500 miles from site.	Capital: High O&M: None	Retain

TABLE A-2-4 (cont.)
EVALUATION OF PROCESS OPTIONS FOR SOIL
FOCUSED FEASIBILITY STUDY
RAYMARK – OU4 – BALLFIELD
STRATFORD, CONNECTICUT

GENERAL RESPONSE ACTION (GRA)	TECHNOLOGY TYPE	PROCESS OPTION	EFFECTIVENESS[1]	IMPLEMENTABILITY[2]	COST[3]	CONCLUSION
Treatment (cont.)	Thermal Treatment (cont.)	Pyrolysis[5]	Would not achieve remedial action objective for the principal COC (Aroclor 1268). Not effective for treating soil contaminated with inorganic contaminants. Potential impacts to human health and the environment from excavation, temporary stockpiling, loading, and transport. Effects could be mitigated using engineering and air pollution controls, and proper decontamination and H&S procedures to prevent the spread of contamination during implementation. Treatment would be performed on site or at an off-site location. Reliable for the treatment of soil contaminated with non-PCB organic contaminants. Not as established as other thermal treatment technologies such as incineration or thermal desorption.	Permits or approvals required to treat soils off site should be obtainable. On-site treatment may not be possible due to limited availability of mobile systems. Availability of equipment/facilities required for off-site treatment would be limited. Distance to treatment facility greater than 500 miles from site.	Capital: High O&M: None	Eliminate
		Thermal Desorption[5]	Could not achieve remedial action objective for the volume of contaminated soil present at the site without another treatment process (not effective for treating soil contaminated with inorganic contaminants). Potential impacts to human health and the environment from excavation, temporary stockpiling, loading, transportation, and on-site thermal desorption. Effects could be mitigated using engineering and air pollution controls, and proper decontamination and H&S procedures. Treatment would be performed on-site or at an off-site location. Reliable process for the treatment of soil contaminated with non-PCB organic contaminants.	Permits or approvals required to treat site soils off site should be obtainable. On-site treatment may be limited due to limited availability of mobile systems. Equipment/facilities required for treatment are available. Distance to treatment facility greater than 500 miles from site.	Capital: High O&M: None	Eliminate
		Supercritical Water Oxidation	Would not achieve remedial action objective for the principal COC (Aroclor 1268). Process not effective for treating soil contaminated with inorganic contaminants. Potential impacts to human health and the environment from excavation, temporary stockpiling, loading, and transport. Effects could be mitigated using engineering and air pollution controls, and proper decontamination procedures, and H&S procedures. Treatment would be performed at an off-site location. Technology still emerging. Not yet proven to be reliable for treatment at full scale.	Permits or approvals required to treat site soils off site should be obtainable. On-site treatment may not be possible due to limited availability of mobile system. Equipment/facilities required for treatment are limited. May be difficult to implement due to heterogeneous nature of waste materials.	Capital: High O&M: None	Eliminate
		Liquefied Gas Solvent Extraction	Would not achieve remedial action objective for the principal COC (Aroclor 1268) Not effective for treating soil contaminated with inorganic contaminants. Potential impacts to human health and the environment from excavation, temporary stockpiling, loading, and transport. Effects could be mitigated using engineering and air pollution controls, and proper decontamination and H&S procedures. Treatment could be performed at an off-site location. Technology still emerging. Not yet proven to be reliable for treatment of heterogeneous waste.	Permits or approvals required to treat site soils off site should be obtainable. Equipment/facilities required for treatment are limited. May be difficult to implement due to heterogeneous nature of waste materials.	Capital: High O&M: None	Eliminate
		Solvent Extraction	Multiple solvents required to address organic and inorganic contaminants. Additional processing may be required to remove residual solvents from treated soils. Potential impacts to human health and the environment from excavation, temporary stockpiling, loading, and transport. Effects could be mitigated using proper engineering controls, and decontamination and H&S procedures. Treatment would be performed at an off-site location. Technology still emerging. Not yet proven to be reliable for treatment at full scale.	Permits or approvals required to treat site soils off site should be obtainable. Equipment/facilities required for treatment are limited. May be difficult to implement due to heterogeneous nature of waste materials.	Capital: High O&M: None	Eliminate

Notes:
1. Effectiveness is evaluated relative to other processes within the same technology type using the following criteria:
   A. Potential effectiveness of process option in handling the estimated volume of contaminated soil and meeting the preliminary remediation goals.
   B. Potential impacts to human health and the environment during the construction and implementation phase.
   C. Reliability of the process with respect to the contaminants and conditions at the site.
2. Implementability is evaluated relative to other processes within the same technology type using the following criteria:
   A. Ability to obtain necessary permits for off-site actions.
   B. Availability of treatment, storage, and disposal services (including capacity).
   C. Availability of necessary equipment and skilled workers to implement the technology.
   D. Potential technical implementability concerns.
3. Cost plays a limited role in the screening of process options. Relative capital and operations and maintenance (O&M) costs are used at this stage rather than detailed cost estimates. Cost analysis is made on the basis of engineering judgment, and each process is evaluated as to whether costs are high, medium, or low relative to other process options in the same technology type.
4. Solidification of metal-contaminated soil was demonstrated to be effective based on results treatability study using Raymark soil-waste materials (*Treatability Study Report for Bench-Scale Solidification and Stabilization,* Halliburton NUS Corp., August 1994) .
5. Low-temperature thermal treatment methods were determined to be ineffective in removing Aroclor 1268 from contaminated Raymark soil-waste materials, while incineration was effective based on results of a second treatability study (*Bench-Scale Treatability Study Report for Thermal Treatment*, Halliburton NUS Corp., October 1994).

TABLE A-2-5
ASSEMBLY OF ALTERNATIVES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU4 – BALLFIELD
STRATFORD, CONNECTICUT

GENERAL RESPONSE ACTION (GRA)	TECHNOLOGY TYPE	PROCESS OPTION	Alt. OU4-1 No Action	Alt. OU4-2 Limited Action	Alt. OU4-3 Containment	Alt. OU4-4 On-site Treatment	Alt. OU4-5 Excavation and Off-site Disposal
No Action	No Action	Not Applicable	✶				
Institutional Actions	Institutional Controls	Deed Restrictions Local Ordinances		✶	✶	✶	✶
	Access Restrictions	Fencing/Signage		✶	✶	✶	
	Monitoring	Environmental Sampling		✶	✶	✶	✶
Containment	Horizontal Barriers	Low-Permeability Cap			✶		
Excavation	Excavation	Bulk Mechanical Excavation			✶	✶	✶
Disposal	Disposal	On-Site Disposal/ Consolidation			✶	✶	
		Out-of-Town Disposal				✶ (1)	✶
Treatment	Immobilization	Solidification/ Stabilization				✶	
	Thermal Treatment	Incineration				✶	

Notes:
✶ - Process option is a component of this alternative
1. Difficult to treat materials may require offsite disposal.

TABLE A-2-6
DESCRIPTION OF POTENTIAL REMEDIAL ALTERNATIVES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU4 – BALLFIELD
STRATFORD, CONNECTICUT

Alternative OU4-1 – No Action

- No actions taken to address Raymark waste at the property.
- Five-year reviews to assess site conditions.

Alternative OU4-2 – Limited Action

- No actions taken to address Raymark waste at the property
- Institutional controls will be placed on property to prohibit certain types of activities such as excavations without written authorization from EPA and DEP and to prohibit groundwater use of any kind.
- Fencing and signage will be installed to discourage access and limit potential exposures.
- New monitoring wells installation.
- Quarterly groundwater monitoring for two years, and annual groundwater monitoring thereafter.
- Monthly inspections to verify effectiveness of institutional controls.
- Annual reporting to document groundwater sampling results and compliance with institutional controls.
- Five-year reviews to assess site conditions.

Alternative OU4-3 –Consolidation, Capping, and Institutional Controls

- Demolition of on-property structures and removal for off-site disposal.
- Excavation of on-property contaminated soil to 4 feet below ground surface (1,400 CY) beyond the extent of the cap for consolidation within OU4 to reduce area of Raymark waste that requires capping, followed by backfilling with clean fill to reduce potential direct contact with contaminants.
- Regrading of on-property Raymark waste to reduce area that requires capping.
- Construction of low-permeability cap (311,000 SF) over regraded Raymark waste area to prevent potential direct contact with contaminants and to minimize potential contaminant migration.
- New monitoring wells installation.
- Enactment of institutional controls on the property to prohibit activities that could intrude into contaminated materials or compromise the integrity of the cap.
- Monthly inspections to verify integrity of cap and surface drainage.
- Annual maintenance and repair of cap to ensure effectiveness.
- Quarterly groundwater monitoring for 2 years, and annual groundwater monitoring thereafter.
- Annual inspections to verify effectiveness of institutional controls.
- Annual reporting to document cap inspection/repair activities, compliance with institutional controls, and groundwater sampling results.
- Five-year reviews to assess site conditions and verify effectiveness of the remedy.

Alternative OU4-4 – On-Site Treatment, Soil Cover, and Institutional Controls

- Demolition of on-property structures and removal for off-site disposal.
- Excavation of on-property Raymark waste to the depth of the seasonal high water table (130,500 CY) and store temporarily on the property.
- Thermal treatment to remove/destroy organic contaminants.
- Confirmatory sampling and analysis to verify effectiveness of thermal treatment.
- Solidification to stabilize metal- and asbestos-contaminated soil.
- Confirmatory sampling and analysis to verify effectiveness of solidification.
- Backfilling of treated soil.

- Construction of soil cover to prevent potential direct contact with residual contaminants (metals) and to minimize potential contaminant migration.
- New monitoring wells installation.
- Enactment of institutional controls on the property to prohibit activities that could intrude into or below treated materials or disturb the soil cover.
- Monthly inspection of the soil cover with annual maintenance and repairs to ensure effectiveness.
- Quarterly groundwater monitoring for two years, and annual groundwater monitoring thereafter.
- Annual inspections to verify effectiveness of institutional controls.
- Annual reporting to document cap inspection/repair activities, compliance with institutional controls, and groundwater sampling results.
- Five-year reviews to assess site conditions and verify effectiveness of the remedy.

<u>Alternative OU4-5 – Excavation, Off-Site Disposal, and Institutional Controls</u>

- Demolition of on-property structures and removal for off-site disposal.
- Excavation of Raymark waste to the depth of the seasonal high water table (130,500 CY) and store temporarily on site.
- Characterize and transport excavated materials to off-site disposal facilities.
- Import clean fill and backfill excavated areas.
- New monitoring wells installation.
- Enactment of institutional controls on the property to prohibit activities that could intrude into contaminated materials present below the water table.
- Quarterly groundwater monitoring for two years, and annual groundwater monitoring thereafter.
- Annual inspections to verify effectiveness of institutional controls.
- Annual reporting to document compliance with institutional controls, and groundwater sampling results.
- Five-year reviews to assess site conditions and verify effectiveness of the remedy.

TABLE A-2-7
SCREENING OF ALTERNATIVES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU4 – BALLFIELD
STRATFORD, CONNECTICUT

ALTERNATIVE	DESCRIPTION	SCREENING CRITERIA			COMMENTS
		EFFECTIVENESS	IMPLEMENTABILITY	COST	
OU4-1 **No Action**	**Implementation Period** No Action **Post-Implementation Period** 5-Year Reviews	Would not achieve remedial action objective. Any reduction in toxicity or volume would be the result of natural attenuation or degradation processes. However, PCBs will only attenuate very gradually. Asbestos will not attenuate at all. Current and future human health risks would remain as quantified in the baseline risk assessment.	No permits required; no treatment, storage or disposal involved; no equipment or services required. Performance of 5-year reviews is required.	Capital: None O&M: Low (for 5-yr reviews)	Retain (as baseline)
OU4-2 **Limited Action**	**Implementation Period** Institutional Controls Monitoring Wells Installation **Post-Implementation Period** Groundwater Monitoring (30 years) 5-Year Reviews	Would not achieve remedial action objective without other actions. Any reduction in toxicity or volume would be the result of natural attenuation or degradation processes. However, PCBs and metal COCs will only attenuate very gradually. Asbestos will not attenuate at all. No human health or environmental impacts from implementation; institutional controls may mitigate human health risks posed by Raymark waste, if controls are enforced. Reliable to the extent those restrictions can be enforced.	No treatment, storage, or disposal involved. Services readily available to implement institutional controls (i.e., signs, fencing, wells installation, groundwater monitoring). Institutional controls and local ordinances would require legal and/or actions by others. Can be a standalone action or part of other alternatives. Performance of 5-year reviews is required. Services readily available to implement institutional controls (signs, fencing, groundwater monitoring).	Capital: Low O&M: Low	Retain.
OU4-3 **Consolidation, Capping, and Institutional Controls**	**Implementation Period** Demolition & Disposal of onsite structures Cap System Construction Monitoring wells Installation Interim Monitoring during Construction - Storm Water - Air Institutional Controls **Post-Implementation Period** Cap Maintenance Groundwater Monitoring (30 years) Storm Water Inspections 5-Year Reviews	Containment achieves remedial action objectives by preventing direct contact with contaminated soils (190,000 CY of Raymark waste would be contained below the cap). No reduction in toxicity or volume through treatment are anticipated. Potential adverse impacts on human health and the environment for containment activities during construction beyond typical earthmoving construction activities because of contaminated soil presence, which can be mitigated through engineering and air pollution controls, and proper decontamination and H&S measures. Institutional controls can also mitigate some potential impacts to human health risks posed by Raymark waste during containment activities. Reliable when containment is properly designed, constructed and maintained; institutional controls and an O&M plan are integral parts of the alternative. Reliable to the extent that restrictions can be enforced.	Will need to comply with substantive requirements of ARARs for on-site activities. Adequate on-site storage capacity required for both consolidation and on-site handling of clean and contaminated materials. Conventional construction processes that are implemented with equipment and services that are readily available from several sources. Community impacts from construction activities are mainly short term including large numbers of vehicles moving clean and contaminated materials. Performance of 5-year reviews is required. Services readily available to implement institutional controls (signs, fencing, groundwater monitoring). Institutional controls and local ordinances would require legal and/or actions by others.	Cost: Medium O&M: Medium	Retain.

TABLE A-2-7
SCREENING OF ALTERNATIVES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU4 – BALLFIELD
STRATFORD, CONNECTICUT

ALTERNATIVE	DESCRIPTION	SCREENING CRITERIA			COMMENTS
		EFFECTIVENESS	IMPLEMENTABILITY	COST	
OU4-4 **On-Site Treatment, Soil Cover, and Institutional Controls**	**<u>Implementation Period</u>** Demolition & Disposal of onsite structures Excavation & Temporary Stockpiling Thermal Treatment Solidification Confirmatory Sampling and Testing Monitoring Wells Installation Interim Monitoring during Construction - Storm Water - Air Institutional Controls Soil Cover **<u>Post-Implementation Period</u>** Groundwater Monitoring 5-Year Reviews	Would achieve remedial action objectives by destroying organic contaminants, stabilizing metals and asbestos, and preventing direct contact with remaining contaminated soils. Potential adverse impacts during construction or implementation beyond typical earthmoving construction activities because of contaminated soil presence, which can be mitigated through engineering and air pollution controls, and proper decontamination and H&S measures. Reduction in toxicity or volume through treatment is anticipated. However, because of the extensive heterogeneity of materials, types of contaminants present, and volume, treatment effectiveness will likely be varied. Extensive materials handling, stockpiling, and testing would be required. Metals would not be destroyed, but would only be stabilized. Reliable if treatment could be properly designed and implemented.	May be difficult to comply with substantive requirements of ARARs for on-site activities, especially for thermal treatment. Community impacts from setup and operation are both short- and long-term including large numbers of vehicles moving clean and contaminated materials. Potential treatment options will also need sufficient space to set up treatment equipment, work areas including storage of contaminated soil (130,500 CY) before and after treatment. Thermal treatment will need to be conducted at high temperatures (i.e., comparable to incineration). Approvals for on-site treatment may be difficult to acquire. Performance of 5-year reviews is required. Services readily available to implement Institutional Controls (signs, fencing, groundwater monitoring). Institutional controls and local ordinances would require legal and/or actions by others.	Cost: High O&M: Low	Eliminate. Potential effectiveness and implementability issues. Effectiveness of treatment could be compromised by heterogeneous nature of materials. On-site thermal treatment may be difficult to implement. Elevated metals concentrations would remain on site. Estimated capital costs for onsite treatment would be high compared to the No Action, Limited Action or Capping and Institutional Controls alternative options.
OU4-5 **Out-of-Town Disposal and Institutional Controls**	**<u>Implementation Period</u>** Demolition & Disposal of onsite structures Excavation of Contaminated Materials Confirmatory Sampling and Testing Backfilling with Clean Fill Interim Monitoring during Response Action - Storm Water - Air Monitoring Wells Construction Institutional Controls Soil Cover **<u>Post-Implementation Period</u>** Groundwater Monitoring (2 years) 5-Year Reviews	May be difficult to accommodate anticipated volume of contaminated soil. Remedial action objectives would be achieved since all contamination above the water table would be removed from site. Extensive materials handling will be required during excavation, temporary storage, and loading of vehicles. Potential adverse impacts may occur during implementation beyond typical earth-moving construction activities because of contaminated soil presence, which can be mitigated through engineering and air pollution controls, and proper decontamination and H&S procedures to prevent the spread of contamination during excavation and loading. Proven and reliable for site contaminants.	Permits for transportation and disposal of contaminated materials at out-of-town disposal facilities could be obtained. Out-of-town disposal capacity for the anticipated volume of contaminated soil may be available (130,000 CY above water table), although out-of-town disposal of the entire volume of Raymark waste (est. 190,000 CY) may be difficult. Will require transport, as disposal facilities are located > 500 miles away. Not readily implemented. Significant specific sampling of on-site materials needed prior to out-of-town disposal. Performance of 5-year reviews is required to assess groundwater quality after closure. Services readily available to implement Institutional Controls (signs, fencing, groundwater monitoring), if not clean closure. Institutional controls would require legal and/or actions by others.	Capital: High O&M: Low (post-closure monitoring will be required)	Eliminate. Out-of-town capacity may be limited and unable to handle the volume of contaminated material that would require disposal. Additionally, the significant volume of material requiring transport and disposal is estimated to result in high capital costs, which would be comparable to on-site thermal treatment, and significantly higher than the No Action, Limited Action or Capping with Institutional Controls alternative options that were screened.

TABLE A-2-8
COMPARATIVE ANALYSIS OF OU4 ALTERNATIVES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU4 – BALLFIELD
STRATFORD, CONNECTICUT

EVALUATION CRITERIA[1]	ALTERNATIVE OU4-1 No Action	ALTERNATIVE OU4-2 Limited Action	ALTERNATIVE OU4-3 Consolidation, Capping, and Institutional Controls
Overall Protection of Human Health and the Environment			
Overall assessment of long-term protectiveness and short-term impacts	▪ Developed as a baseline per NCP for comparison purposes. ▪ Would not be protective of human health or environment in the long term. ▪ Contaminants will continue to pose potential health risks through direct exposure (dermal, ingestion, inhalation). ▪ Unacceptable blood lead levels in children, if no action taken. ▪ SVOCs and metals will continue to gradually leach, degrade groundwater quality, and will continue to migrate in aquifer.	▪ Offers very limited protection to human health, no protection for the environment. ▪ Contaminants will continue to pose potential risks through direct exposure (dermal, ingestion, inhalation), depending on effectiveness of the deterrent (fencing and signage). ▪ Unacceptable blood lead levels in children, if no action taken. ▪ SVOCs and metals will continue to gradually leach, degrade groundwater quality, and will continue to migrate in aquifer.	▪ Offers protection to human health by preventing direct exposure (dermal contact, incidental ingestion, and inhalation). ▪ Leaching of contaminants (SVOCs and metals) into groundwater will be reduced and can reduce migration of these chemicals in the aquifer. ▪ Institutional Controls could limit potential intrusion/damage of cover system, if enforced. ▪ Periodic maintenance would sustain effectiveness of the cap. ▪ Long-term monitoring would alert responsible parties of possible changes in groundwater quality or characteristics of capped materials.
Compliance with ARARs[2]			
Compliance with chemical-specific ARARs	▪ No applicable chemical-specific ARARs because no response action will be taken.	▪ No applicable chemical-specific ARARs because only limited actions will be taken.	▪ This alternative would comply with chemical-specific ARARs presented in Appendix C, ARAR Table A.
Compliance with location-specific ARARs	▪ No applicable location-specific ARARs because no response action will be taken.	▪ No applicable location-specific ARARs because only limited actions will be taken.	▪ There are no location-specific ARARs for OU4.
Compliance with action-specific ARARs	▪ Exceeds federal risk criteria. ▪ Would not comply with CT RCSA RSRs because no actions will be taken.	▪ Exceeds federal risk criteria. ▪ Would not comply with CT RCSA RSRs for environmental land use restrictions (ELURs). See Appendix C, ARAR Table A.	▪ This alternative would comply with the action-specific ARARs presented in Appendix C, ARAR Tables A and D.
Long-Term Effectiveness and Permanence			
Magnitude of residual risks	▪ Carcinogenic risks will remain at 2.0 E-04, which is at high end of EPA's acceptable risk range, due to potential unrestricted use of OU4. ▪ Non-carcinogenic risk will remain at 5.3 E+01, which exceeds the EPA's acceptable risk range. ▪ Contaminated Raymark waste totaling 190,000 CY would remain unaddressed. ▪ 5-year reviews will be required because waste remains on site.	▪ Carcinogenic risks may be lower than 2.0 E-04, which is at high end of EPA's acceptable risk range, because entry into OU4 would be limited by access restrictions (fencing). ▪ Non-carcinogenic risks may be lower than at 5.3 E+01, because entry into OU4 would be limited by access restrictions (fencing). ▪ Contaminated Raymark waste totaling 190,000 CY would remain unaddressed. ▪ 5-year reviews will be required because waste remains on site.	▪ Potential carcinogenic risks will not occur because direct exposure to contaminants will be eliminated by capping. ▪ Potential non-carcinogenic risks will not occur because direct exposure to contaminants will be eliminated by capping. ▪ Contaminated Raymark waste totaling 185,700 CY would remain on site, but will be controlled and contained. ▪ Contaminated Raymark waste totaling 4,300 CY would remain on site, but would be a depths greater than 4 feet below ground surface preventing direct contact with contaminants. ▪ 5-year reviews will be required because waste remains on site.
Adequacy and reliability of controls	▪ No controls are used. Therefore, no protection for human health or the environment from potential exposure to contaminants.	▪ Institutional Controls may be effective if these controls are enforced and monitored.	▪ Capping is effective and protective, as long as the cover system is maintained. ▪ Institutional Controls are effective if these controls are enforced and monitored.
Reduction of Toxicity, Mobility, or Volume Through Treatment			
Treatment process used	▪ No treatment used.	▪ No treatment used.	▪ No treatment used.
Reduction in toxicity, mobility, or volume	▪ No reduction of toxicity, mobility, or volume through treatment.	▪ No reduction of toxicity, mobility, or volume through treatment.	▪ No reduction of toxicity, mobility, or volume through treatment.
Type and quantity of treatment residuals	▪ No treatment, therefore no residuals.	▪ No treatment, therefore no residuals.	▪ No treatment, therefore no residuals.
Satisfies statutory preference for treatment	▪ Would not satisfy statutory preference for treatment.	▪ Would not satisfy statutory preference for treatment.	▪ Would not satisfy statutory preference for treatment.

TABLE A-2-8
COMPARATIVE ANALYSIS OF OU4 ALTERNATIVES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU4 – BALLFIELD
STRATFORD, CONNECTICUT

EVALUATION CRITERIA[1]	ALTERNATIVE OU4-1 No Action	ALTERNATIVE OU4-2 Limited Action	ALTERNATIVE OU4-3 Consolidation, Capping, and Institutional Controls
Short-Term Effectiveness			
Risks to community during implementation of remedial action	▪ No additional risks to community as no actions would be taken.	▪ No additional risks to community as no actions would be taken.	▪ Limited impacts to community are anticipated. Increased truck and vehicular traffic would occur during site preparation, demolition of existing structures, decontamination, and soils excavation/consolidation. ▪ Increased vehicular traffic on public roads will need to be coordinated and scheduled to minimize impacts to the local community. ▪ Fugitive dust emissions from demolition, soil excavation/consolidation, cap system construction could be minimized or eliminated by applying proper engineering controls (i.e., dust suppressants, enclosures, etc.) and monitoring.
Risks to workers during implementation of remedial action	▪ No additional risks to workers as no actions would be taken.	▪ No additional risks to workers as no actions would be taken.	▪ Risks to workers during the remedial action can be minimized or eliminated through the use of proper personal protective equipment to prevent exposures to contaminant-laden dusts (i.e., metals, asbestos fibers, and PCBs).
Environmental impacts	▪ No additional risks to environment as no actions would be taken.	▪ No additional risks to environment as no actions would be taken.	▪ No permanent adverse impacts to the environment are anticipated as the result of the remedial action. ▪ There are no on-site wetlands or unique habitats that would be disturbed by the remedial action.
Time until remedial action is achieved	▪ RAO will not be achieved.	▪ Limited actions would be taken, RAO could be achieved if institutional controls are effectively enforced.	▪ Approximately 3 years required to achieve the RAO, including pre-design, design, and construction activities.
Implementability			
Constructable	▪ Not applicable.	▪ Fencing (access restrictions) and signage easily constructed. ▪ Institutional Controls can be prepared to restrict land use.	▪ No anticipated difficulties or uncertainties associated with excavation, consolidation and construction of a landfill cap. ▪ Handling of hazardous and asbestos-contaminated materials will require specially trained workers and supervisors.
Technology reliability	▪ Not applicable.	▪ Institutional Controls can be effective if enforced and maintained.	▪ Containment is a reliable technology, if properly maintained. ▪ Long-term monitoring is reliable for evaluation of subsurface conditions.
Ease of implementing additional actions, if necessary	▪ Easily implemented.	▪ Easily implemented.	▪ Should additional actions be warranted, these can be implemented. ▪ However, repairs may be required to ensure cap integrity after additional actions are completed.
Monitoring effectiveness	▪ Can be monitored.	▪ Monitoring can be effective in evaluating site conditions and potential changes.	▪ Effectiveness of the cover system can be monitored through periodic inspections and maintenance. ▪ Effectiveness of the institutional controls can also be monitored through periodic inspections.
Coordination with other agencies	▪ Not applicable.	▪ Coordination with other agencies can be readily implemented.	▪ Coordination with other agencies can be readily implemented.
Availability of treatment, storage, and disposal services	▪ Not applicable.	▪ Not applicable.	▪ Not applicable.

TABLE A-2-8
COMPARATIVE ANALYSIS OF OU4 ALTERNATIVES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU4 – BALLFIELD
STRATFORD, CONNECTICUT

EVALUATION CRITERIA[1]	ALTERNATIVE OU4-1 No Action	ALTERNATIVE OU4-2 Limited Action	ALTERNATIVE OU4-3 Consolidation, Capping, and Institutional Controls
Availability of equipment and specialists	▪ Not applicable.	▪ Specialty equipment is not required. Equipment and personnel to install fencing and signage are readily available. Specialists that prepare Institutional Controls are available.	▪ Some specialty equipment will be required to control dust emissions during construction. ▪ Equipment and personnel to perform demolition (of onsite structures), and to excavate, consolidate, and cap contaminated soils are available. Equipment and personnel to install fencing and signage are readily available. ▪ Some lead time will be required to order the necessary quantities of cover system materials. ▪ Specialists that prepare Institutional Controls are available.
Availability of prospective technologies	▪ Not applicable.	▪ Institutional Controls are readily available.	▪ Capping is well demonstrated technology to contain contaminated materials. ▪ A variety of companies are available that have the experience and capability to implement the consolidation and capping of contaminated materials at OU4.
Cost			
Capital Costs	**$0**	**$195,000**	**$8,807,300**
O&M Costs (Present Worth)[3]	**$21,600**	**$720,500**	**$1,554,200**
Total Present Worth Costs[3]	**$21,600**	**$915,500**	**$10,361,500**

Notes:
1. Evaluation criteria from *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final*, EPA/540/G-89/004, OSWER Directive 9355.3-01, October 1988.
2. Chemical-specific, location-specific and action-specific ARARS are presented in Appendix C.
3. Present Worth calculated based on 7% discount rate per *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*, EPA 540-R-00-002, OSWER 9355.0-75, July 2000

TABLE A-2-9a
PRESENT VALUE ANALYSIS
ALTERNATIVE OU4-1
FOCUSED FEASIBILITY STUDY
RAYMARK - OU4 - BALLFIELD
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$10,000	$10,000	7.0%	$7,130
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$10,000	$10,000	7.0%	$5,083
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$10,000	$10,000	7.0%	$3,624
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$10,000	$10,000	7.0%	$2,584
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$10,000	$10,000	7.0%	$1,842
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$10,000	$10,000	7.0%	$1,314
TOTAL	**$0**					**$21,578**
					PV O&M	**$21,578**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE A-2-9b
PRESENT VALUE ANALYSIS
ALTERNATIVE OU4-2
FOCUSED FEASIBILITY STUDY
RAYMARK - OU4 - BALLFIELD
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$194,990	$0	$0	$194,990	7.0%	$194,990
1	$0	$86,655	$0	$86,655	7.0%	$80,986
2	$0	$86,655	$0	$86,655	7.0%	$75,688
3	$0	$51,150	$0	$51,150	7.0%	$41,753
4	$0	$51,150	$0	$51,150	7.0%	$39,022
5	$0	$51,150	$10,000	$61,150	7.0%	$43,599
6	$0	$51,150	$0	$51,150	7.0%	$34,083
7	$0	$51,150	$0	$51,150	7.0%	$31,853
8	$0	$51,150	$0	$51,150	7.0%	$29,770
9	$0	$51,150	$0	$51,150	7.0%	$27,822
10	$0	$51,150	$10,000	$61,150	7.0%	$31,085
11	$0	$51,150	$0	$51,150	7.0%	$24,301
12	$0	$51,150	$0	$51,150	7.0%	$22,711
13	$0	$51,150	$0	$51,150	7.0%	$21,225
14	$0	$51,150	$0	$51,150	7.0%	$19,837
15	$0	$51,150	$10,000	$61,150	7.0%	$22,163
16	$0	$51,150	$0	$51,150	7.0%	$17,326
17	$0	$51,150	$0	$51,150	7.0%	$16,193
18	$0	$51,150	$0	$51,150	7.0%	$15,133
19	$0	$51,150	$0	$51,150	7.0%	$14,143
20	$0	$51,150	$10,000	$61,150	7.0%	$15,802
21	$0	$51,150	$0	$51,150	7.0%	$12,353
22	$0	$51,150	$0	$51,150	7.0%	$11,545
23	$0	$51,150	$0	$51,150	7.0%	$10,790
24	$0	$51,150	$0	$51,150	7.0%	$10,084
25	$0	$51,150	$10,000	$61,150	7.0%	$11,267
26	$0	$51,150	$0	$51,150	7.0%	$8,808
27	$0	$51,150	$0	$51,150	7.0%	$8,232
28	$0	$51,150	$0	$51,150	7.0%	$7,693
29	$0	$51,150	$0	$51,150	7.0%	$7,190
30	$0	$51,150	$10,000	$61,150	7.0%	$8,033
TOTAL	**$194,990**					**$915,481**
					PV O&M	**$720,490**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE A-2-9c
PRESENT VALUE ANALYSIS
ALTERNATIVE OU4-3
FOCUSED FEASIBILITY STUDY
RAYMARK - OU4 - BALLFIELD
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$8,807,307	$0	$0	$8,807,307	7.0%	$8,807,307
1	$0	$153,838	$0	$153,838	7.0%	$143,774
2	$0	$153,838	$0	$153,838	7.0%	$134,368
3	$0	$118,332	$0	$118,332	7.0%	$96,595
4	$0	$118,332	$0	$118,332	7.0%	$90,275
5	$0	$118,332	$10,000	$128,332	7.0%	$91,499
6	$0	$118,332	$0	$118,332	7.0%	$78,850
7	$0	$118,332	$0	$118,332	7.0%	$73,692
8	$0	$118,332	$0	$118,332	7.0%	$68,871
9	$0	$118,332	$0	$118,332	7.0%	$64,365
10	$0	$118,332	$10,000	$128,332	7.0%	$65,238
11	$0	$118,332	$0	$118,332	7.0%	$56,219
12	$0	$118,332	$0	$118,332	7.0%	$52,541
13	$0	$118,332	$0	$118,332	7.0%	$49,104
14	$0	$118,332	$0	$118,332	7.0%	$45,891
15	$0	$118,332	$10,000	$128,332	7.0%	$46,514
16	$0	$118,332	$0	$118,332	7.0%	$40,083
17	$0	$118,332	$0	$118,332	7.0%	$37,461
18	$0	$118,332	$0	$118,332	7.0%	$35,010
19	$0	$118,332	$0	$118,332	7.0%	$32,720
20	$0	$118,332	$10,000	$128,332	7.0%	$33,164
21	$0	$118,332	$0	$118,332	7.0%	$28,579
22	$0	$118,332	$0	$118,332	7.0%	$26,709
23	$0	$118,332	$0	$118,332	7.0%	$24,962
24	$0	$118,332	$0	$118,332	7.0%	$23,329
25	$0	$118,332	$10,000	$128,332	7.0%	$23,645
26	$0	$118,332	$0	$118,332	7.0%	$20,376
27	$0	$118,332	$0	$118,332	7.0%	$19,043
28	$0	$118,332	$0	$118,332	7.0%	$17,797
29	$0	$118,332	$0	$118,332	7.0%	$16,633
30	$0	$118,332	$10,000	$128,332	7.0%	$16,859
TOTAL	**$8,807,307**					**$10,361,473**
					PV O&M	**$1,554,166**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE A-2-9d
CAPITAL COSTS
OU4 ALTERNATIVES (OU4-1, OU4-2, AND OU4-3)
FOCUSED FEASIBILITY STUDY
RAYMARK - OU4- BALLFIELD
STRATFORD, CONNECTICUT

DESCRIPTION		UNIT	UNIT COST	QUANTITY			TOTAL COST			SOURCE
				OU4 - 1	OU4 - 2	OU4 - 3	OU4 - 1	OU4 - 2	OU4 - 3	
1.0 Mobilization/Demobilization										
1.1	Equipment Mobilization	LS	$96,526	0	0	1	$0	$0	$96,526	see Appendix A cost assumptions
1.2	Field Support Facilities	LS	$37,538	0	0	1	$0	$0	$37,538	see Appendix A cost assumptions
1.3	Monthly Costs associated with Field Support	MONTH	$51,481	0	0	6	$0	$0	$308,883	see Appendix A cost assumptions
	Subtotal						**$0**	**$0**	**$442,947**	
2.0 Site Preparation										
2.1	Site Access Road Construction	SY	$23.06	0	0	1,100	$0	$0	$25,365	Means 2008 HC, 32 11 23.23 0300
2.2	Demolition and Disposal	LS	$550,000	0	0	1	$0	$0	$550,000	see Appendix A cost assumptions
2.3	Clear and Grub	ACRE	$3,968	0	0	14	$0	$0	$55,556	Means 2008 HC, 31 11 10.10 0020
2.4	Site Survey	EA	$5,945	0	0	1	$0	$0	$5,945	TtNUS, 2005
2.5	Decontamination Facilities & Services	LS	$350,000	0	0	1	$0	$0	$350,000	see Appendix A cost assumptions
2.6	Install Erosion and Sedimentation Controls	LF	$8.97	0	0	2,500	$0	$0	$22,415	Means 2008 HC, 31 25 13.10 1100, 1250
2.7	Install Fence and signage[2]	LF	$28.31	0	2,500	2,500	$0	$70,774	$70,774	see cost assumptions (2010) in Appendix G
	Subtotal						**$0**	**$70,774**	**$1,080,056**	
3.0 Interim Construction Monitoring										
3.2	Stormwater	LS	$28,199.21	0	0	1	$0	$0	$28,199	TtNUS, 1999
3.3	Air	LS	$89,369.80	0	0	1	$0	$0	$89,370	TtNUS, 1999
	Subtotal						**$0**	**$0**	**$117,569**	
4.0 Spread/Compact Raymark Waste										
4.1	Excavate Raymark Waste[3]	CY	$2.12	0	0	1,400	$0	$0	$2,973	Means 2008 HC, 31 23 16.42 0200
4.2	Haul Raymark Waste (0.25 miles round trip)[4]	CY	$4.00	0	0	1,680	$0	$0	$6,721	Means 2008 HC, 31 23 23.18 0320
4.3	Spread Raymark Waste	CY	$2.40	0	0	1,680	$0	$0	$4,036	Means 2008 HC, 31 23 23.17 0400, 31 23 23.23 5000
4.4	Compact Raymark Waste	CY	$0.32	0	0	1,680	$0	$0	$539	Means 2008 HC, 31 23 23.23 5060
4.5	Watering with 3,000 gallon Tank truck, per Pass	ACRE	$168.43	0	0	3,920	$0	$0	$660,255	Means 2005 ER, 318 05 0413
4.6	Dust suppressant - tree resin based	ACRE	$11,452	0	0	28	$0	$0	$320,655	Means 2005 ER, 33 08 0576
4.7	Perimeter Air Sampling	EA	$243.76	0	0	6	$0	$0	$1,365	Aero-Tech, 2005
4.8	Equipment Decontamination	HR	$54.56	0	0	70	$0	$0	$3,820	Means 2004 ER, 33 17 0823
	Subtotal						**$0**	**$0**	**$1,000,364**	
5.0 Construct Low-Permeability Cap										
5.1	Deliver, Dump, Spread, and Compact Sand Subbase (6")[5]	CY	$27.00	0	0	6,336	$0	$0	$171,031	Means 2008 HC (multiple items)
5.2	Install Geosynthetic Clay Liner (bottom layer)	SF	$2.86	0	0	311,022	$0	$0	$890,289	Means 2009 FC, 33.46.26.10 0180
5.3	Install 60 mil HDPE liner	SF	$2.84	0	0	311,022	$0	$0	$883,890	Means 2005 ER, 33 08 0572
5.4	Install Geosynthetic Drainage Layer	SF	$0.65	0	0	311,022	$0	$0	$203,406	Means 2005 ER, 33 08 0513
5.5	Furnish, Spread, and Compact Soil Layer (24")[5]	CY	$11.83	0	0	25,343	$0	$0	$299,797	see cost assumptions (2008)
5.6	Install Nonwoven Geotextile Delineation/Warning Layer	SF	$1.29	0	0	311,022	$0	$0	$401,218	Means 2010 SW, 31.32.19.16.1550
5.7	Furnish, Place, and Spread Topsoil (6")[5]	CY	$34.65	0	0	6,336	$0	$0	$219,527	Means 2005 ER, 18 05 0301
5.8	Hydroseeding with Mulch and Fertilizer	MSF	$43.97	0	0	311	$0	$0	$13,677	Means 2008 HC, 32 92 19.14 3500
5.9	Site Cleanup	HR	$405.12	0	0	64	$0	$0	$25,928	Means 2004, 17 04 0101
5.10	Clean Fill, Delivered, Dumped, Spread, and Compacted[5]	CY	$11.83	0	0	1,540	$0	$0	$18,218	see cost assumptions (2008)
5.11	Install Geotextile Fabric Layer	SY	$2.21	0	0	34,558	$0	$0	$76,373	Means 2010 SW, 31.32.19.16 1500
5.12	As-Built Survey	LS	$30,000.00	0	1	1	$0	$30,000	$30,000	see Appendix A cost assumptions
	Subtotal						**$0**	**$30,000**	**$3,233,354**	

TABLE A-2-9d
CAPITAL COSTS
OU4 ALTERNATIVES (OU4-1, OU4-2, AND OU4-3)
FOCUSED FEASIBILITY STUDY
RAYMARK - OU4- BALLFIELD
STRATFORD, CONNECTICUT

	DESCRIPTION	UNIT	UNIT COST	QUANTITY			TOTAL COST			SOURCE
				OU4 - 1	OU4 - 2	OU4 - 3	OU4 - 1	OU4 - 2	OU4 - 3	
6.0 Well Replacement/Installation										
6.1	Well Replacement/Installation (assume 5 wells)	LS	$21,450.22	0	1	1	$0	$21,450	$21,450	see Appendix A cost assumptions
	Subtotal						**$0**	**$21,450**	**$21,450**	
TOTAL DIRECT COSTS							**$0**	**$122,224**	**$5,895,740**	
7.0 Other Costs										
7.1	Project Management (5% of direct costs)						$0	$6,111	$294,787	OSWER 9355.0-75
7.2	Engineering and Design (8% direct costs)						$0	$0	$471,659	OSWER 9355.0-75
7.3	Construction management (6% of direct costs)						$0	$7,333	$353,744	OSWER 9355.0-75
7.4	Location Adjustment (9%)						$0	$11,000	$530,617	Means 2004 ER
7.5	Contingency (15%)						$0	$18,334	$884,361	OSWER 9355.0-75
7.6	Health and Safety Monitoring (6% of direct costs)						$0	$7,333	$353,744	TtNUS 1999 Report
7.7	Deed Restriction Transactional Fees (assume 1 property)						$0	$22,655	$22,655	
TOTAL OTHER COSTS							**$0**	**$72,766**	**$2,911,567**	
TOTAL CAPITAL COST							**$0**	**$194,990**	**$8,807,307**	

Notes:
[1] For source information regarding unit pricing - refer to cost assumptions provided in Appendix A and G; historical rates asjusted to reflect 2010 price increases.
[2] Assume fencing and signage to be maintained for Alt. OU4-2 only - all other fencing and signage would be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated.
[4] Volume for hauling RW includes a bulking factor of 1.2.
[5] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement.

RW = Raymark waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet

LF = linear foot
CY = cubic yard
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
There would be no impacts to floodplains or wetlands.

TABLE A-2-9e
OPERATIONS AND MAINTENANCE COSTS
OU4 ALTERNATIVES (OU4-1, OU4-2, OU4-3)
FOCUSED FEASIBILITY STUDY
RAYMARK - OU4- BALLFIELD
STRATFORD, CONNECTICUT

DESCRIPTION		UNIT	UNIT COST[1]	QUANTITY			TOTAL COST		
				OU4 - 1	OU4 - 2	OU4 - 3	OU4 - 1	OU4 - 2	OU4 - 3
OM.1.0 Groundwater Monitoring (per event)									
OM.1.1	Sampling Equipment Rental	LS	$1,073	0	1	1	$0	$1,073	$1,073
OM.1.2	Sampling Labor - FOL	HR	$110	0	24	24	$0	$2,640	$2,640
OM.1.3	Sampling Labor - Sampler	HR	$90	0	12	12	$0	$1,080	$1,080
OM.1.4	Analytical Costs	EA	$697	0	6	6	$0	$4,183	$4,183
OM.1.5	Data Validation	HR	$110	0	6	6	$0	$660	$660
OM.1.6	Report Preparation	LS	$2,200	0	1	1	$0	$2,200	$2,200
	Subtotal						**$0**	**$11,835**	**$11,835**
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)									
OM.2.1	Inspections	HR	$110.00	0	120	120	$0	$13,200	$13,200
OM.2.2	Mowing (twice per year)	MSF	$7.34	0	0	1,230	$0	$0	$9,023
OM.2.3	Revegetation (1% per year)	MSF	$56.31	0	0	6	$0	$0	$346
OM.2.4	Asphalt Repairs	SF	$1.81	0	0	0	$0	$0	$0
OM 2.5	Fence Repair[2]	LF	$27.57	0	83	0	$0	$2,298	$0
OM 2.6	Sign Replacement[3]	EA	$73.95	0	100	0	$0	$7,395	$0
OM.2.7	Reporting (annual)	LS	$10,000.00	0	1	1	$0	$10,000	$10,000
OM 2.8	Topsoil replacement (1% per year)	CY	$34.65	0	0	63	$0	$0	$2,195
OM 2.9	Cap/Culvert/Streambank Repairs (2% per year of capital costs)	LS	$64,667.08	0	0	1	$0	$0	$64,667
OM 2.10	Contractor mobilizations	LS	$321.75	0	1	3	$0	$322	$965
	Subtotal						**$0**	**$33,214**	**$100,397**
OM.3.0 Deed Restrictions									
OM.3.1	Inspection (annual)	LS	$1,100.00	0	1	1	$0	$1,100	$1,100
OM.3.2	Deed Restriction Reporting (annual)	EA	$5,000.00	0	1	1	$0	$5,000	$5,000
	Subtotal						**$0**	**$6,100**	**$6,100**
ANNUAL O&M COSTS ALT. OU4-2 (YEARS 1-2)[4]							--	**$86,655**	--
ANNUAL O&M COSTS ALT. 0U4-2 (YEARS 3-30)[5]							--	**$51,150**	--
ANNUAL O&M COSTS ALT. OU4-3 (YEARS 1-2)[6]							--	**--**	**$153,838**
ANNUAL O&M COSTS ALT. OU4-3 (YEARS 3-30)[7]							**--**	**--**	**$118,332**

Notes:

[1] For source information regarding unit pricing - refer to cost assumptions provided in Appendix G.

[2] Assume fencing will not be required following remedial action and would be maintained for Alternative OU4-2 only.

[3] Assume signage will not be required following remedial action and would be maintained for Alternative OU4-2 only.

[4] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface and fence/sign inspections with annual repairs, annual deed inspections and one annual report for all O&M activities

[5] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface and fence/sign inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities

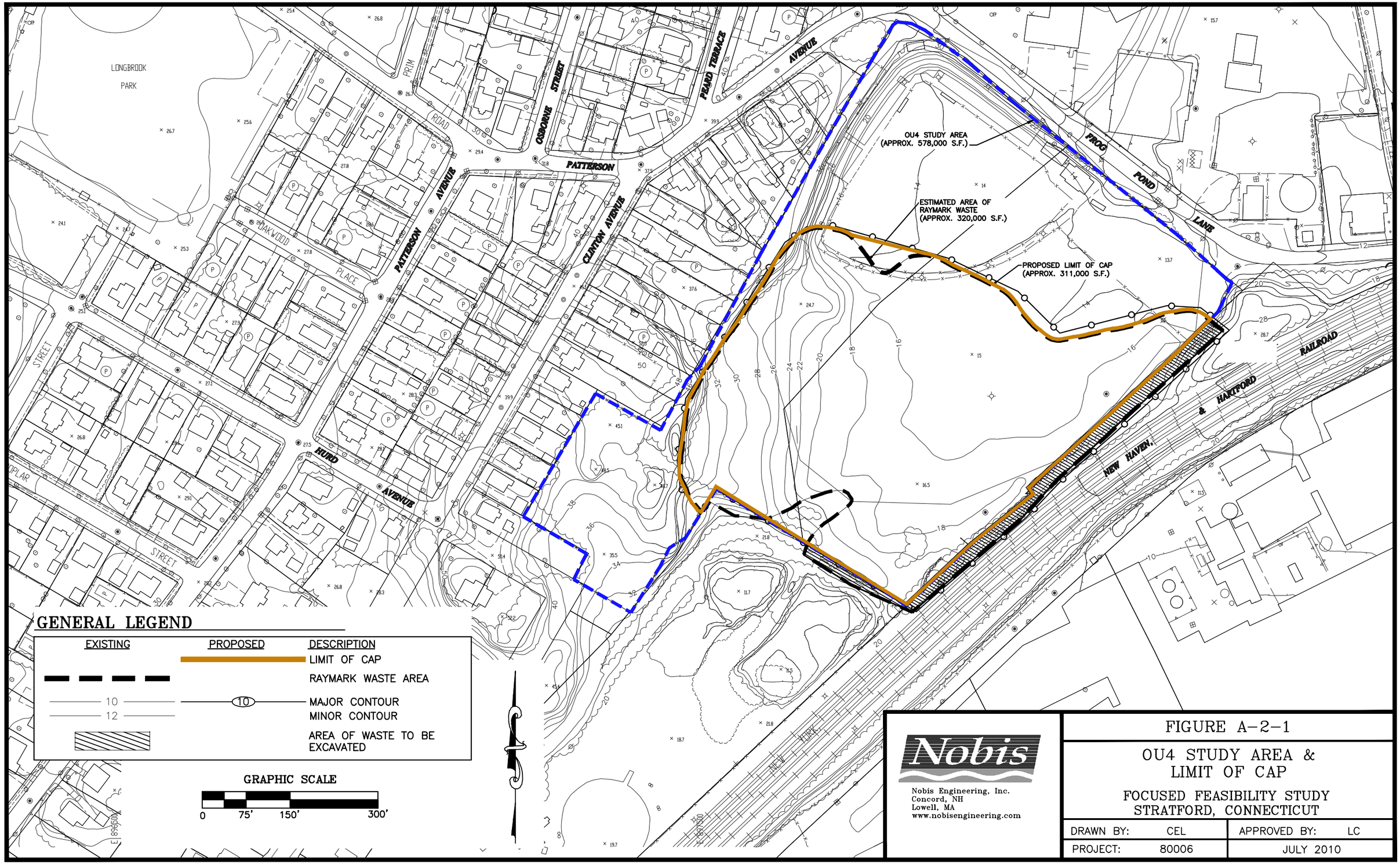
[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

COST ASSUMPTIONS
FOCUSED FEASIBILITY STUDY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		RATIONALE
General Assumptions		
The costs shown in these tables reflect those that would be expected for implementation of remedial actions at one property or property group at a time. Performing actions on more than one property or property group during the same mobilization could potentially result in cost savings.		
Other Costs presented in Section 7.0 of the cost estimate are based on recommended percentages contained in *A Guide to Developing and Documenting Cost Estimates During the Feasibility* (OSWER 9355.0-75), July 2000. Location adjustment based on value published in Means 2005 ER. Contingency line items based on typical values presented in OSWER 9355.0-75		
OU4 - BALL FIELD		
Generally assumptions same as OU3's, but item number designations may have changed to accommodate fewer items used. Cost items specific to OU 4 are detailed below.		
2.0 Site Preparation		
2.2	Demolition and Disposal	Demolition of Ballfield Structures - including bleachers, grandstand, utility building, and former snack vending building. Assume non-hazardous demolition.
		Foundation removal: Brick/Concrete Block Bldg. is 32' x 53' = 1700 SF
		Wood frame for food vending shed is 35' x 17' = 600 SF
		Assume 12"-thick slab foundation w/average reinforcing
		Assume footing 1 FT thick, 2 FT wide w/average reinforcing
		Volume of concrete bleachers = 18" thickness (assumed)
		Volume of concrete foundation = 1700 SF x 1 LF = 1700 CF = 63 CY
		70Length of footing = 2 x (32 LF + 53 LF) = 170 LF; Vol. = 2 LF x 1 LF x 170 LF = 13 CY
		Volume of Concrete Block structure = 600 SF x 10 LF (wall height) = 17,000 CF = 630 CY
		Volume of Wood Frame = 600 SF x 10 LF (wall height) = 6000 CF
		Volume of bleachers: 20000 SF x 1.5 FT thick = 1111 CY; assume similar to plain concrete demo. 12" thick @ 20000 SF
		Weight of bleachers: 20000 SF x 1.5 FT (thick) = 30000 CF x 150 lbs/CF = 4.5 million lbs = 2250 TONS x 1.3 = 2925 TONS (use 30% factor for buidlings and miscellaneous structures associated with bleachers).
		Assume $25000 for miscellaneous removal work (railings, moveable bleachers, wooden seating, press box, etc.)
		Remove chainlink fence 3000 LF, assume posts every 8 ft.
		Disposal. Assume materials consolidated on site. Volume = 63+13+630+1111 CY
2.4	Site Survey	14 acres
	Interim-construction topo survey	Pre construction. Topographic survey, conventional, average of min. and max. [Means 2008 HC, 02 21 13.09 0020 & 0100]
		Post excavation. Topographic survey, conventional, average of min. and max. [Means 2008 HC, 02 21 13.09 0020 & 0100]
	As constructed survey	Post construction. Topographic survey, conventional, average of min. and max. [Means 2008 HC, 02 21 13.09 0020 & 0100]

COST ASSUMPTIONS
FOCUSED FEASIBILITY STUDY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		RATIONALE
General Assumptions		
The costs shown in these tables reflect those that would be expected for implementation of remedial actions at one property or property group at a time. Performing actions on more than one property or property group during the same mobilization could potentially result in cost savings.		
Other Costs presented in Section 7.0 of the cost estimate are based on recommended percentages contained in *A Guide to Developing and Documenting Cost Estimates During the Feasibility* (OSWER 9355.0-75), July 2000. Location adjustment based on value published in Means 2005 ER. Contingency line items based on typical values presented in OSWER 9355.0-75		
OU4 - BALL FIELD		
Generally assumptions same as OU3's, but item number designations may have changed to accommodate fewer items used. Cost items specific to OU 4 are detailed below.		
3.0 Interim Construction Monitoring		
		Monitor groundwater, storm water, air, and soil during remedial action implementation.
		Assumes 26 samples per month for 6 months @ $600/sample (VOCs - $150, SVOCs - $125, PCBs - $125, Metals - $100, asbestos - $75, misc. - $150); Labor - 3 hours/sample @ $100/sample. ODCs - $10000.
		Analyze 5 storm water samples for 6 months for various parameters (see OU3 details). Assumes 2 hours per sample Labor.
		Monitor air quality for 6 months at 40 hours per month.
		Analyze excavated sidewall/bottoms for metals, PCBs, and asbestos. ~400 samples (~25 ft on center for botton, 3 samples vertical per 25 Ft interval). 2 hours/sample.
		See OU4 FFS Cost Estimate Details
5.0 Construct Low-Permeability Cap		
	As-built survey	14 acres. Post construction. Topographic survey, conventional, average of min. and max. [Means 2008 HC, 02 21 13.09 0020 & 0100]
5.11	*Interim-construction topo survey*	Post excavation. Topographic survey, conventional, average of min. and max. [Means 2008 HC, 02 21 13.09 0020 & 0100]
	As constructed survey	Post construction. Topographic survey, conventional, average of min. and max. [Means 2008 HC, 02 21 13.09 0020 & 0100]
		See OU9 FFS Cost Estimate Details



Nobis

Nobis Engineering, Inc.
Concord, NH
Lowell, MA
www.nobisengineering.com

FIGURE A-2-1

OU4 STUDY AREA & LIMIT OF CAP

FOCUSED FEASIBILITY STUDY
STRATFORD, CONNECTICUT

DRAWN BY:	CEL	APPROVED BY:	LC
PROJECT:	80006	JULY 2010	

K:\80000 Task Orders\80006 Raymark\Raymark CAD\FS Figures\Final_FS\FS-OU4.dwg

APPENDIX A-3

FOCUSED FEASIBILITY STUDY

FOR

OPERABLE UNIT 9

APPENDIX A-3

A-3-1.0 INTRODUCTION

This report presents the Focused Feasibility Study (FFS) for Operable Unit (OU) 9 of the Raymark Industries, Inc. (Raymark) Superfund Site (the Site) located in Stratford, Connecticut. This FFS Report was prepared by Nobis Engineering, Inc. (Nobis) for the United States Environmental Protection Agency (EPA) under Task Order No. 0006-RICO-01H3, Contract No. EP-S1-06-03. A range of remedial options are presented in the FFS that address risks to human health that were identified during the Remedial Investigation (RI) for OU9 (TtNUS, 2005).

This FFS was prepared consistent with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986; the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) 40 CFR 300; and the *Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (EPA, 1988) (RI/FS Guidance Document).

This FFS only addresses source control for the OU9 Study Area. The key features of the OU9 Study Area are depicted in Figure 1-1 (Site Locus), Figure 1-2 (Surrounding Areas), and Figure 3-1 (Physical Features) of the *OU9 Remedial Investigation Report* (TtNUS, July 2005).

The NCP, under 40 CFR 300.5, defines a source control action as "….The construction or installation and start-up of those actions necessary to prevent the continued release of hazardous substances or pollutants or contaminants (primarily from a source on top of or within the ground, or in building or other structures) into the environment." The remedial options developed in this report will be used by EPA to develop and formulate a preferred remedy for the OU9 Study Area soils.

The OU9 Study Area is located in the vicinity of Sikorsky Airport and as such is subject to FAA regulations for site development for adjacent properties. FAA regulations restrict development with respect to the adjacent properties' elevations and distances from the runways. These regulations may significantly affect the OU9 remedial options. Evaluation of the potential impact of these regulations on the OU9 Study Area is ongoing.

Contaminated groundwater associated with the Raymark Site constitutes the Raymark – OU2 – Groundwater Operable Unit, which was evaluated under the Remedial Investigation Report (TtNUS, 2005).

The remedial options developed in this document will be used by EPA to formulate a preferred remedy that will address Raymark waste at the OU9 Study Area.

A-3-1.1 Objective of the FFS

The overall objective of this FFS is to develop and evaluate source control remedial alternatives that address contaminated soil (Raymark waste) at the OU9 Study Area.

A-3-1.2 Background for the FFS

The general FS (or FFS) process is described in detail in Section 1.2 and Section 2 of Volume 1. Section 1.3 of Volume 1 describes the history of the former Raymark Facility. OU9 is one of the locations that received Raymark waste as fill material, resulting in chemical contamination (TtNUS, 2005).

Brief descriptions of the major classes of chemical contaminants detected in the soils of the former Raymark Facility and the common industrial uses of these chemicals are presented in Sections 1.5.2.1 to 1.5.2.7 of Volume 1. Section 1.5.2.8 of Volume I provides a reference for the specific chemicals known to have been stored, handled, and/or used at the former Raymark Facility during its operation that may have contributed to contamination of the OU9 Study Area. This background information provides a reference framework for the chemicals identified in the soil at the OU9 Study Area.

A-3-1.3 Physical Characteristics of the OU9 Study Area

The physical characteristics of the OU9 Study Area and the region in which the OU9 Study Area is situated are presented herein. The OU9 Study Area topography and surface geology and fill materials are described in the OU9 RI (TtNUS, 2005). Throughout this report, all elevations are stated in feet with respect to the National Geodetic Vertical Datum (NGVD), 1929.

APPENDIX A-3

The OU9 Study Area is located south of the former Raymark Facility near Sikorsky Airport and adjacent to the mouth of Long Island Sound. The OU9 Study Area is divided into two adjacent areas: Short Beach Park and the Stratford Landfill. Both areas have historically received residential, commercial, and industrial wastes. Prior to this disposal activity, the entire area was comprised of low-lying marshes. Over the years, the area was operated as a municipal landfill and was systemically filled in with waste. In addition, the former Raymark Facility also dumped manufacturing seconds (irregular or defective product) at the municipal landfill. In the early 1980s, a large portion of the landfill was excavated and six disposal cells were created to specifically accept Raymark's manufacturing wastes. This cell area was capped with a geotextile membrane as an interim measure in 1993 by the Connecticut Department of Environmental Protection (CTDEP). More recently, the Town of Stratford developed a portion of the OU9 Study Area (Short Beach Park) into a municipal recreational park.

The Short Beach Park portion of the OU9 Study Area consists of 64.1 acres and currently includes a soccer field, baseball fields, a nine-hole golf course, mini-golf course, tennis and handball courts, as well as a beach and picnic areas. The Stratford Landfill portion of the OU9 Study Area, consists of 29.8 acres and was also operated as a municipal landfill accepting town waste from at least two local municipalities as well as wastes from the former Raymark Facility and other local businesses. Today this property still accepts organic matter, leaves, and brush from local residents and the DPW. Both portions of OU9 are considered part of the OU9 Study Area and are addressed in this FFS as shown in Figure A-3-1.

Long Island Sound borders the OU9 Study Area to the east. There are residences located to the west and south of the OU9 Study Area. The Sikorsky Regional Airport is located on the northwest side of the Study Area; the landfill is an approach zone for the airport and has a height restriction in place to prevent obstruction of airplane flight paths. Currently, the height of Stratford Landfill is just below the airport's approach surface. In addition, Short Beach Park may be in a Runway Protection Zone. The OU9 Study Area, shown on Figure A-3-1, is bounded to the north by the Marine Basin and Airport Property (see Section 4.3.16 of Volume 1). The southern portion of Short Beach Park and areas adjoining Long Island Sound are within the 100-year floodplain, as observed from Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps for Stratford, Connecticut (FEMA, 1992). The 100-year frequency base flood elevation ranges from 10 to 12 feet. As discussed in Section 3.1.5.1 of Volume 1, the delineation of the flood areas was developed using the Town of Stratford maps which presented

a more accurate depiction of the applicable flood contours. The remainder of the OU9 Study Area is outside the 100-year floodplain.

The Stratford area receives approximately 44 inches of precipitation (rainfall, snow, etc.) per year (NOAA, 2002). Short Beach Park is covered mostly with grassed playing fields and a golf course, with some cover in the form of parking areas, playing courts, and facility buildings. The Stratford Landfill is almost entirely vegetated, with the exception of a dirt access road. Precipitation that does not infiltrate into the ground discharges to the Marine Basin to the north and to Long Island Sound to the east through surface runoff.

A-3-1.4 Nature and Extent of Contamination

This section presents a general summary of the nature and extent of contamination encountered at the OU9 Study Area. A description of the nature and extent of contamination is presented in Section 4.0 of the OU9 RI Report (TtNUS, 2005). The waste from the former Raymark Facility dumped at the OU9 Study Area eventually becomes the contamination source.

Raymark waste appears to be present throughout most of the OU9 Study Area, and is distributed heterogeneously, probably the result of irregular disposal. Raymark waste has been identified throughout the OU9 Study Area, both vertically and horizontally. Investigations of the Raymark waste have identified numerous contaminants including volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, PCBs, metals, and asbestos. Based on the Raymark waste definition presented in Section 2.2.2.1 of Volume 1, EPA, in consultation with the CTDEP, calculated the area of Raymark waste at OU9. The estimated volume is shown on Table A-3-1.

For Short Beach Park, samples were grouped into two categories: 0 to 2 feet, and greater than 2 feet. The 2 foot in depth was used to separate samples evaluating different exposure scenarios in a human health risk assessment. Limited depth samples were obtained with a maximum sample depth of 12 feet. The majority of Raymark waste was found between 0 and 6 feet (see OU9 RI Report, Table 4-1, TtNUS, 2005). Sample collection focused on the Raymark indicator contaminants of asbestos, lead, PCB and copper. Samples were also analyzed for dioxins and furans, metals and SPLP metals, SVOCs, VOCs, and pesticides.

For the Stratford Landfill, samples were also collected from the 0 to 2 foot depth interval and from deeper than 2 feet intervals. Limited samples were collected to a depth of 35 to 40 feet; the majority of Raymark waste was found throughout the landfill from 0 to 38 feet as a scattered dumping pattern (see OU9 RI Report, Table 4-1, TtNUS, 2005). Samples were collected and analyzed for asbestos, total metals, SVOCs, VOC, pesticides, and PCBs.

A-3-1.5 Contaminant Fate and Transport

A description of the fate and transport of contamination is presented in Section 5.0 of the OU9 RI (TtNUS, 2005). Within the OU9 Study Area, past direct disposal of contaminated waste materials as fill throughout a large portion of the OU9 Study Area has resulted in the release of contaminants to the soil. No groundwater samples were collected; however, based on samples collected from other Raymark Operable Units, and the fact that Raymark waste is mingled with solid waste, there is a potential for leaching of metals to occur.

A-3-1.6 Summary of OU9 Baseline Risk Assessment

The risk assessment contained in Section 6.0 of the OU9 RI Report (TtNUS, 2005) focused on current and potential future human health risks. A summary of potential risks is presented in Table 6-1 (TtNUS, 2005) and is summarized on Table A-3-1. Contaminants that pose potential human heath risks include polynuclear aromatic hydrocarbons (PAHs), PCBs, arsenic, dioxin TEQ, lead, and asbestos. A qualitative ecological evaluation was also conducted and is presented in Section 7.0 of the OU9 RI (TtNUS, 2005). The findings indicate that the area is extremely disturbed as a result of the filling. Most of the habitat within OU9 was recently established. Although the terrain is not unique, it is important as a habitat for a variety of wildlife and birds, especially because the surrounding area is developed. The only wetlands identified within the (OU9 Study Area although there are significant wetlands in the abutting areas), are the shallow ponds of the golf course.

A-3-2.0 IDENTIFICATION AND SCREENING OF TECHNOLOGIES

Section 2.0 of Volume 1 presents the general approach for the identification and screening of technologies for an FS and the potential action-specific, location-specific and chemical-specific applicable, relevant and appropriate requirements (ARARs).

A-3-2.1 Development of Remedial Action Objectives (RAOs)

As presented in Section 2.2 of Volume 1, the process for developing a medium-specific RAO to protect human health and the environment includes the three major components of the RAO development process: identifying contaminants of concern (COCs), determining preliminary remediation goals (PRGs), and formulating the RAO statement. The medium of concern for this FFS is soil based on the definition of Raymark waste (see Section 2.2.2.1 of Volume 1). As such, a single RAO for soil was developed for OU9 based on the results of the RI, the site-specific baseline human health risk assessment, historical information on the constituents present in waste at the former Raymark Facility, and ARARs. The soil RAO for protection of human health is to prevent direct exposure (inhalation, dermal contact, or ingestion) to soil meeting the definition of Raymark waste. Achieving this RAO will also protect human health from potential exposure to Raymark waste constituents and co-located contaminants.

This FFS does not include an RAO for the protection of the environment. Based on ecological risk evaluations performed for OU9, there are few, if any, known ecological impacts from the Site contaminants.

A-3-2.2 Development of General Response Actions

As discussed in Section 2.3 of Volume 1, general response actions are media-specific measures that may be taken to satisfy the RAOs established for a Site. General response actions may include treatment, containment, removal, disposal, and institutional actions, or a combination of these measures. Several general response actions were identified to provide a wide range of possible options for satisfying the RAO stated above. The potential general response actions identified are: no action, institutional actions, containment, excavation, treatment, and disposal. Table A-3-2 presents a summary of the RAO and general response actions along with an initial identification of the general remedial technology types and process options that correspond to each general response action.

A-3-2.3 Identification and Preliminary Screening of Technologies and Process Options

The preliminary screening and the detailed evaluations of technologies and process options for remediation of soil (Raymark waste) at OU9 is presented in this section. The screening of

technologies and process options is documented on Tables A-3-3 and A-3-4, respectively. Potential remedial technologies and process options were identified and screened according to their overall applicability (technical implementability) to Raymark waste, the contaminants of concern (lead, asbestos, PCBs, and copper), and the site-specific conditions present at OU9 (i.e., complex mixture of contaminants, large volume of contaminated material). The purpose of this screening effort is to investigate available technologies and process options and to eliminate those (obviously) not applicable to the OU9, based on the established RAO and general response actions provided in Section A-3-2.2. Technology identification considered the demonstrated performance of each technology type for similar site conditions and COCs.

Table A-3-3 screens the technologies and process options that may be used to address soil/sediment contamination, grouped by general response action. A brief description of the process option is provided and a determination is made to either retain or eliminate it based on the evaluation of its technical implementability. A brief description of the rationale that was used to eliminate technologies is also provided. The remedial technologies that are retained from this screening are further evaluated as described in Table A-3-4.

A-3-2.4 Evaluation and Selection of Technologies and Process Options

As discussed in Section 2.5.2 of Volume 1, detailed evaluations of technologies and process options retained in the preliminary screening step are conducted to further focus the alternatives development process. In this step, process options are evaluated with respect to other processes in the same technology category. One or two representative process options are selected, if possible, for each technology type, to simplify the subsequent development and evaluation of alternatives without limiting flexibility during remedy selection or remedial design.

The evaluation of technologies and process options utilizes three criteria: effectiveness, implementability, and relative cost. The RI/FS Guidance Document suggests that this evaluation focus on the effectiveness criterion, with less emphasis directed at the implementability and relative cost criteria. The evaluation also considers the volume of Raymark waste that would require treatment and the contaminant type and concentrations that are anticipated. The evaluation of technologies and process options is presented on Table A-3-4.

As the result of the preliminary screening, the following process options were retained:

General Response Action	Technology	Process Option
No Action	No Action	No Action
Institutional Actions	Institutional Controls	Deed Restrictions – Local Ordinances
	Access Restrictions	Fencing and Signage
	Monitoring	Environmental Sampling
Containment	Horizontal Barriers	Low Permeability Cap
Excavation	Excavation	Bulk Mechanical Excavation
Disposal	Disposal	Out-of-Town Disposal
		On-Site Consolidation
Treatment	Immobilization	Solidification/Stabilization
	Thermal Treatment	Incineration

A-3-3.0 DEVELOPMENT AND SCREENING OF ALTERNATIVES

The technologies and process options that were retained were then used to assemble potential remedial alternatives. Institutional actions will be a part of virtually every potential alternative, either as a measure that complements another technology to help maintain the effectiveness of the alternative (i.e., institutional controls, access restrictions) or as a measure to ensure that the alternative continues to protect human health in the long term (environmental sampling). The primary components of potential remedial alternatives will include some combination of the containment, removal, disposal and treatment technologies.

As discussed in Section 3.0 of Volume 1, these process options are combined to assemble remedial alternatives that address the RAOs.

A-3-3.1 Development of Alternatives

Using the retained general response actions, technology types and process options, six alternatives were assembled to address the RAO. Consistent with the NCP, alternatives were assembled that represent a range of actions that encompass: no action, limited action, containment, on-site treatment, and excavation with off-site disposal. Table A-3-5 presents the matrix depicting the assemblage of process options for each alternative.

A-3-3.2 Remedial Alternative Descriptions

The technologies and process options that were retained were assembled into four alternatives. A detailed summary of each alternative is presented in Table A-3-6. The remedial alternatives are screened for effectiveness, implementability, and cost, as presented in Table A-3-7.

After screening, the following alternatives were retained:

- Alternative OU9-1 – No action (as a baseline, required by the NCP);
- Alternative OU9-2 – Limited action;
- Alternative OU9-3A – Consolidation, capping, and institutional controls; and
- Alternative OU9-3B – Consolidation, capping (compliant with FAA requirements), and institutional controls.

Two alternatives, OU9-3A and OU9-3B, both use containment (capping) to address the contaminated materials. These two alternatives were developed to provide a range of costs associated with the capping of contaminated materials to meet different ARARs. OU9-3A consists of excavating Raymark waste from the Airport Property North of Marine Basin, from Short Beach Park, and from portions of the Stratford Landfill for consolidation and containment over in-situ Raymark waste left in-place within the Stratford Landfill. The consolidated Raymark waste would be graded and capped to meet the requirements of the Connecticut landfill closure requirements. However, OU9-3A would not meet the requirements of the FAA requirements and regulations governing approach surface and runway protection zone for the adjacent Sikorsky Regional Airport. Alternative OU9-3B is similar to OU9-3A, but OU9-3B would require additional excavation of in situ Raymark waste and specific grading over the Stratford Landfill prior to capping so that the FAA requirements and regulations will be met.

Both Alternatives OU9-3A and OU9-3B consist of containment of Raymark waste that would be consolidated within OU9 from Short Beach Park (OU9), the Airport Property located north of the Marine Basin Property (OU6), and the Stratford Landfill (OU9) and do not include consolidation of Raymark waste from any other portion of Stratford. An evaluation of OU9 as a location for consolidation of Raymark waste removed from other properties within Stratford is presented in Appendix F.

Detailed assessments of the retained alternatives with the evaluation criteria specified in the NCP are summarized in Table A-3-8. The estimated present worth costs, capital costs, and operations and maintenance costs are presented in Tables A-3-9a through A-3-9f. A conceptual layout of the cap footprint that would be constructed for implementation of Alternative OU9-3A or OU9-3B is presented on Figure A-3-2.

TABLE A-3-1
IDENTIFICATION OF COCS AND WASTE VOLUMES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU9 – SHORT BEACH PARK & STRATFORD LANDFILL
STRATFORD, CONNECTICUT

SELECTION OF COCs – HUMAN HEALTH RISKS[1]				
Receptor	**Human Health Risks**	**Numerical Risk**	**Primary Chemical Risk Drivers**	**Contaminants of Concern (> 1 E-06 or HI > 1.0)**
STRATFORD LANDFILL				
RME Commercial Worker	**Total RME Carcinogenic Risk**	Carc. Risk = **1.31 E-04** (at high end of acceptable risk range)[1]	▪ Aroclors, total = 4.86 E-05, ▪ Benzo(a)pyrene (BaP) = 2.18 E-05, ▪ Dioxin TEQ = 4.39 E-05	▪ Aroclors, total ▪ Benzo(a)pyrene ▪ Dioxin TEQ
	Total RME Non-carcinogenic risk	Total HI = **3.46 E+00** (exceeds acceptable risk range)[1]	▪ Aroclor, total = 3.4 E+00.	▪ Aroclor, total
SHORT BEACH PARK				
RME, Adult Recreational Visitor	**Total RME Carcinogenic Risk**	Carc. Risk = **3.95 E-06**(within acceptable risk range)[1]	▪ Aroclors, total = 1.19 E-06 ▪ Benzo(a)pyrene = 1.04 E-06 ▪ Dioxin TEQ = 4.49 E-07	▪ None
	Total RME Non-carcinogenic risk	Total HI = **1.1 E-01** (within acceptable risk range)[1]	▪ Aroclor, total = 8.7 E-02 ▪ Ba = 8.73 E-03 ▪ As = 4.89 E-03 ▪ Cr = 4.87 E-03	▪ None
RME, Child Recreational Visitor	**Total RME Carcinogenic Risk**	Carc. Risk = **8.44 E-06** (within acceptable risk range)[1]	▪ Aroclors, total = 2.49 E-06, ▪ As = 1.7 E-06, ▪ Benzo(a)pyrene = 2.19 E-06 ▪ Dioxin TEQ = 9.87 E-07	▪ None
	Total RME Non-carcinogenic risk	Total HI = **9.4 E-01** (within acceptable risk range)[1]	▪ Aroclor, total = 7.25 E-01 ▪ Ba = 8.15 E-02 ▪ As = 4.42 E-02 ▪ Cr = 4.55 E-02	▪ None

TABLE A-3-1
IDENTIFICATION OF COCS AND WASTE VOLUMES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU9 – SHORT BEACH PARK & STRATFORD LANDFILL
STRATFORD, CONNECTICUT

SELECTION OF COCs – HUMAN HEALTH RISKS[1]				
Receptor	**Human Health Risks**	**Numerical Risk**	**Primary Chemical Risk Drivers**	**Contaminants of Concern (> 1 E-06 or HI > 1.0)**
RME Commercial Worker	**Total RME Carcinogenic Risk**	Carc. Risk = **4.72 E-05** (within acceptable risk range)[1]	▪ Aroclors, total = 1.27 E-05 ▪ BaP = 1.6 E-05 ▪ Dioxin TEQ = 3.33 E-06 ▪ As = 5.07 E-06 ▪ benzo(a)anthracene = 2.81 E-06	▪ None
	Total RME Non-carcinogenic risk	Total HI = **1.02 E+00** (near acceptable risk range)[1]	▪ Aroclor, total = 8.89 E-01 ▪ As = 3.16 E-02 ▪ Ba = 3.61 E-02 ▪ Cr = 2.07 E-02 ▪ Va 1.34 = E-02	▪ Aroclor, total
RME Adult-Resident	**Total RME Carcinogenic Risk**	Carc. Risk = **5.3 E-05** (within acceptable risk range)[1]	▪ Aroclors, total = 1.38 E-05 ▪ Benzo(a)pyrene = 1.75 E-05 ▪ Dioxin TEQ = 3.97 E-06 ▪ As = 6.37 E-06	▪ Aroclors, total ▪ Benzo(a)pyrene ▪ Dioxin TEQ ▪ As
	Total RME Non-carcinogenic risk	Total HI = **1.19 E-00** (slightly exceeds acceptable risk range)[1]	▪ Aroclor, total = 1.01 E-00 ▪ Ba = 5.06 E-02 ▪ As = 4.13 E-02 ▪ Cr = 2.9 E-02	▪ Aroclor, total
RME Child-Resident	**Total RME Carcinogenic risk**	Carc. Risk = **1.12 E-04** (at high end of acceptable risk range)[1]	▪ Aroclors, total = 2.88 E-05 ▪ As = 1.44 E-05 ▪ Benzo(a)pyrene = 3.68 E-05 ▪ Dioxin TEQ = 8.74 E-06	▪ PCBs (A1268) ▪ Arsenic ▪ Benzo(a)pyrene ▪ Dioxin TEQ
	Total RME Non-carcinogenic risk	Total HI = **1.01 E+01** (slightly exceeds acceptable risk range)[1]	▪ Aroclor, total = 8.4 E+00 ▪ As = 3.73 E-01 ▪ Ba = 4.72 E-01 ▪ Cr = 2.71 E-01 ▪ Ni = 1.02 E-01 ▪ Va = 1.76 E-01	▪ PCBs (A1268)

TABLE A-3-1
IDENTIFICATION OF COCS AND WASTE VOLUMES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU9 – SHORT BEACH PARK & STRATFORD LANDFILL
STRATFORD, CONNECTICUT

SELECTION OF COCs – HUMAN HEALTH RISKS			
Other Chemical that Pose Health Risk	Stratford LF ▪ Lead – 0.01% of surface samples and 11% of subsurface samples exceeded the 1000 mg/Kg acceptable concentration. ▪ Asbestos - 57% of surface samples and 71% of subsurface samples exceeded the 1% definition. Short Beach Park ▪ Lead - 15% of surface samples and 49% of subsurface samples exceeded the 400 mg/Kg acceptable concentration. ▪ Asbestos - 44% of surface samples and 70% of subsurface samples exceeded the 1% definition.	▪ Not quantifiable health risks, but detected concentrations pose potential risks.	▪ Lead ▪ Asbestos

SELECTION OF COCs - ECOLOGICAL CONSIDERATIONS[1]
▪ Ecological evaluation - Previously existing habitats have been significantly altered or disturbed. Most of habitat present in landfill area consists of early successional habitat that has been recently established. Only wetlands identified in shallow ponds in gold course. The ecological evaluation did not assess potential COCs. May be possible to recreate habitat in adjacent area.
PROTECTION OF GROUNDWATER[1]
▪ No groundwater samples are available to evaluate quality. ▪ One Short Beach Park sample tested using the SPLP; no metals detected in excess of the RSR PMC for GB aquifer. Two Stratford LF samples tested using the SPLP' lead exceeded RSR PMC.

TABLE A-3-1
IDENTIFICATION OF COCS AND WASTE VOLUMES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU9 – SHORT BEACH PARK & STRATFORD LANDFILL
STRATFORD, CONNECTICUT

PRGs[2]		
COC	**Units**	**Value**
PCBs - total	µg/Kg	**1**
Asbestos	%	**1**
Lead	mg/Kg	**400**
Copper	mg/Kg	**2500**

WASTE VOLUMES	
Total Volume of Contaminated Wastes at Stratford Landfill	**1,800,000 CY**
Raymark Waste at Short Beach Park	**61,000 CY**
Airport Property North of Marine Basin	**10,500 CY**
Total Volume of Raymark Waste	**1,900,000 CY**

Notes:
1. Appendix C, risk assessment, *Remedial Investigation, Raymark – OU9 – Short Beach Park and Stratford Landfill, Stratford, Connecticut*, TtNUS, July 2005.
2. Based on definition of Raymark Waste developed by EPA.

TABLE A-3-2
REMEDIAL ACTION OBJECTIVES, GENERAL RESPONSE ACTIONS, TECHNOLOGY TYPES, AND PROCESS OPTIONS
FOCUSED FEASIBILITY STUDY
RAYMARK – OU9 – STRATFORD LANDFILL AND SHORT BEACH PARK
STRATFORD, CONNECTICUT

Environmental Medium	Remedial Action Objective (from site characterization)	General Response Action	Remedial Technology Types (for general response actions)	Process Options
Soil	Protection of Human Health Prevent direct exposure (inhalation, dermal contact, or ingestion) with soil meeting the definition of Raymark Waste.	No Action	No Action	- not applicable
		Institutional Actions	Institutional Controls	- deed restrictions - local ordinances - access restrictions
			Access Restrictions	- fencing/signage
			Monitoring	- environmental sampling
		Containment	Horizontal Barriers	- low permeability cap - permeable cover
		Excavation	Excavation	- bulk mechanical excavation
		Disposal	Disposal	- out-of-town disposal - on-site consolidation
		Treatment	Immobilization	- solidification/stabilization - microencapsulation
			Thermal Treatment	- incineration - pyrolysis - thermal desorption - supercritical water oxidation - vitrification
			Physical Treatment	- soil flushing - soil washing - liquefied gas solvent extract - soil vapor extraction - electrokinetic separation
			Chemical Treatment	- dehalogenation - chemical oxidation - solvent extraction
			Biological Treatment	- aerobic biodegradation - anaerobic biodegradation - biopiles - bioventing - phytoremediation

TABLE A-3-3
PRELIMINARY SCREENING OF REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS
FOCUSED FEASIBILITY STUDY
RAYMARK – OU9 – STRATFORD LANDFILL AND SHORT BEACH PARK
STRATFORD, CONNECTICUT

GENERAL RESPONSE ACTION (GRA)	REMEDIAL TECHNOLOGY	PROCESS OPTION	DESCRIPTION	SCREENING COMMENTS
No Action	No Action	Not Applicable	No activities conducted to address soil contamination.	Retained. Used as baseline for comparison with other options as required by National Contingency Plan.
Institutional Actions	Institutional Controls	Deed Restrictions, Local Ordinances, Periodic Evaluations	Administrative action used to restrict future site activities on individual properties. Restrictions would manage, limit, or prevent activities such as excavation or residential development. Periodic evaluations will be required to ensure institutional controls are implemented and are effective.	Retained. Potentially applicable.
	Access Restrictions	Fencing and Signage	Barrier erected to restrict access to contaminated properties with “No Trespassing” or hazard warning signs posted.	Retained. Potentially applicable.
	Monitoring	Environmental Sampling	Periodic monitoring events that include groundwater sampling to determine whether a continuing source of contamination is present or if contaminants are migrating.	Retained. Potentially applicable.
Containment	Horizontal Barriers	Low permeability Cap	Asphalt, concrete, geosynthetics, or multimedia materials are used to form an impermeable barrier to prevent direct contact with contaminated material and to minimize leaching of contaminants to groundwater.	Retained. Potentially applicable.
		Permeable Cover	Soil, crushed stone, geosynthetics, and vegetative cover used to prevent direct contact with contaminated soil and minimize erosion and surface migration of contaminated soil.	Retained. Potentially applicable.
Excavation	Excavation	Bulk Mechanical Excavation	Use of common construction equipment to remove contaminated soil. Excavation would be a prerequisite to any other process option that is performed ex situ.	Retained. Potentially applicable.
Disposal	Disposal	Out-of-Town Disposal	Transportation and disposal of treated or untreated soil to an approved, licensed, out-of-town disposal location. Would be used in conjunction with excavation. Could also be used as an ultimate disposal location after an ex situ treatment process.	Retained. Potentially applicable.
		On-site Consolidation	Assumes consolidation within OU-9 CAMU.	Retained. Potentially applicable.

TABLE A-3-3
PRELIMINARY SCREENING OF REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS
FOCUSED FEASIBILITY STUDY
RAYMARK – OU9 – STRATFORD LANDFILL AND SHORT BEACH PARK
STRATFORD, CONNECTICUT

GENERAL RESPONSE ACTION (GRA)	REMEDIAL TECHNOLOGY	PROCESS OPTION	DESCRIPTION	SCREENING COMMENTS
Treatment	Immobilization	Solidification/ Stabilization	Soil mixing equipment used to mix reagents with contaminated soil to physically and/or chemically decrease the mobility of contaminants. Potential reagents include cement, pozzolanic material, thermoplastics, polymers and asphalt. Treatment may be performed in situ or ex situ.	Retained. Potentially applicable.
		Micro-encapsulation	Contaminants adsorbed to soil particles are desorbed and then encapsulated by an inert, silica-based solution that will minimize leaching. Treatment would be performed ex situ.	Eliminated. Not feasible in cases involving large quantities of contaminated, heterogeneous material.
	Thermal Treatment	Incineration	Destruction of organic contaminants by subjecting them to high temperatures under controlled conditions in a combustion chamber. Treatment would be performed ex situ.	Retained. Potentially applicable to treat organic contaminants.
		Pyrolysis	Chemical decomposition of organic contaminants by heating the material in the absence of oxygen. Treatment would be performed ex situ.	Retained. Potentially applicable to treat non-PCB organic contaminants.
		Thermal Desorption	Air, heat and mechanical agitation are used to volatilize organic contaminants from soil into a vapor stream. Vapor is usually further treated. Treatment would be done ex situ.	Retained. Potentially applicable to treat non-PCB organic contaminants.
		Supercritical Water Oxidation	Contaminated media is exposed to water in a high temperature, high pressure environment. Under such conditions, organic substances are oxidized. Treatment would be done ex situ.	Retained. Potentially applicable to treat non-PCB organic contaminants.
		Vitrification	Melting of contaminated material to volatilize or pyrolyze organics and entrain inorganics in a stable vitreous residual. Treatment may be done in situ or ex situ.	Eliminated due to technical implementability issues based on the variability and distribution of contaminants at the site, and possible absence of glass-forming materials (silicon or aluminum oxides) in geologic materials.
	Physical Treatment	Soil Flushing	Contaminants sorbed to soil are mobilized or dissolved in an aqueous flushing solution in situ. The flushing solution is then extracted from the subsurface and treated. Flushing solution may be augmented by chemicals that increase the mobilization or dissolution of organics and some heavy metals from the soil. Treatment would be performed in situ.	Eliminated. Also, difficult to ensure capture of flushing solution due to shallow water table. Not a reliable method in cases involving multiple types of contaminants.

TABLE A-3-3
PRELIMINARY SCREENING OF REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS
FOCUSED FEASIBILITY STUDY
RAYMARK – OU9 – STRATFORD LANDFILL AND SHORT BEACH PARK
STRATFORD, CONNECTICUT

GENERAL RESPONSE ACTION (GRA)	REMEDIAL TECHNOLOGY	PROCESS OPTION	DESCRIPTION	SCREENING COMMENTS
Treatment (cont.)	Physical Treatment (cont.)	Soil Washing	Process reduces the amount of contaminated material by two means. Finer particles, which contain the bulk of contaminants, are separated from more coarse material. Contaminants sorbed to soil are dissolved in an aqueous washing solution. The wash water may be augmented by chemicals which increase the leaching of organics and some heavy metals from the soil. Treatment would be performed ex situ.	Eliminated due to technical implementability issues related to the feasibility of washing the anticipated volume of contaminated soil.
		Liquefied Gas Solvent Extraction	Liquefied gas solvents, such as propane, are used to extract organics from soil. Treatment would be performed ex situ.	Retained. Potentially applicable to treat organic contaminants.
		Soil Vapor Extraction	In situ technology in which vacuum blowers and extraction wells are used to strip volatile organic compounds from unsaturated soil. Treatment will be done in situ.	Eliminated. Not effective for treatment of metals, PCBs, or asbestos.
		Electrokinetic Separation	A low-intensity direct current is applied to contaminated soil between electrodes, causing ions to move towards the positive or negative electrode. Once contaminants have been separated from soil particles in this manner, they may be recovered and treated either ex situ or in situ.	Eliminated. Materials to be treated are too heterogeneous. Technical implementability low.
	Chemical Treatment	Dehalogenation	Contaminated soil is screened, processed with a crusher and pug mill, and mixed with reagents. The mixture is heated in a reactor. Dehalogenation occurs through either replacement of the halogen molecules or the decomposition and partial volatilization of contaminants. Treatment would be done ex situ.	Eliminated. May be able to treat PCBs and dioxins, but materials are too heterogeneous.
		Chemical Oxidation	Oxidants are injected or mixed into the subsurface where they react with contaminants to form less toxic or harmless end products. Treatment would be performed in situ.	Eliminated. Generally more effective for treatment of aqueous wastes.
		Solvent Extraction	Chemical desorption and dissolution of organic and some inorganic contaminants by washing soil with a solvent solution. Treatment would be done ex situ.	Retained. Potentially applicable. However, multiple solvent formulations will be required.

TABLE A-3-3
PRELIMINARY SCREENING OF REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS
FOCUSED FEASIBILITY STUDY
RAYMARK – OU9 – STRATFORD LANDFILL AND SHORT BEACH PARK
STRATFORD, CONNECTICUT

GENERAL RESPONSE ACTION (GRA)	REMEDIAL TECHNOLOGY	PROCESS OPTION	DESCRIPTION	SCREENING COMMENTS
Treatment (cont.)	Biological Treatment	Aerobic Biodegradation	Microorganisms degrade organic contaminants to carbon dioxide and water. Oxygen is used as an electron acceptor in the degradation process. Treatment may be done in situ or ex situ.	Eliminated. Inorganic contaminants, and PCBs generally not amenable to biological treatment.
		Anaerobic Biodegradation	An electron acceptor other than oxygen is used in the process in which microorganisms degrade organic contaminants. Treatment may be done in situ or ex situ.	Eliminated. Not likely to be effective at treating site contaminants.
		Biopiles	Excavated soils are mixed with soil amendments and placed on a treatment area that includes leachate collection systems and some form of aeration. Moisture, heat, nutrient, and oxygen levels are controlled to enhance the biodegradation of contaminants.	Eliminated. Not implementable at this site.
		Bioventing	Oxygen is directly injected into unsaturated subsurface soils via a network of air injection wells at air flow rates adequate to sustain microbial activity. Volatile contaminants are desorbed from soil and biodegraded as vapors move through the biologically active soil.	Eliminated. Not applicable to site contaminants.
		Phyto-remediation	Plants are used to naturally remediate contaminants via three mechanisms: direct uptake and accumulation of contaminants in plant tissue, release of enzymes that stimulate microbial activity and biochemical transformation, and enhancement of mineralization in plants' roots. Treatment would be done in situ.	Eliminated. Effectiveness limited to soil within the reach of plant root systems. Plants would require harvesting, proper disposal, and replanting. Not effective for certain site contaminants. Reliable cost information not available.

Notes:
1. General response actions, remedial technologies, and process options for soil were adapted from Table A-3-2.
2. Process options were retained or eliminated based on an evaluation of their technical implementability given the contaminant types and concentrations in soil, and other relevant site characteristics such as the location and distribution of contaminated soil throughout Stratford.

TABLE A-3-4
EVALUATION OF PROCESS OPTIONS FOR SOIL
FOCUSED FEASIBILITY STUDY
RAYMARK – OU9 – STRATFORD LANDFILL AND SHORT BEACH PARK
STRATFORD, CONNECTICUT

GENERAL RESPONSE ACTION (GRA)	TECHNOLOGY TYPE	PROCESS OPTION	EFFECTIVENESS[1]	IMPLEMENTABILITY[2]	COST[3]	CONCLUSION
No Action	No Action	Not Applicable	Would not achieve remedial action objective.	No permits required; no treatment, storage, or disposal involved; no equipment or services required.	Capital: None O&M: None	Retain (as baseline)
Institutional Actions/Limited Action	Institutional Controls	Deed Restrictions Local Ordinances	Would not achieve remedial action objective without other actions. No human health or environmental impacts from implementation. Reliable to the extent that the restrictions can be enforced.	Institutional controls and local ordinances would require legal and/or political actions from others. No treatment, storage, or disposal involved. Services readily available to implement institutional controls.	Capital: Low O&M: Low	Retain
	Access Restrictions	Fencing/Signage	Would not achieve remedial action objective without other actions. No human health or environmental impacts from implementation. Reliable to the extent that barriers are maintained and warnings are heeded.	No treatment, storage, or disposal involved. Conventional construction, readily available skilled labor and services from several sources.	Capital: Low O&M: Low	Retain
	Monitoring	Environmental Sampling	Would not achieve remedial action objective without other actions. Very low potential for impacts to human health and environment during implementation. Reliable process for the evaluation of contaminant migration trends and to monitor the progress of remediation.	No permits required for implementation. No treatment, storage, or disposal involved. Labor and services readily available from several sources.	Capital: None O&M: Medium	Retain
Containment	Horizontal Barriers	Low-Permeability Cap	Would achieve remedial action objectives by preventing direct contact with contaminated soils. Some potential adverse impacts during construction or implementation beyond typical earth-moving construction activities because of contaminated soil presence, which can be mitigated through engineering and air pollution controls, and proper decontamination and H&S measures. Reliable technology when properly designed, constructed, and maintained.	Will need to comply with substantive requirements of ARARs for on-site activities. No treatment, storage, or disposal involved. Materials, labor, and services for implementation readily available from several sources.	Capital: Medium O&M: Medium	Retain
		Permeable Cover	Would achieve remedial action objectives by preventing direct contact with contaminated soils. May not comply with CT RSR requirements for pollutant mobility. Some potential adverse impacts during construction or implementation beyond typical earth-moving construction activities because of contaminated soil presence, which can be mitigated through engineering and air pollution controls, and proper decontamination and H&S measures. Reliable technology when properly designed, constructed, and maintained.	Will need to comply with substantive requirements of ARARs for on-site activities. No treatment, storage, or disposal involved. Materials, labor, and services for implementation readily available from several sources.	Capital: Low O&M: Medium	Eliminate
Excavation	Excavation	Bulk Mechanical Excavation	Would be required to consolidate and grade contaminated soil. This process is typically used in conjunction with other remediation options. Would achieve remedial action objective by removing all soil with concentrations exceeding remedial goals (for out-of-Town disposal). Some potential adverse impacts during construction or implementation beyond typical earth-moving construction activities because of contaminated soil presence, which can be mitigated through engineering and air pollution controls, and proper decontamination and H&S procedures to prevent the spread of contamination during excavation. Very reliable process for the removal of contaminated soil.	Will need to comply with substantive requirements of ARARs for on-site activities. Adequate on-site capacity available for temporary storage of excavated material. Location to be determined. No treatment or disposal involved. Conventional construction process that is easily implemented with equipment and services that are readily available from several sources. Excavation in soil located below the water table could present technical implementability issues.	Capital: Low O&M: None **Note**: Includes cost of excavating only. Transport, treatment, or disposal of soil not included.	Retain

TABLE A-3-4
EVALUATION OF PROCESS OPTIONS FOR SOIL
FOCUSED FEASIBILITY STUDY
RAYMARK – OU9 – STRATFORD LANDFILL AND SHORT BEACH PARK
STRATFORD, CONNECTICUT

GENERAL RESPONSE ACTION (GRA)	TECHNOLOGY TYPE	PROCESS OPTION	EFFECTIVENESS[1]	IMPLEMENTABILITY[2]	COST[3]	CONCLUSION
Disposal	Disposal	Out-of-Town Disposal	May be difficult to accommodate anticipated volume of contaminated soil. Remedial action objectives would be achieved since all contamination would be removed from site. Some potential adverse impacts may occur during implementation beyond typical earth-moving construction activities because of contaminated soil presence, which can be mitigated through engineering and air pollution controls, and proper decontamination and H&S procedures to prevent the spread of contamination during excavation and loading. Potential for release of contaminants during transport due to accidents. Proven and reliable for site contaminants.	Permits for out-of-Town landfill disposal could be obtained. Out-of-Town disposal capacity for the anticipated volume of contaminated soil above the water table (1.2 million CY) and/or out-of-town disposal of the entire volume of Raymark waste (>1.9 million CY) may be difficult. Will require transport, as disposal facilities are located > 500 miles away. Not readily implementable.	Capital: High O&M: None	Retain
		On-Site Disposal/ Consolidation	Remedial action objective would be achieved for contaminated soil that is consolidated and isolated beneath low-permeability cap to eliminate direct contact risks by isolating wastes from human and environmental contact. Potential impacts to human health and the environment from excavation, placement, and grading of contaminated soil and transportation to consolidation areas could be mitigated using engineering and air pollution controls, and proper decontamination and H&S procedures. Proven and reliable for site contaminants.	Disposal capacity for the anticipated volume of contaminated soil and temporary storage of stockpiles would be available on site. Materials and services required to implement technology readily available. No technical implementability concerns identified.	Capital: Medium O&M: Medium	Retain
Treatment	Immobilization	Solidification/ Stabilization (S/S)[4]	May be difficult to achieve remedial action objective due to debris presence in contaminated soil volume. Heterogeneous contaminants (organic and inorganic). Treatment for metals may interfere with treatment for organics, and vice versa. Could be effective if one type of contaminant removed by another process first. Potential impacts to human health and the environment from excavation, temporary stockpiling, loading, transport, implementation of S/S process can be mitigated using engineering and air pollution controls, and proper decontamination and H&S procedures. S/S would be implemented on site. Reliable process for the treatment of soil contaminated with organic or inorganic contaminants, but not both simultaneously.	If untreatable fraction needs to be sent for out-of-Town disposal, permits can be obtained. Temporary storage and disposal capacity available on site. Equipment and skilled labor required for treatment readily available from several vendors. Can be difficult to implement because two different types of contaminants (organics and metals) require treatment. However, if one contaminant type is removed by pre-treatment, this process is implementable to address the remaining contaminant type. Extensive screening required to segregate debris from contaminated soil that require treatment.	Capital: Medium O&M: None	Retain
	Thermal Treatment	Incineration[5]	Would achieve remedial action objective for the organic contaminants, but would be ineffective for treating soil contaminated with metals and asbestos. Potential impacts to human health and the environment from excavation, temporary stockpiling, loading, transport, and on-site incineration. Effects could be mitigated using engineering and air pollution controls, and proper decontamination and H&S procedures to prevent the spread of contamination during implementation. Incineration would be performed either on site or off site. Very reliable process for the treatment of soil contaminated with organic contaminants.	Permits or approvals required to incinerate site soils off site should be obtainable. Temporary storage and disposal capacity available on site. Equipment/facilities required for treatment are available. Extensive screening required to segregate debris from contaminated soil that require treatment. Distance to incineration facility greater than 500 miles from site.	Capital: High O&M: None	Retain
		Pyrolysis[5]	Would not achieve remedial action objective for the principal COCs (Aroclor 1268 and dioxin). Not effective for treating soil contaminated with inorganic contaminants. Potential impacts to human health and the environment from excavation, temporary stockpiling, loading, and transport. Effects could be mitigated using engineering and air pollution controls, and proper decontamination and H&S procedures to prevent the spread of contamination during implementation. Treatment would be performed on site or at an out-of-town location. Reliable for the treatment of soil contaminated with non-PCB organic contaminants. Not as established as other thermal treatment technologies such as incineration or thermal desorption.	Permits or approvals required to treat soils off site should be obtainable. On-site treatment may not be possible due to limited availability of mobile systems. Availability of equipment/facilities required for out-of-town treatment would be limited. Extensive screening required to segregate debris from contaminated soil that require treatment. Distance to treatment facility greater than 500 miles from site.	Capital: High O&M: None	Eliminate

TABLE A-3-4
EVALUATION OF PROCESS OPTIONS FOR SOIL
FOCUSED FEASIBILITY STUDY
RAYMARK – OU9 – STRATFORD LANDFILL AND SHORT BEACH PARK
STRATFORD, CONNECTICUT

GENERAL RESPONSE ACTION (GRA)	TECHNOLOGY TYPE	PROCESS OPTION	EFFECTIVENESS[1]	IMPLEMENTABILITY[2]	COST[3]	CONCLUSION
Treatment (cont.)	Thermal Treatment (cont.)	Thermal Desorption[5]	Could not achieve remedial action objective for the volume of contaminated soil present at the site without another treatment process (not effective for treating soil contaminated with inorganic contaminants). Potential impacts to human health and the environment from excavation, temporary stockpiling, loading, transportation, and on-site thermal desorption. Effects could be mitigated using engineering and air pollution controls, and proper decontamination and H&S procedures. Treatment would be performed on-site or at an out-of-town location. Reliable process for the treatment of soil contaminated with non-PCB organic contaminants.	Permits or approvals required to treat site soils off site should be obtainable. On-site treatment may be limited due to limited availability of mobile systems. Equipment/facilities required for treatment are available. Extensive screening required to segregate debris from contaminated soil that require treatment. Distance to treatment facility greater than 500 miles from site.	Capital: High O&M: None	Eliminate
		Supercritical Water Oxidation	Would not achieve remedial action objective for the principal COCs (Aroclor 1268 and dioxin). Process not effective for treating soil contaminated with inorganic contaminants. Potential impacts to human health and the environment from excavation, temporary stockpiling, loading, and transport. Effects could be mitigated using engineering and air pollution controls, proper decontamination procedures, and H&S procedures. Treatment would be performed at an out-of-town location. Technology still emerging. Not yet proven to be reliable for treatment at full scale.	Permits or approvals required to treat site soils off site should be obtainable. On-site treatment may not be possible due to limited availability of mobile system. Equipment/facilities required for treatment are limited. Extensive screening required to segregate debris from contaminated soil that require treatment. May be difficult to implement due to heterogeneous nature of waste materials.	Capital: High O&M: None	Eliminate
		Liquefied Gas Solvent Extraction	Would not achieve remedial action objective for the principal COCs (Aroclor 1268 and dioxin). Not effective for treating soil contaminated with inorganic contaminants. Potential impacts to human health and the environment from excavation, temporary stockpiling, loading, and transport. Effects could be mitigated using engineering and air pollution controls, and proper decontamination and H&S procedures. Treatment could be performed at an out-of-town location. Technology still emerging. Not yet proven to be reliable for treatment of heterogeneous waste.	Permits or approvals required to treat site soils off site should be obtainable. Equipment/facilities required for treatment are limited. Extensive screening required to segregate debris from contaminated soil that require treatment. May be difficult to implement due to heterogeneous nature of waste materials.	Capital: High O&M: None	Eliminate
		Solvent Extraction	Multiple solvents required to address organic and inorganic contaminants. Additional processing may be required to remove residual solvents from treated soils. Potential impacts to human health and the environment from excavation, temporary stockpiling, loading, and transport. Effects could be mitigated using proper engineering controls, and decontamination and H&S procedures. Treatment would be performed at an out-of-town location. Technology still emerging. Not yet proven to be reliable for treatment at full scale.	Permits or approvals required to treat site soils off site should be obtainable. Equipment/facilities required for treatment are limited. Extensive screening required to segregate debris from contaminated soil that require treatment. May be difficult to implement due to heterogeneous nature of waste materials.	Capital: High O&M: None	Eliminate

Notes:

1. Effectiveness is evaluated relative to other processes within the same technology type using the following criteria:
   A. Potential effectiveness of process option in handling the estimated volume of contaminated soil and meeting the preliminary remediation goals.
   B. Potential impacts to human health and the environment during the construction and implementation phase.
   C. Reliability of the process with respect to the contaminants and conditions at the site.
2. Implementability is evaluated relative to other processes within the same technology type using the following criteria:
   A. Ability to obtain necessary permits for off-site actions.
   B. Availability of treatment, storage, and disposal services (including capacity).
   C. Availability of necessary equipment and skilled workers to implement the technology.
   D. Potential technical implementability concerns.
3. Cost plays a limited role in the screening of process options. Relative capital and operations and maintenance (O&M) costs are used at this stage rather than detailed cost estimates. Cost analysis is made on the basis of engineering judgment, and each process is evaluated as to whether costs are high, medium, or low relative to other process options in the same technology type.
4. Solidification of metal-contaminated soil was demonstrated to be effective based on results treatability study using Raymark soil-waste materials (*Treatability Study Report for Bench-Scale Solidification and Stabilization,* Halliburton NUS Corp., August 1994).
5. Low-temperature thermal treatment methods were determined to be ineffective in removing Aroclor 1268 from contaminated Raymark soil-waste materials, while incineration was effective based on results of a second treatability study (*Bench-Scale Treatability Study Report for Thermal Treatment*, Halliburton NUS Corp., October 1994)

Eliminated process option (see screening comment)

TABLE A-3-5
ASSEMBLY OF ALTERNATIVES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU9 – STRATFORD LANDFILL AND SHORT BEACH PARK
STRATFORD, CONNECTICUT

GENERAL RESPONSE ACTION (GRA)	TECHNOLOGY TYPE	PROCESS OPTION	Alt. OU9-1 No Action	Alt. OU9-2 Limited Action	Alt. OU9-3A / OU9-3B Containment	Alt. OU9-4 On-Site Treatment	Alt. OU9-5 Excavation and Off-Site Disposal
No Action	No Action	Not Applicable	✶				
Institutional Actions	Institutional Controls	Deed Restrictions Local Ordinances		✶	✶	✶	✶
	Access Restrictions	Fencing/Signage		✶	✶	✶	
	Monitoring	Environmental Sampling		✶	✶	✶	✶
Containment	Horizontal Barriers	Low-Permeability Cap			✶		
Excavation	Excavation	Bulk Mechanical Excavation			✶	✶	✶
Disposal	Disposal	On-Property Disposal/ Consolidation			✶ (1)	✶ (1)	
		Out-of-Town Disposal				✶ (2)	✶
Treatment	Immobilization	Solidification/ Stabilization				✶	
	Thermal Treatment	Incineration				✶	

Notes:
✶ - Process option is a component of this alternative
(1) Raymark waste from the nearby Airport Property north of Marine Basin would be consolidated into OU9.
(2) Difficult to treat materials may require offsite disposal.

TABLE A-3-6
DESCRIPTION OF POTENTIAL REMEDIAL ALTERNATIVES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU9 – STRATFORD LANDFILL AND SHORT BEACH PARK
STRATFORD, CONNECTICUT

Alternative OU9-1 – No Action

- No actions taken to address Raymark waste at the property.
- Five-year reviews to assess site conditions.

Alternative OU9-2 – Limited Action

- No actions taken to address Raymark waste at the property.
- Institutional controls will be placed on property to prohibit certain types of activities such as excavations without written authorization from EPA and DEP and to prohibit groundwater use of any kind.
- Fencing and signage installed to discourage access and limit potential exposures.
- New monitoring wells installation.
- Quarterly groundwater monitoring for two years, and annual groundwater monitoring thereafter.
- Monthly inspections to verify effectiveness of institutional controls.
- Annual reporting to document groundwater sampling results and compliance with deed restrictions.
- Five-year reviews to assess site conditions.

Alternative OU9-3A – Consolidation, Capping, and Institutional Controls

- Demolition of structures and removal for out-of-town disposal.
- Excavate Raymark waste to 4 feet below ground surface (~7,000 CY) and backfill with clean fill to prevent potential direct contact with waste left in-place at the Airport Property north of Marine Basin Property (Airport Property) and place at Stratford Landfill.
- Excavate Raymark waste to 4 feet below ground surface (~40,700 CY) and backfill with clean fill to prevent potential direct contact with waste left in-place at Short Beach Park and place at Stratford Landfill.
- Excavation and regrading of contaminated soil (7,200 CY) at the Stratford Landfill to reduce area of Raymark waste that requires capping.
- Grading of consolidated and compacted materials so the finished elevations comply with Connecticut landfill closure regulations and requirements.
- Construction of low-permeability cap over consolidated Raymark waste area to prevent potential direct contact with contaminants and to minimize potential contaminant migration.
- New monitoring wells installation.
- Enactment of institutional controls on the property to prohibit activities that can intrude into contaminated materials or can compromise the integrity of the cap.
- Monthly inspections to verify integrity of cap and surface drainage.
- Annual maintenance and repair of cap to ensure effectiveness.
- Quarterly groundwater monitoring for two years, and annual groundwater monitoring thereafter.
- Annual inspection to verify effectiveness of institutional controls.
- Annual reporting to document cap inspection/repair activities, compliance with deed restrictions, and groundwater sampling results.
- Five-year reviews to assess site conditions and verify effectiveness of the remedy.

Alternative OU9-3B – Consolidation, Capping (Compliant with FAA Requirements), and Institutional Controls

- Demolition of structures and removal for out-of-town disposal.
- Excavate Raymark waste to 4 feet below ground surface (~7,000 CY) and backfill with clean fill to prevent potential direct contact with waste left in-place at the Airport Property north of Marine Basin Property (Airport Property) and place at Stratford Landfill.

- Excavate Raymark waste to 4 feet below ground surface (~40,700 CY) and backfill with clean fill to prevent potential direct contact with waste left in-place at Short Beach Park and place at Stratford Landfill.
- Excavation and regrading of contaminated soil (154,500 CY) at the Stratford Landfill to reduce area of Raymark waste that requires capping.
- Grading of consolidated and compacted materials so the finished elevations comply with Connecticut landfill closure and FAA clear and approach zone regulations and requirements.
- Construction of low-permeability cap over consolidated Raymark waste area to prevent potential direct contact with contaminants and to minimize contaminant migration.
- New monitoring wells installation.
- Enactment of institutional controls on the property to prohibit activities that can intrude into contaminated materials or can compromise the integrity of the cap.
- Monthly inspections to verify integrity of cap and surface drainage.
- Annual maintenance and repair of cap to ensure effectiveness.
- Quarterly groundwater monitoring for two years, and annual groundwater monitoring thereafter.
- Annual inspections to verify effectiveness of institutional controls.
- Annual reporting to document cap inspection/repair activities, compliance with deed restrictions, and groundwater sampling results.
- Five-year reviews to assess site conditions and verify effectiveness of the remedy.

Alternative OU9-4 – On-Site Treatment, Soil Cover, and Institutional Controls

- Demolition of structures and remove for out-of-town disposal.
- Excavation of Raymark waste (~1.2 million CY) to the depth of the seasonal high water table and store temporarily on site.
- Thermal treatment to remove/destroy organic contaminants.
- Confirmatory sampling and analysis to verify effectiveness of thermal treatment.
- Solidification to stabilize metal- and asbestos-contaminated soil.
- Confirmatory sampling and analysis to verify effectiveness of solidification.
- Backfilling and compaction of treated soil.
- Construction of soil cover to prevent potential direct contact with residual contaminants (metals and asbestos) and to minimize potential contaminant migration.
- New monitoring wells installation.
- Enactment of institutional controls on the property to prohibit activities that can intrude into treated materials or disturb the soil cover.
- Monthly inspections of the soil cover and surface drainage.
- Annual maintenance and repair of soil cover and surface drainage to ensure their effectiveness.
- Quarterly groundwater monitoring for two years, and annual groundwater monitoring thereafter.
- Annual inspections to verify effectiveness of institutional controls.
- Annual reporting to document cap inspection/repair activities, compliance with deed restrictions, and groundwater sampling results.
- Five-year reviews to assess site conditions and verify effectiveness of the remedy.

Alternative OU9-5 – Excavation, Out-of-town Disposal, and Institutional Controls

- Demolition of structures and remove for out-of-town disposal.
- Excavation of Raymark waste (~1.2 million CY) to the depth of the seasonal high water table and store temporarily on site.
- Characterize and transport excavated materials to out-of-town disposal facilities.
- Import clean fill and backfill excavated areas.
- New monitoring wells installation.

TABLE A-3-6
DESCRIPTION OF POTENTIAL REMEDIAL ALTERNATIVES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU9 – STRATFORD LANDFILL AND SHORT BEACH PARK
STRATFORD, CONNECTICUT

- Enactment of institutional controls on the property prohibit certain types of activities such as excavations without written authorization from EPA and DEP, that could intrude into contaminated materials present below the water table and to prohibit groundwater use of any kind.
- Quarterly groundwater monitoring for two years, and annual groundwater monitoring thereafter.
- Annual inspections to verify effectiveness of institutional controls.
- Annual reporting to document compliance with deed restrictions, and groundwater sampling results.
- Five-year reviews to assess site conditions and verify effectiveness of the remedy.

TABLE A-3-7
SCREENING OF ALTERNATIVES
DRAFT FOCUSED FEASIBILITY STUDY
RAYMARK – OU9 – STRATFORD LANDFILL AND SHORT BEACH PARK
STRATFORD, CONNECTICUT

ALTERNATIVE	DESCRIPTION	SCREENING CRITERIA			COMMENTS
		EFFECTIVENESS	IMPLEMENTABILITY	COST	
Alt. OU9-1 **No Action**	**Implementation Period** No Action **Post-Implementation Period** 5-Year Reviews	Would not achieve remedial action objective.	No permits required; no treatment, storage or disposal involved; no equipment or services required.	Capital: None O&M: Low	Retain (as baseline)
Alt. OU9-2 **Limited Action**	**Implementation Period** Institutional Controls Install Monitoring wells **Post-Implementation Period** Groundwater Monitoring Storm Water Monitoring 5-Year Reviews	Would not achieve remedial action objective without other actions. No human health or environmental impacts from implementation. Reliable to the extent that restrictions can be enforced.	Institutional controls and local ordinances would require legal and/or political actions from others. No treatment, storage, or disposal involved. Services readily available to implement institutional controls.	Capital: medium O&M: medium	Retain.
Alt. OU9-3A **Consolidation, Capping, and Institutional Controls**	**Implementation Period** Demolition & Disposal of onsite structures Cap System Construction Monitoring Wells Construction Interim Monitoring during Construction - Storm Water - Air Institutional Controls **Post-Implementation Period** Cap Maintenance Groundwater Monitoring Storm Water Monitoring 5-Year Reviews	Would achieve remedial action objectives by preventing direct contact with contaminated soils and reducing contaminant leaching. Some potential adverse impacts during construction or implementation beyond typical earthmoving construction activities because of contaminated soil presence, which can be mitigated through engineering and air pollution controls, and proper decontamination and H&S measures. Reliable when properly designed, constructed and maintained.	Will need to comply with substantive requirements of ARARs for on-site activities. Adequate on-site storage capacity required. No treatment or disposal involved. Conventional construction process that is easily implemented with equipment and services that are readily available from several sources. Excavation below ground water table could present technical implementability issues. The finished grade of the landfill may be problematic as it is adjacent to the Sikorsky Regional Airport and will be in the airport's approach surface. In addition, Short Beach Park may be in a Runway Protection Zone. Institutional controls and local ordinances would require legal and/or actions by others.	Cost: Medium. O&M: Medium.	Retain.
Alt. OU9-3B **Consolidation, Capping (Compliant with FAA Requirements), and Institutional Controls**	**Implementation Period** Demolition & Disposal of onsite structures Cap System Construction Monitoring Wells Construction Interim Monitoring during Construction - Storm Water - Air Institutional Controls **Post-Implementation Period** Cap Maintenance Groundwater Monitoring Storm Water Monitoring 5-Year Reviews	Would achieve remedial action objectives by preventing direct contact with contaminated soils and reducing potential contaminant leaching. Some potential adverse impacts during construction or implementation beyond typical earthmoving construction activities because of contaminated soil presence, which can be mitigated through engineering and air pollution controls, and proper decontamination and H&S measures. Reliable when properly designed, constructed and maintained.	Will need to comply with substantive requirements of ARARs for on-site activities. Adequate on-site storage capacity required. Conventional construction processes that can be implemented with equipment and services that are readily available from several sources. Excavation below ground water table could present technical implementability issues. The finished grade of the landfill will comply with the FAA's requirements relevant to the Sikorsky Regional Airport approach surface and runway protection zone. Institutional controls and local ordinances would require legal and/or actions by others.	Cost: Medium. O&M: Medium.	Retain.

TABLE A-3-7
SCREENING OF ALTERNATIVES
DRAFT FOCUSED FEASIBILITY STUDY
RAYMARK – OU9 – STRATFORD LANDFILL AND SHORT BEACH PARK
STRATFORD, CONNECTICUT

ALTERNATIVE	DESCRIPTION	SCREENING CRITERIA			COMMENTS
		EFFECTIVENESS	IMPLEMENTABILITY	COST	
Alt. OU9-4 **On-site Treatment**	**Implementation Period** Demolition & Disposal of onsite structures Excavation & Temporary Stockpiling Thermal Treatment Solidification Confirmatory Sampling and Testing Monitoring Wells Construction Interim Monitoring during Construction - Storm Water - Air Institutional Controls Soil Cover **Post-Implementation Period** Groundwater Monitoring Storm Water Monitoring 5-Year Reviews	Would achieve remedial action objectives by preventing direct contact with contaminated soils and reducing contaminant leaching. Some adverse impacts during construction or implementation beyond typical earthmoving construction activities because of contaminated soil presence, which can be mitigated through engineering and air pollution controls, and proper decontamination and H&S measures. Reduction in toxicity or volume through treatment is anticipated. However, because of the extensive heterogeneity of materials, types of contaminants present, and volume, treatment effectiveness will likely be varied. Extensive materials handling, stockpiling, and testing would be required. Metals would not be destroyed, but would only be stabilized. Reliable if treatment could be properly designed and implemented.	Will need to comply with substantive requirements of ARARs for on-site activities. Community impacts from setup and operation are both short- and long-term including large numbers of vehicles moving clean and contaminated materials. Potential treatment options will also need sufficient space to set up treatment equipment, work areas including storage of contaminated soil before and after treatment. Thermal treatment will need to be conducted at high temperatures (i.e., comparable to incineration). Approvals for on-site incineration may be difficult to acquire. Performance of 5-year reviews is required. Services readily available to implement institutional controls (signs, fencing, groundwater monitoring). Institutional controls and local ordinances would require legal and/or actions by others.	Cost: High. O&M: Medium.	Eliminate. Potential effectiveness and implementability issues. Effectiveness of treatment could be compromised by heterogeneous nature of materials. Elevated metals concentrations would remain on site. On-site thermal treatment may be difficult to implement and would have high capital costs compared to the No Action, Limited Action or Capping and Institutional Controls alternative options.
Alt. OU9-5 **Excavation and Out-of-town Disposal**	**Implementation Period** Demolition & Disposal of onsite structures Excavation of Contaminated Materials Confirmatory Sampling Backfilling with Clean Fill Interim Monitoring during Response Action - Storm Water - Air Monitoring Wells Construction **Post-Implementation Period** Groundwater Monitoring Storm Water Monitoring 5-Year Reviews	May be difficult to accommodate anticipated volume of contaminated soil. Remedial action objectives would be achieved since all contamination above the water table would be removed from site. Adverse impacts may occur during implementation beyond typical earth-moving construction activities because of contaminated soil presence, which can be mitigated through engineering and air pollution controls, and proper decontamination and H&S procedures to prevent the spread of contamination during excavation and loading. Potential for release of contaminants during transport due to accidents. Proven and reliable for site contaminants.	Permits for transportation and disposal of contaminated materials at out-of-town disposal facilities could be obtained. Out-of-town disposal capacity for the anticipated volume of contaminated soil (1.2 million CY to the water table) and/or out-of-town disposal of the entire volume of Raymark waste (1.9 million CY) may be difficult. Will require transport, as disposal facilities are located > 500 miles away. Not readily implemented. Significant specific sampling of on-site materials needed prior to out-of-town disposal. Performance of 5-year reviews is required to assess groundwater quality after closure. Services readily available to implement institutional controls (signs, fencing, groundwater monitoring), if not clean closure. Institutional controls and local ordinances would require legal and/or actions by others.	Capital: High O&M: Low (post-closure monitoring)	Eliminate. Out-of-town capacity may be limited in ability to handle disposal volume of contaminated materials. Extensive materials transport to out-of-town disposal facilities will be required and would have high capital costs compared to the No Action, Limited Action or Capping and Institutional Controls alternative options.

TABLE A-3-8
COMPARATIVE ANALYSIS OF OU9 ALTERNATIVES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU9 – STRATFORD LANDFILL AND SHORT BEACH PARK
STRATFORD, CONNECTICUT

EVALUATION CRITERIA[1]	ALTERNATIVE OU9-1 No Action	ALTERNATIVE OU9-2 Limited Action	ALTERNATIVE OU9-3A Consolidation, Containment, Institutional Controls
Overall Protection of Human Health and the Environment			
Overall assessment of long-term protectiveness and short-term impacts	▪ Developed as a baseline per NCP for comparison purposes. ▪ Would not be protective of human health or environment in the long term. ▪ Contaminants will continue to pose potential health risks through direct exposure (dermal, ingestion, inhalation). ▪ Unacceptable blood lead levels in children, if no action taken. ▪ SVOCs and metals will continue to gradually leach into groundwater and will continue to migrate in aquifer.	▪ Offers very limited protection to human health, no protection for the environment. ▪ Contaminants will continue to pose potential risks through direct exposure (dermal, ingestion, inhalation). ▪ Unacceptable blood lead levels in children, if no action taken. ▪ SVOCs and metals will continue to gradually leach into groundwater and will continue to migrate in aquifer.	▪ Offers protection to human health by preventing direct exposure (dermal contact, incidental ingestion, and inhalation). ▪ Leaching of contaminant (SVOCs and metals) groundwater would be reduced and can reduce potential migration of these chemicals in the aquifer. ▪ Institutional controls could limit potential intrusion/damage of cover system, if enforced. ▪ Periodic maintenance would sustain effectiveness of the cap. ▪ Long-term monitoring would alert responsible parties of possible changes in groundwater quality or characteristics of capped materials.
Compliance with ARARs[2]			
Compliance with chemical-specific ARARs	▪ No applicable chemical-specific ARARs.	▪ No applicable chemical-specific ARARs because no actions will be taken.	▪ This alternative would comply with chemical-specific ARARs presented in Appendix C, ARAR Table A.
Compliance with location-specific ARARs	▪ No applicable location-specific ARARs.	▪ No applicable location-specific ARARs because no actions will be taken.	▪ Would be subject to FAA regulations and advisories that govern vertical and lateral restrictions in the vicinity of airport runways. OU9 Study Area abuts the Sikorsky Regional Airport. Finished grade of capped and the consolidated landfill will need to be below the airport's approach surface to comply with FAA regulations for Imaginary Surfaces (14 CFR 77.25), and Airport Design (FAA AC 150/1300-13). Extensive earth moving and grading will be required to comply with the FAA requirements. Short Beach Park is currently in a Runway Protection Zone. Because of this, Alternative OU4-3A may not be viable. See Appendix C, ARAR Tables B and C.
Compliance with action-specific ARARs	▪ Exceeds federal risk criteria. ▪ Would not comply with CT RCSA RSRs because no actions will be taken.	▪ Exceeds federal risk criteria. ▪ Would not comply with CT RCSA RSRs because no actions will be taken. See Appendix C, ARAR Table A.	▪ This alternative would comply with chemical-specific ARARs presented in Appendix C, ARAR Tables A and D.
Long-Term Effectiveness and Permanence			
Magnitude of residual risks	▪ Carcinogenic risks will remain at 1.31 E-04 (for Stratford Landfill, RME Commercial Worker), which is at high end of EPA's acceptable risk range, due to continued unrestricted use of OU9. ▪ Non-carcinogenic risk will remain at 3.46 E+00, which exceeds the EPA's acceptable risk range. ▪ Contaminated Raymark waste totaling 1.9 million CY would remain unaddressed. ▪ 5-year reviews will be required because waste remains on site.	▪ Carcinogenic risks may be lower than 1.31 E-04, which is at high end of EPA's acceptable risk range, because entry into OU9 would be limited by access restrictions (fencing). ▪ Non-carcinogenic risks may be lower than at 3.46 E+00, because entry into OU9 would be limited by access restrictions (fencing). ▪ Contaminated Raymark waste totaling 1.9 million CY would remain unaddressed. ▪ 5-year reviews will be required because waste remains on site.	▪ Potential carcinogenic risks will not occur because direct exposure to contaminants will be eliminated by consolidation and capping. ▪ Potential non-carcinogenic risks will not occur because direct exposure to contaminants will be eliminated by consolidation and capping. ▪ Contaminated Raymark waste totaling ~1.9 CY would remain on site, but will be controlled and contained. ▪ Contaminated Raymark waste totaling 23,800 CY would remain on site, but would be a depths greater than 4 feet below ground surface. ▪ 5-year reviews will be required because waste remains on site.
Adequacy and reliability of controls	▪ No controls are used. Therefore, no protection for human health or the environment from potential exposure to contaminants.	▪ Access and land use restrictions may be effective if these controls are enforced and monitored.	▪ Capping is effective and protective, as long as the cover system is maintained. ▪ Access and land use restrictions are effective if these controls are enforced and monitored.
Reduction of Toxicity, Mobility, or Volume Through Treatment			
Treatment process used	▪ No treatment used.	▪ No treatment used.	▪ No treatment used.
Reduction in toxicity, mobility, or volume	▪ No reduction of toxicity, mobility, or volume through treatment.	▪ No reduction of toxicity, mobility, or volume through treatment.	▪ No reduction of toxicity, mobility, or volume through treatment.
Type and quantity of treatment residuals	▪ No treatment, therefore no residuals.	▪ No treatment, therefore no residuals.	▪ No treatment, therefore no residuals.
Satisfies statutory preference for treatment	▪ Would not satisfy statutory preference for treatment.	▪ Would not satisfy statutory preference for treatment.	▪ Would not satisfy statutory preference for treatment.

TABLE A-3-8
COMPARATIVE ANALYSIS OF OU9 ALTERNATIVES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU9 – STRATFORD LANDFILL AND SHORT BEACH PARK
STRATFORD, CONNECTICUT

EVALUATION CRITERIA[1]	ALTERNATIVE OU9-1 No Action	ALTERNATIVE OU9-2 Limited Action	ALTERNATIVE OU9-3A Consolidation, Containment, Institutional Controls
Short-Term Effectiveness			
Risks to community during implementation of remedial action	▪ No additional risks to community as no action would be taken.	▪ No additional risks to community as no action would be taken.	▪ Limited impacts to community are anticipated. Increased truck and vehicular traffic would occur during site preparation, demolition of existing structures, decontamination, and soils excavation/consolidation. ▪ Increased vehicular traffic on public roads will need to be coordinated and scheduled to minimize impacts to the local community. ▪ Fugitive dust emissions from demolition, soil excavation/consolidation, cap system construction could be minimized or eliminated by applying proper engineering controls (i.e., dust suppressants, enclosures, etc.) and monitoring.
Risks to workers during implementation of remedial action	▪ No additional risks to workers as no action would be taken.	▪ No additional risks to workers as no action would be taken.	▪ Risks to workers during the remedial action can be minimized or eliminated through the use of proper personal protective equipment to prevent exposures to contaminant-laden dusts (i.e., metals, asbestos fibers, and PCBs).
Environmental impacts	▪ No additional risks to environment as no action would be taken.	▪ No additional risks to environment as no action would be taken.	▪ No permanent adverse impacts to the environment are anticipated as the result of the remedial action. ▪ There are no unique habitats that would be disturbed by the remedial action.
Time until remedial action is achieved	▪ RAO will not be achieved.	▪ Limited actions would be taken, RAO could be achieved if institutional controls are effectively enforced.	▪ Approximately 2 to 3 years required to achieve the RAO, including pre-design, design, and construction activities.
Implementability			
Constructable	▪ Not applicable.	▪ Fencing (access restrictions) and signage easily constructed. ▪ Institutional controls can be prepared to restrict land use.	▪ No anticipated difficulties or uncertainties associated with excavation, consolidation and construction of a landfill cap. ▪ Handling of hazardous and asbestos-contaminated materials will require specially trained workers and supervisors.
Technology reliability	▪ Not applicable.	▪ Access and land use restrictions can be effective if enforced and maintained.	▪ Containment is a reliable technology, if properly maintained. ▪ Long-term monitoring is reliable for evaluation of subsurface conditions.
Ease of implementing additional actions, if necessary	▪ Easily implemented.	▪ Easily implemented.	▪ Should additional actions be warranted, these can be implemented, however repairs may be required to ensure cap integrity after additional actions are completed.
Monitoring effectiveness	▪ Can be monitored.	▪ Monitoring can be effective in evaluating site conditions and potential changes.	▪ Effectiveness of the cover system can be monitored through periodic inspections and maintenance. ▪ Effectiveness of the institutional controls can also be monitored through periodic inspections.
Coordination with other agencies	▪ Not applicable.	▪ Coordination with other agencies can be readily implemented.	▪ Coordination with other agencies can be readily implemented. However, the current status of the landfill and proximity to the Sikorsky Airport runway will require extensive coordination between federal, state, and municipal entities.
Availability of treatment, storage, and disposal services	▪ Not applicable.	▪ Not applicable.	▪ Treatment, storage, and disposal services are available for contaminated materials that contain PHCs that cannot be land disposed at the site.
Availability of equipment and specialists	▪ Not applicable.	▪ Specialty equipment is not required. Equipment and personnel to install fencing and signage are readily available. Specialists that prepare institutional controls are available.	▪ Some specialty equipment will be required to control dust emissions during construction. ▪ Equipment and personnel to perform demolition (of onsite structures), and to excavate, consolidate, and cap contaminated soils are available. Equipment and personnel to install fencing and signage are readily available. ▪ Some lead time will be required to order the necessary quantities of cover system materials. ▪ Specialists that prepare institutional controls are available.
Availability of prospective technologies	▪ Not applicable.	▪ Access and land use restrictions are readily available.	▪ Capping is well demonstrated technology to contain contaminated materials. ▪ A variety of companies are available that have the experience and capability to implement the consolidation and capping of contaminated materials.

TABLE A-3-8
COMPARATIVE ANALYSIS OF OU9 ALTERNATIVES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU9 – STRATFORD LANDFILL AND SHORT BEACH PARK
STRATFORD, CONNECTICUT

EVALUATION CRITERIA[1]	ALTERNATIVE OU9-1 No Action	ALTERNATIVE OU9-2 Limited Action	ALTERNATIVE OU9-3A Consolidation, Containment, Institutional Controls
Cost			
Capital Costs	**$0**	**$499,400**	**$33,653,900**
O&M Costs (present worth)[3]	**$43,200**	**$1,324,100**	**$5,619,900**
Total Present Worth Costs[3]	**$43,200**	**$1,823,500**	**$39,255,900**

EVALUATION CRITERIA[1]	ALTERNATIVE OU9-3B Consolidation, Capping (Compliant with FAA Requirements), and Institutional Controls
Overall Protection of Human Health and the Environment	
Overall assessment of long-term protectiveness and short-term impacts	▪ Same as OU3-3A
Compliance with ARARs[2]	
Compliance with chemical-specific ARARs	▪ Same as OU3-3A
Compliance with location-specific ARARs	▪ Would comply with FAA requirements. See Appendix C, ARAR Tables B and C.
Compliance with action-specific ARARs	▪ Same as OU3-3A
Long-Term Effectiveness and Permanence	
Magnitude of residual risks	▪ Same as OU3-3A
Adequacy and reliability of controls	▪ Same as OU3-3A
Reduction of Toxicity, Mobility, or Volume Through Treatment	
Treatment process used	▪ Same as OU3-3A
Reduction in toxicity, mobility, or volume	▪ Same as OU3-3A
Type and quantity of treatment residuals	▪ Same as OU3-3A
Satisfies statutory preference for treatment	▪ Same as OU3-3A
Short-Term Effectiveness	
Risks to community during implementation of remedial action	▪ Same as OU3-3A
Risks to workers during implementation of remedial action	▪ Same as OU3-3A
Environmental impacts	▪ Same as OU3-3A
Time until remedial action is achieved	▪ Same as OU3-3A

TABLE A-3-8
COMPARATIVE ANALYSIS OF OU9 ALTERNATIVES
FOCUSED FEASIBILITY STUDY
RAYMARK – OU9 – STRATFORD LANDFILL AND SHORT BEACH PARK
STRATFORD, CONNECTICUT

EVALUATION CRITERIA[1]	ALTERNATIVE OU9-3B Consolidation, Capping (Compliant with FAA Requirements), and Institutional Controls
Implementability	
Constructable	▪ Same as OU3-3A
Technology reliability	▪ Same as OU3-3A
Ease of implementing additional actions, if necessary	▪ Same as OU3-3A
Monitoring effectiveness	▪ Same as OU3-3A
Coordination with other agencies	▪ Same as OU3-3A
Availability of treatment, storage, and disposal services	▪ Same as OU3-3A
Availability of equipment and specialists	▪ Same as OU3-3A
Availability of prospective technologies	▪ Same as OU3-3A
Cost	
Capital Costs	**$47,308,300**
O&M Costs (present worth)[3]	**$5,619,900**
Total Present Worth Costs[3]	**$52,929,300**

Notes:
1. Evaluation criteria from *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final*, EPA/540/G-89/004, OSWER Directive 9355.3-01, October 1988.
2. Chemical-specific, location-specific and action-specific ARARS are presented in Appendix C.
3. Present Worth calculated based on 7% discount rate per *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*, EPA 540-R-00-002, OSWER 9355.0-75, July 2000.

TABLE A-3-9a
PRESENT VALUE ANALYSIS
ALTERNATIVE OU9-1
FOCUSED FEASIBILITY STUDY
RAYMARK - OU9- STRATFORD LANDFILL AND SHORT BEACH PARK
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$20,000	$20,000	7.0%	$14,260
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$20,000	$20,000	7.0%	$10,167
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$20,000	$20,000	7.0%	$7,249
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$20,000	$20,000	7.0%	$5,168
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$20,000	$20,000	7.0%	$3,685
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$20,000	$20,000	7.0%	$2,627
TOTAL	**$0**					**$43,156**
					PV O&M	**$43,156**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE A-3-9b
PRESENT VALUE ANALYSIS
ALTERNATIVE OU9-2
FOCUSED FEASIBILITY STUDY
RAYMARK - OU9- STRATFORD LANDFILL AND SHORT BEACH PARK
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$499,363	$0	$0	$499,363	7.0%	$499,363
1	$0	$173,794	$0	$173,794	7.0%	$162,424
2	$0	$173,794	$0	$173,794	7.0%	$151,799
3	$0	$91,193	$0	$91,193	7.0%	$74,441
4	$0	$91,193	$0	$91,193	7.0%	$69,571
5	$0	$91,193	$20,000	$111,193	7.0%	$79,279
6	$0	$91,193	$0	$91,193	7.0%	$60,766
7	$0	$91,193	$0	$91,193	7.0%	$56,790
8	$0	$91,193	$0	$91,193	7.0%	$53,075
9	$0	$91,193	$0	$91,193	7.0%	$49,603
10	$0	$91,193	$20,000	$111,193	7.0%	$56,525
11	$0	$91,193	$0	$91,193	7.0%	$43,325
12	$0	$91,193	$0	$91,193	7.0%	$40,491
13	$0	$91,193	$0	$91,193	7.0%	$37,842
14	$0	$91,193	$0	$91,193	7.0%	$35,366
15	$0	$91,193	$20,000	$111,193	7.0%	$40,301
16	$0	$91,193	$0	$91,193	7.0%	$30,890
17	$0	$91,193	$0	$91,193	7.0%	$28,869
18	$0	$91,193	$0	$91,193	7.0%	$26,981
19	$0	$91,193	$0	$91,193	7.0%	$25,216
20	$0	$91,193	$20,000	$111,193	7.0%	$28,734
21	$0	$91,193	$0	$91,193	7.0%	$22,024
22	$0	$91,193	$0	$91,193	7.0%	$20,583
23	$0	$91,193	$0	$91,193	7.0%	$19,237
24	$0	$91,193	$0	$91,193	7.0%	$17,978
25	$0	$91,193	$20,000	$111,193	7.0%	$20,487
26	$0	$91,193	$0	$91,193	7.0%	$15,703
27	$0	$91,193	$0	$91,193	7.0%	$14,676
28	$0	$91,193	$0	$91,193	7.0%	$13,716
29	$0	$91,193	$0	$91,193	7.0%	$12,818
30	$0	$91,193	$20,000	$111,193	7.0%	$14,607
TOTAL	**$499,363**					**$1,823,481**
					PV O&M	**$1,324,118**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE A-3-9c
PRESENT VALUE ANALYSIS
ALTERNATIVE OU9-3A
FOCUSED FEASIBILITY STUDY
RAYMARK - OU9- STRATFORD LANDFILL AND SHORT BEACH PARK
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$33,635,909	$0	$0	$33,635,909	7.0%	$33,635,909
1	$0	$519,979	$0	$519,979	7.0%	$485,962
2	$0	$519,979	$0	$519,979	7.0%	$454,170
3	$0	$437,378	$0	$437,378	7.0%	$357,031
4	$0	$437,378	$0	$437,378	7.0%	$333,674
5	$0	$437,378	$20,000	$457,378	7.0%	$326,104
6	$0	$437,378	$0	$437,378	7.0%	$291,443
7	$0	$437,378	$0	$437,378	7.0%	$272,377
8	$0	$437,378	$0	$437,378	7.0%	$254,558
9	$0	$437,378	$0	$437,378	7.0%	$237,905
10	$0	$437,378	$20,000	$457,378	7.0%	$232,508
11	$0	$437,378	$0	$437,378	7.0%	$207,795
12	$0	$437,378	$0	$437,378	7.0%	$194,201
13	$0	$437,378	$0	$437,378	7.0%	$181,496
14	$0	$437,378	$0	$437,378	7.0%	$169,623
15	$0	$437,378	$20,000	$457,378	7.0%	$165,775
16	$0	$437,378	$0	$437,378	7.0%	$148,155
17	$0	$437,378	$0	$437,378	7.0%	$138,463
18	$0	$437,378	$0	$437,378	7.0%	$129,404
19	$0	$437,378	$0	$437,378	7.0%	$120,939
20	$0	$437,378	$20,000	$457,378	7.0%	$118,195
21	$0	$437,378	$0	$437,378	7.0%	$105,632
22	$0	$437,378	$0	$437,378	7.0%	$98,722
23	$0	$437,378	$0	$437,378	7.0%	$92,264
24	$0	$437,378	$0	$437,378	7.0%	$86,228
25	$0	$437,378	$20,000	$457,378	7.0%	$84,272
26	$0	$437,378	$0	$437,378	7.0%	$75,315
27	$0	$437,378	$0	$437,378	7.0%	$70,387
28	$0	$437,378	$0	$437,378	7.0%	$65,783
29	$0	$437,378	$0	$437,378	7.0%	$61,479
30	$0	$437,378	$20,000	$457,378	7.0%	$60,084
TOTAL	**$33,635,909**					**$39,255,851**
					PV O&M	**$5,619,942**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE A-3-9d
PRESENT VALUE ANALYSIS
ALTERNATIVE OU9-3B
FOCUSED FEASIBILITY STUDY
RAYMARK - OU9- STRATFORD LANDFILL AND SHORT BEACH PARK
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$47,308,328	$0	$0	$47,308,328	7.0%	$47,308,328
1	$0	$519,979	$0	$519,979	7.0%	$485,962
2	$0	$519,979	$0	$519,979	7.0%	$454,170
3	$0	$437,378	$0	$437,378	7.0%	$357,031
4	$0	$437,378	$0	$437,378	7.0%	$333,674
5	$0	$437,378	$20,000	$457,378	7.0%	$326,104
6	$0	$437,378	$0	$437,378	7.0%	$291,443
7	$0	$437,378	$0	$437,378	7.0%	$272,377
8	$0	$437,378	$0	$437,378	7.0%	$254,558
9	$0	$437,378	$0	$437,378	7.0%	$237,905
10	$0	$437,378	$20,000	$457,378	7.0%	$232,508
11	$0	$437,378	$0	$437,378	7.0%	$207,795
12	$0	$437,378	$0	$437,378	7.0%	$194,201
13	$0	$437,378	$0	$437,378	7.0%	$181,496
14	$0	$437,378	$0	$437,378	7.0%	$169,623
15	$0	$437,378	$20,000	$457,378	7.0%	$165,775
16	$0	$437,378	$0	$437,378	7.0%	$148,155
17	$0	$437,378	$0	$437,378	7.0%	$138,463
18	$0	$437,378	$0	$437,378	7.0%	$129,404
19	$0	$437,378	$0	$437,378	7.0%	$120,939
20	$0	$437,378	$20,000	$457,378	7.0%	$118,195
21	$0	$437,378	$0	$437,378	7.0%	$105,632
22	$0	$437,378	$0	$437,378	7.0%	$98,722
23	$0	$437,378	$0	$437,378	7.0%	$92,264
24	$0	$437,378	$0	$437,378	7.0%	$86,228
25	$0	$437,378	$20,000	$457,378	7.0%	$84,272
26	$0	$437,378	$0	$437,378	7.0%	$75,315
27	$0	$437,378	$0	$437,378	7.0%	$70,387
28	$0	$437,378	$0	$437,378	7.0%	$65,783
29	$0	$437,378	$0	$437,378	7.0%	$61,479
30	$0	$437,378	$20,000	$457,378	7.0%	$60,084
TOTAL	**$47,308,328**					**$52,928,269**
					PV O&M	**$5,619,942**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE A-3-9e
CAPITAL COSTS
OU9 ALTERNATIVES (OU9-1, OU9-2, OU9-3A 3B)
FOCUSED FEASIBILITY STUDY
RAYMARK - OU9- STRATFORD LANDFILL AND SHORT BEACH PARK
STRATFORD, CONNECTICUT

	DESCRIPTION	UNIT	UNIT COST[1]	QUANTITY				TOTAL COST				SOURCE
				OU9 - 1	OU9 - 2	OU9 - 3A	OU9 - 3B	OU9 - 1	OU9 - 2	OU9 - 3A	OU9 - 3B	
1.0	**Mobilization/Demobilization**											
1.1	Personnel/Equipment Mobilization	LS	$96,526	0	0	1	1	$0	$0	$96,526	$96,526	see Appendix A cost assumptions
1.2	Field Support Facilities	LS	$37,538	0	0	3	3	$0	$0	$112,614	$112,614	see Appendix A cost assumptions
1.3	Monthly Costs associated with Field Support	MONTH	$51,481	0	0	6	6	$0	$0	$308,883	$308,883	see Appendix A cost assumptions
	Subtotal							**$0**	**$0**	**$518,023**	**$518,023**	
2.0	**Site Preparation**											
	Stratford LF & Short Beach Park											
2.1	Site Access Road Construction	SY	$23.06	0	0	1,900	1,900	$0	$0	$43,812	$43,812	Means 2008 HC, 32 11 23.23 0300
2.2	Demolition and Disposal	LS	$30,000	0	0	1	1	$0	$0	$30,000	$30,000	see Appendix A cost assumptions
2.3	Clear and Grub	ACRE	$3,968	0	0	18	18	$0	$0	$71,429	$71,429	Means 2008 HC, 31 11 10.10 0020
2.4	Site Survey	EA	$5,945	0	0	1	1	$0	$0	$5,945	$5,945	TtNUS, 2005
2.5	Decontamination Facilities & Services	LS	$350,000	0	0	1	1	$0	$0	$350,000	$350,000	see Appendix A cost assumptions
2.6	Install Erosion and Sedimentation Controls	LF	$8.97	0	0	5,000	5,000	$0	$0	$44,831	$44,831	Means 2008 HC, 31 25 13.10 1100, 1250
2.7	Install Fence and signage[2]	LF	$28.31	0	5,000	5,000	5,000	$0	$141,548	$141,548	$141,548	see cost assumptions (2010) in Appendix G
	Airport Property N. of Marine Basin											
2.8	Site Access Road Construction	SY	$23.06	0	0	900	900	$0	$0	$20,753	$20,753	Means 2008 HC, 32 11 23.23 0300
2.9	Clear and Grub	ACRE	$3,968	0	0	2	2	$0	$0	$7,937	$7,937	Means 2008 HC, 31 11 10.10 0020
2.10	Decontamination Facilities & Services	LS	$50,000	0	0	1	1	$0	$0	$50,000	$50,000	see Appendix A cost assumptions (2010)
2.11	Install Erosion and Sedimentation Controls	LF	$8.97	0	0	1,200	1,200	$0	$0	$10,759	$10,759	Means 2008 HC, 31 25 13.10 1100, 1250
2.12	Install Fence and signage[2]	LF	$28.31	0	1,200	1,200	1,200	$0	$33,971	$33,971	$33,971	see cost assumptions (2010) in Appendix G
	Subtotal							**$0**	**$175,519**	**$810,986**	**$810,986**	
3.0	**Interim Construction Monitoring**											
3.1	Stormwater	LS	$5,784.45	0	0	1	1	$0	$0	$5,784	$5,784	TtNUS, 1999
3.2	Air	LS	$26,030.04	0	0	1	1	$0	$0	$26,030	$26,030	TtNUS, 1999
3.3	Soil Confirmatory	LS	$182,326.90	0	0	1	1	$0	$0	$182,327	$182,327	see Appendix A cost assumptions
	Subtotal							**$0**	**$0**	**$214,141**	**$214,141**	
4.0	**Spread/Compact Raymark Waste**											
	Stratford LF & Short Beach Park											
4.1	Excavate Raymark Waste[3]	CY	$2.12	0	0	47,700	194,900	$0	$0	$101,294	$413,884	Means 2008 HC, 31 23 16.42 0200
4.2	Haul Raymark Waste (0.25 miles round trip)[4]	CY	$4.00	0	0	57,240	233,880	$0	$0	$228,987	$935,629	Means 2008 HC, 31 23 23.18 0320
4.3	Spread Raymark Waste	CY	$2.40	0	0	57,240	233,880	$0	$0	$137,515	$561,879	Means 2008 HC, 31 23 23.17 0400, 31 23 23.23 5000
4.4	Compact Raymark Waste	CY	$0.32	0	0	57,240	233,880	$0	$0	$18,356	$75,001	Means 2008 HC, 31 23 23.23 5060
4.5	Watering with 3,000 gallon Tank truck, per Pass	ACRE	$168	0	0	13,824	56,160	$0	$0	$2,328,410	$9,459,167	Means 2005 ER, 318 05 0413
4.6	Dust suppressant - tree resin	ACRE	$11,452	0	0	74	74	$0	$0	$847,447	$847,447	Means 2005 ER, 33 08 0576
4.7	Perimeter Air Sampling	EA	$243.76	0	0	191	780	$0	$0	$46,509	$190,036	Aero-Tech, 2005
4.8	Equipment Decontamination	HR	$54.56	0	0	2,385	9,745	$0	$0	$130,136	$531,732	Means 2004 ER, 33 17 0823
	Airport Property N. of Marine Basin											
4.9	Excavate Raymark Waste[3]	CY	$2.12	0	0	7,000	7,000	$0	$0	$14,865	$14,865	Means 2008 HC, 31 23 16.42 0200
4.10	Haul Raymark Waste (1 mile round trip)[4]	CY	$16.00	0	0	8,400	8,400	$0	$0	$134,416	$134,416	Means 2008 HC, 31 23 23.18 0320
4.11	Spread Raymark Waste	CY	$2.40	0	0	8,400	8,400	$0	$0	$20,180	$20,180	Means 2008 HC, 31 23 23.17 0400, 31 23 23.23 5000
4.12	Compact Raymark Waste	CY	$0.32	0	0	8,400	8,400	$0	$0	$2,694	$2,694	Means 2008 HC, 31 23 23.23 5060
4.13	Watering with 3,000 gallon Tank truck, per Pass	ACRE	$168	0	0	112	112	$0	$0	$18,864	$18,864	Means 2005 ER, 318 05 0413
4.14	Dust suppressant - tree resin	ACRE	$11,452	0	0	4	4	$0	$0	$45,808	$45,808	Means 2005 ER, 33 08 0576
4.15	Perimeter Air Sampling	EA	$243.76	0	0	28	28	$0	$0	$6,825	$6,825	Aero-Tech, 2005
4.16	Equipment Decontamination	HR	$54.56	0	0	350	350	$0	$0	$19,098	$19,098	Means 2004 ER, 33 17 0823
	Subtotal							**$0**	**$0**	**$4,101,405**	**$13,277,525**	

TABLE A-3-9e
CAPITAL COSTS
OU9 ALTERNATIVES (OU9-1, OU9-2, OU9-3A 3B)
FOCUSED FEASIBILITY STUDY
RAYMARK - OU9- STRATFORD LANDFILL AND SHORT BEACH PARK
STRATFORD, CONNECTICUT

	DESCRIPTION	UNIT	UNIT COST[1]	QUANTITY				TOTAL COST				SOURCE
				OU9 - 1	OU9 - 2	OU9 - 3A	OU9 - 3B	OU9 - 1	OU9 - 2	OU9 - 3A	OU9 - 3B	
5.0 Construct Low-Permeability Cap												
5.1	Deliver, Dump, Spread, and Compact Sand Subbase (6")[5]	CY	$27.00	0	0	30,974	30,974	$0	$0	$836,140	$836,140	Means 2008 HC (multiple items)
5.2	Install Geosynthetic Clay Liner (bottom layer)	SF	$2.86	0	0	1,520,530	1,520,530	$0	$0	$4,352,460	$4,352,460	Means 2009 FC, 33.46.26.10 0180
5.3	Install 60 mil HDPE liner	SF	$2.84	0	0	1,520,530	1,520,530	$0	$0	$4,321,178	$4,321,178	Means 2005 ER, 33 08 0572
5.4	Install Geosynthetic Drainage Layer	SF	$0.65	0	0	1,520,530	1,520,530	$0	$0	$994,413	$994,413	Means 2005 ER, 33 08 0513
5.5	Furnish, Spread, and Compact Soil Layer (24")[5]	CY	$11.83	0	0	123,895	123,895	$0	$0	$1,465,653	$1,465,653	see cost assumptions (2008)
5.6	Install Nonwoven Geotextile Delineation/Warning Layer	SF	$1.29	0	0	1,520,530	1,520,530	$0	$0	$1,961,484	$1,961,484	Means 2010 SW, 31.32.19.16.1550
5.7	Furnish, Place, and Spread Topsoil (6")[5]	CY	$34.65	0	0	30,974	30,974	$0	$0	$1,073,230	$1,073,230	Means 2005 ER, 18 05 0301
5.8	Hydroseeding with Mulch and Fertilizer	MSF	$43.97	0	0	1,521	1,521	$0	$0	$66,862	$66,862	Means 2008 HC, 32 92 19.14 3500
5.9	Site Cleanup	HR	$405.12	0	0	64	64	$0	$0	$25,928	$25,928	Means 2004, 17 04 0101
5.10	Clean Fill, Delivered, Dumped, Spread, and Compacted[5]	CY	$11.83	0	0	52,250	52,250	$0	$0	$618,107	$618,107	see cost assumptions (2008)
5.11	Install Geotextile Fabric Layer	SY	$2.21	0	0	168,948	168,948	$0	$0	$373,375	$373,375	Means 2010 SW, 31.32.19.16 1500
5.12	As-Built Survey	LS	$50,000	0	1	1	1	$0	$50,000	$50,000	$50,000	see Appendix A cost assumptions
5.13	Build Replacement Dorne Drive	LS	$280,000	0	0	1	1	$0	$0	$280,000	$280,000	see Appendix A cost assumptions
	Subtotal							**$0**	**$50,000**	**$16,418,829**	**$16,418,829**	
6.0 Well Replacement/Installation												
6.1	Well Replacement/Installation (assume 15 wells)	LS	$80,438.34	0	1	1	1	$0	$80,438	$80,438	$80,438	see Appendix A cost assumptions
	Subtotal							**$0**	**$80,438**	**$80,438**	**$80,438**	
7.0 Wetlands & Floodplains Mitigation[6]												
7.1	Purchase land for Flood Storage Mitigation	ACRE	$200,000.00	0	0	0	0	$0	$0	$0	$0	see Appendix A cost assumptions
7.2	Flood storage mitigation	LS	$225,000.00	0	0	1	1	$0	$0	$225,000	$225,000	see Appendix A cost assumptions
7.3	Purchase land for Wetlands Mitigation	ACRE	$200,000.00	0	0	0	0	$0	$0	$0	$0	see Appendix A cost assumptions
7.4	Construct compensatory wetlands	LS	$160,000.00	0	0	1	1	$0	$0	$160,000	$160,000	see Appendix A cost assumptions
	Subtotal							**$0**	**$0**	**$385,000**	**$385,000**	
TOTAL DIRECT COSTS								**$0**	**$305,957**	**$22,528,822**	**$31,704,942**	
7.0 Other Costs												
7.1	Project Management (5% of direct costs)							$0	$15,298	$1,126,441	$1,585,247	OSWER 9355.0-75
7.2	Engineering and Design (8% direct costs)							$0	$0	$1,802,306	$2,536,395	OSWER 9355.0-75
7.3	Construction management (6% of direct costs)							$0	$18,357	$1,351,729	$1,902,297	OSWER 9355.0-75
7.4	Location Adjustment (9%)							$0	$27,536	$2,027,594	$2,853,445	Means 2004 ER
7.5	Contingency (15%)							$0	$45,894	$3,379,323	$4,755,741	OSWER 9355.0-75
7.6	Health and Safety Monitoring (6% of direct costs)							$0	$18,357	$1,351,729	$1,902,297	TtNUS 1999 Report
7.7	Deed Restriction Transactional Fees							$0	$67,964	$67,964	$67,964	
TOTAL OTHER COSTS								**$0**	**$193,406**	**$11,107,086**	**$15,603,385**	
TOTAL CAPITAL COST								**$0**	**$499,363**	**$33,635,909**	**$47,308,328**	

Notes:
[1] For source information regarding unit pricing - refer to cost assumptions provided in Appendix A and G; rates asjusted to reflect 2010 price increases.
[2] Assume fencing and signage to be maintained for Alt. OU9-2 only - all other fencing and signage would be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated.
[4] Volume for hauling RW includes a bulking factor of 1.2.
[5] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[6] Impacts to floodplains will evaluated during Remedial Design and will require onsite compensation to ensure no loss of flood storage capacity will be incurred; impacted wetlands would be restored to pre-existing conditions to the extent practical.

RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation

TABLE A-3-9f
OPERATIONS AND MAINTENANCE COSTS
OU9 ALTERNATIVES (OU9-1, OU9-2, OU9-3A 3B)
FOCUSED FEASIBILITY STUDY
RAYMARK - OU9- STRATFORD LANDFILL AND SHORT BEACH PARK
STRATFORD, CONNECTICUT

DESCRIPTION		UNIT	UNIT COST[1]	QUANTITY			TOTAL COST		
				OU9 - 1	OU9 - 2	OU9 - 3A & 3B	OU9 - 1	OU9 - 2	OU9 - 3A & 3B
OM.1.0	**Groundwater Monitoring (per events)**								
OM.1.1	Sampling Equipment Rental	LS	$1,073	0	1	1	$0	$1,073	$1,073
OM.1.2	Sampling Labor - FOL	HR	$110	0	68	68	$0	$7,480	$7,480
OM.1.3	Sampling Labor - Sampler	HR	$90	0	34	34	$0	$3,060	$3,060
OM.1.4	Analytical Costs	EA	$697	0	17	17	$0	$11,851	$11,851
OM.1.5	Data Validation	HR	$110	0	17	17	$0	$1,870	$1,870
OM.1.6	Report Preparation	LS	$2,200	0	1	1	$0	$2,200	$2,200
	Subtotal						**$0**	**$27,534**	**$27,534**
OM.2.0	**Ground Surface Inspections, Maintenance, and Repairs (per year)**								
OM.2.1	Inspections	HR	$110.00	0	120	120	$0	$13,200	$13,200
OM.2.2	Mowing (twice per year)	MSF	$7.34	0	0	4,000	$0	$0	$29,344
OM.2.3	Revegetation (1% per year)	MSF	$56.31	0	0	20	$0	$0	$1,126
OM.2.4	Asphalt Repairs	SF	$1.81	0	0	0	$0	$0	$0
OM 2.5	Fence Repair[2]	LF	$27.57	0	207	0	$0	$5,698	$0
OM 2.6	Sign Replacement[3]	EA	$73.95	0	248	0	$0	$18,340	$0
OM.2.7	Reporting (annual)	LS	$10,000.00	0	1	1	$0	$10,000	$10,000
OM 2.8	Topsoil replacement (1% per year)	CY	$34.65	0	0	310	$0	$0	$10,732
OM 2.9	Cap/Culvert/Streambank Repairs (2% per year of capital costs)	LS	$328,376.59	0	0	1	$0	$0	$328,377
OM 2.10	Contractor mobilizations	LS	$321.75	0	1	3	$0	$322	$965
	Subtotal						**$0**	**$47,559**	**$393,744**
OM.3.0	**Deed Restrictions**								
OM.3.1	Inspection (annual)	LS	$1,100.00	0	1	1	$0	$1,100	$1,100
OM.3.2	Deed Restriction Reporting (annual)	EA	$5,000.00	0	3	3	$0	$15,000	$15,000
	Subtotal						**$0**	**$16,100**	**$16,100**
ANNAUL O&M COSTS ALT. OU9-2 (YEARS 1-2)[4]							**--**	**$173,794**	**--**
ANNUAL O&M COSTS ALT. 0U9-2 (YEARS 3-30)[5]							**--**	**$91,193**	**--**
ANNUAL O&M COSTS ALT. OU9-3A AND OU9-3B (YEARS 1-2)[6]							**--**	**--**	**$519,979**
ANNUAL O&M COSTS ALT. OU9-3A AND OU9-3B (YEARS 3-30)[7]							**--**	**--**	**$437,378**

Notes:

[1] For source information regarding unit pricing - refer to cost assumptions provided in Appendix G.

[2] Assume fencing will not be required following remedial action and would be maintained for Alternative OU9-2 only.

[3] Assume signage will not be required following remedial action and would be maintained for Alternative OU9-2 only.

[4] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface and fence/sign inspections with annual repairs, annual deed inspections and one annual report for all O&M activities

[5] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface and fence/sign inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities

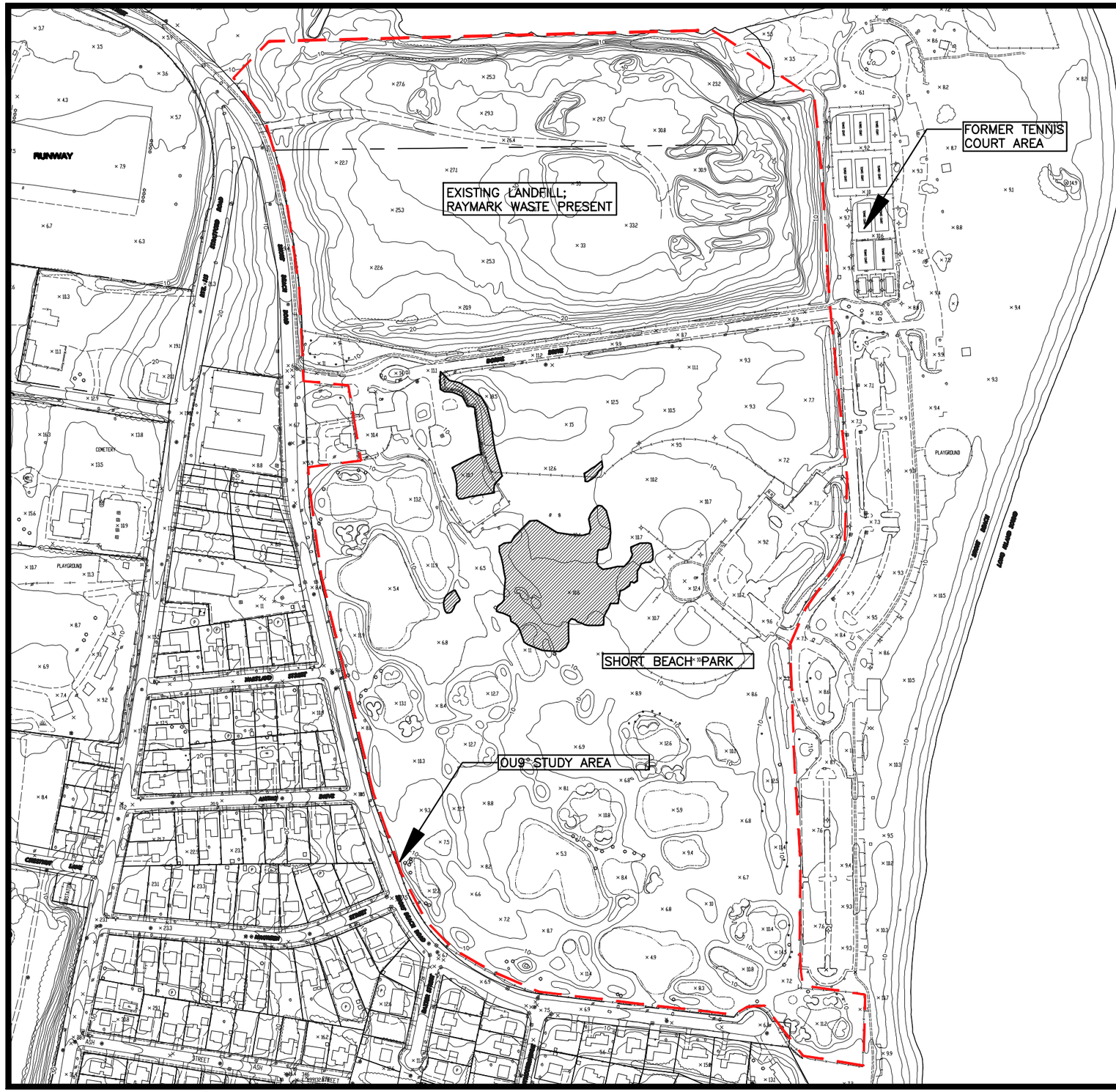
[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

COST ASSUMPTIONS
FOCUSED FEASIBILITY STUDY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		RATIONALE
General Assumptions		
The costs shown in these tables reflect those that would be expected for implementation of remedial actions at one property or property group at a time. Performing actions on more than one property or property group during the same mobilization could potentially result in cost savings.		
Other Costs presented in Section 7.0 of the cost estimate are based on recommended percentages contained in *A Guide to Developing and Documenting Cost Estimates During the Feasibility* (OSWER 9355.0-75), July 2000. Location adjustment based on value published in Means 2005 ER. Contingency line items based on typical values presented in OSWER 9355.0-75		
OU9 - STRATFORD LANDFILL & SHORE BEACH PARK		
Generally assumptions same as OU3's, but item number designations may have changed to accommodate fewer items used. Cost items specific to OU 9 are detailed below.		
2.0 Site Preparation		
2.2	Demolition and Disposal	Remove existing roadway - 1200 LF x 20 FT wide, 4-inch thick asphalt
		Remove two onsite structures - each 100 FT x 50 FT x 12 FT high; 8 inch thick walls
		Dispose of rubble in area to be capped.
2.3	Site Survey - Short Beach Park & Stratford LF	37 acres.
	Pre-construction topographic and boundary survey	Topo. Survey - conventional, use average of min. and max. [Means 2008 HC, 02 21 13.09 0020 & 0100]. Boundary survey - lot location and lines, maximum. Site/property boundaries, areas of Raymark Waste [Means 2008 HC, 02 21 13.13 0320]
		See OU9 FFS Cost Estimate Details
2.10	Site Survey - Airport Property	Topgraphic survey, conventional, min. [Means 2008 HC 02 21 13.09 0010]
2.11	Airport Property N.- Decontamination Facilities & Services	Equipment decontamination pads assumed assumed 20' x 40' in size with 6" gravel base, 60-mil high density polyethylene liner, and 4" crushed stone, graded to divert decontamination fluids into a water collection sump.
		See OU9 FFS Cost Estimate Details
3.0 Interim Construction Monitoring		
		Monitor storm water, air, and soil during remedial action implementation.
		Analyze 5 storm water samples for 6 months for various parameters (see OU3 details).
		Monitor air quality for 6 months.
		Analyze excavated sidewall/bottoms for metals, PCBs, and asbestos. ~300 samples (~25 ft on center for botton, 3 samples vertical per 25 Ft interval).
		See OU9 FFS Cost Estimate Details
4.0 Spread/Compact Raymark Waste		
4.5	Watering with 3,000 gallon Tank truck, per Pass	Assumes 4 acres per day, 4 passes, 120 days
4.6	Dust suppressant - tree resin	Assumes 1 application pre-construction, 1 application post-backfilling/compaction/grading.
4.8	Equipment/personnel decontaminantion - Short Beach Park	Equipment decontaminantion using 6HP steam cleaner, 3 HP water pump.
		Assume 2 hours per day operations & 1 maintenance/repair per month.
		Provision of personnel decontamination trailer with showers.
		Use 2 frac tanks to store clean and used water.
		1500 gallons per day water usage.
		See OU9 FFS Cost Estimate Details
4.16	Equipment/personnel decontaminantion - Airport Property N.	Assumes 10 days operation.

COST ASSUMPTIONS
FOCUSED FEASIBILITY STUDY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		RATIONALE
General Assumptions		
The costs shown in these tables reflect those that would be expected for implementation of remedial actions at one property or property group at a time. Performing actions on more than one property or property group during the same mobilization could potentially result in cost savings.		
Other Costs presented in Section 7.0 of the cost estimate are based on recommended percentages contained in *A Guide to Developing and Documenting Cost Estimates During the Feasibility* (OSWER 9355.0-75), July 2000. Location adjustment based on value published in Means 2005 ER. Contingency line items based on typical values presented in OSWER 9355.0-75		
OU9 - STRATFORD LANDFILL & SHORE BEACH PARK		
Generally assumptions same as OU3's, but item number designations may have changed to accommodate fewer items used. Cost items specific to OU 9 are detailed below.		
5.0 Construct Low-Permeability Cap		
5.11	As-built survey	Post construction. Topographic survey, conventional, average of min. and max. [Means 2008 HC, 02 21 13.09 0020 & 0100]
	Interim-construction topo survey	Post excavation. Topographic survey, conventional, average of min. and max. [Means 2008 HC, 02 21 13.09 0020 & 0100]
	As constructed survey	Post construction. Topographic survey, conventional, average of min. and max. [Means 2008 HC, 02 21 13.09 0020 & 0100]
		See OU9 FFS Cost Estimate Details
5.12	Build Replacement Dorne Drive	Fine grading, compaction, import and placement of 4 inches gravel, 3 inch binding course, and 3 inches wearing course.
6.0 Well Replacement/Installation		
		Assume 15 wells, at $5000 each. Installed on finished landfill, and downgradient locations in Short Beach Park (2008)
6.0 Wetlands & Floodplains Mitigation		
6.1	Purchase land for Flood Storage Mitigation	Based on TtNUS 2006 OU6 FS report cost assumptions - not required for OU9
6.2	Flood storage mitigation	Based on TtNUS 2006 OU6 FS report cost assumptions.
6.3	Purchase land for Wetlands Mitigation	Based on TtNUS 2006 OU6 FS report cost assumptions - not required for OU9
6.4	Construct compensatory wetlands	Based on TtNUS 2006 OU6 FS report cost assumptions - assume 25,000 SF (0.57 acre) at a lump sum of $110,815.



GENERAL LEGEND

EXISTING	PROPOSED	DESCRIPTION
10		CONTOUR
		EXISTING RAYMARK WASTE

GRAPHIC SCALE

0 150' 300' 600'

Nobis

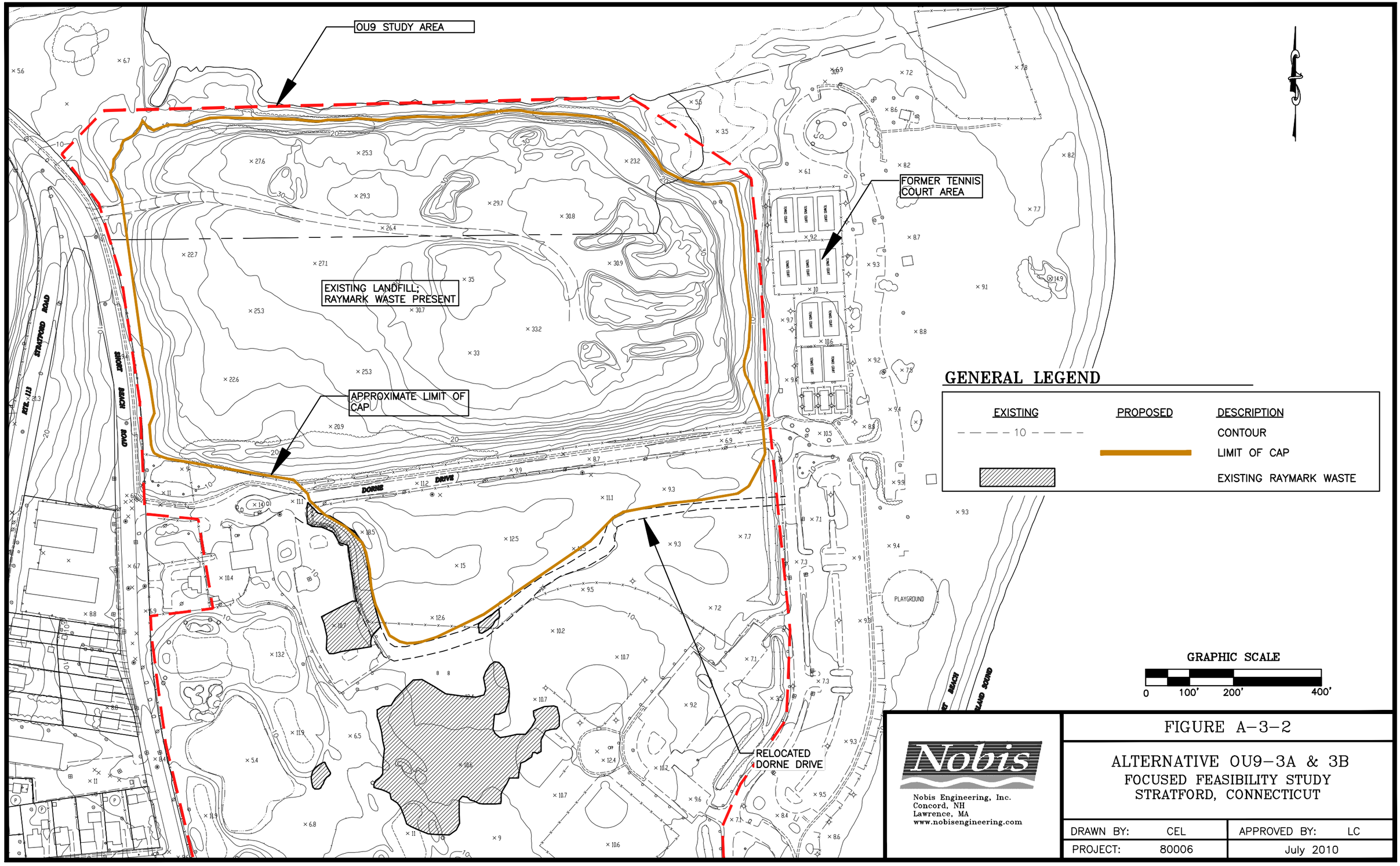
Nobis Engineering, Inc.
Concord, NH
Lawrence, MA
www.nobisengineering.com

FIGURE A-3-1

OU9 STUDY AREA
FOCUSED FEASIBILITY STUDY
STRATFORD, CONNECTICUT

DRAWN BY:	CEL	APPROVED BY:	LC
PROJECT:	80006	July 2010	

K:\80000 Task Orders\80006 Raymark\Raymark CAD\FS Figures\Final_FS\FS-OU9.dwg


OU9 STUDY AREA
FORMER TENNIS COURT AREA
EXISTING LANDFILL; RAYMARK WASTE PRESENT
APPROXIMATE LIMIT OF CAP
RELOCATED DORNE DRIVE
PLAYGROUND
DORNE DRIVE
SHORT BEACH ROAD
STRATFORD ROAD
RTE. 113
GENERAL LEGEND
EXISTING
PROPOSED
DESCRIPTION
10
CONTOUR
LIMIT OF CAP
EXISTING RAYMARK WASTE
GRAPHIC SCALE
0
100'
200'
400'
Nobis
Nobis Engineering, Inc.
Concord, NH
Lawrence, MA
www.nobisengineering.com
FIGURE A-3-2
ALTERNATIVE OU9-3A & 3B
FOCUSED FEASIBILITY STUDY
STRATFORD, CONNECTICUT
DRAWN BY: CEL
APPROVED BY: LC
PROJECT: 80006
July 2010

APPENDIX B

GENERAL DESCRIPTION OF THE POTENTIAL REMEDIAL ALTERNATIVES

APPENDIX B

GENERAL DESCRIPTION OF POTENTIAL REMEDIAL ALTERNATIVES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Alternative 1 – No Action

- No actions taken to address Raymark waste at the property.
- Five-year reviews.
- No groundwater monitoring.

Alternative 2 – Restrictions with Long-Term Monitoring

- No on-site actions taken to address Raymark waste at the property
- Institutional controls placed on property to prohibit excavation, groundwater use, and any activity that might result in direct contact with Raymark waste.
- Fencing and signage installed around Raymark waste area to discourage access.
- Monitoring well installations.
- Quarterly groundwater monitoring for two years, annual groundwater monitoring thereafter.
- Annual inspections to verify effectiveness of institutional controls.
- Annual reporting to document groundwater sampling results and compliance with institutional controls.
- Five-year reviews.

Alternative 3 – Low Permeability Cap with In-Town Disposal

- Excavate Raymark waste to facilitate construction of a low permeability cap over Raymark waste area on the property to prevent direct contact with Raymark waste contaminants.
- Excavated Raymark waste transported to an in-Town consolidation unit.
- Institutional controls placed on the property to prohibit activities that would compromise the integrity of the cap.

- Monthly cap inspections to verify integrity of cap.
- Periodic maintenance of cap to ensure its effectiveness.
- Monitoring well installations.
- Quarterly groundwater monitoring for two years, annual groundwater monitoring thereafter.
- Annual inspections to verify effectiveness of institutional controls.
- Annual reporting to document groundwater sampling results, compliance with institutional controls, and.cap inspection/repair activities.
- Five-year reviews.

Alternative 4 – Low Permeability Cap with Out-of-Town Disposal

- Excavate Raymark waste to facilitate construction of a low permeability cap over Raymark waste area on the property to prevent direct contact with Raymark waste contaminants.
- Excavated Raymark waste transported to an out-of-Town disposal facility.
- Institutional controls placed on the property to prohibit activities that would compromise the integrity of the cap.
- Monthly cap inspections to verify integrity of cap.
- Periodic maintenance of cap to ensure its effectiveness.
- Monitoring well installations.
- Quarterly groundwater monitoring for two years, annual groundwater monitoring thereafter.
- Annual inspections to verify effectiveness of institutional controls.
- Annual reporting to document groundwater sampling results, compliance with institutional controls, and.cap inspection/repair activities.
- Five-year reviews.

Alternative 5 – Excavation to Water Table with In-Town Disposal

- Excavate Raymark waste to the depth of the seasonal high water table on the property (complete removal of Raymark waste would occur on eight of the properties).
- Excavated Raymark waste transported to an in-Town consolidation unit.
- Backfill Raymark waste excavations with clean fill.
- Monitoring well installations.

- If Raymark waste is left in place below the water table:
  - Institutional controls placed on the property to prohibit groundwater use and activities that would enable contact with Raymark waste contaminants.
  - Annual inspections to verify effectiveness of institutional controls.
  - Quarterly groundwater monitoring for two years, after which groundwater monitoring may no longer be required.
  - Annual reporting to document compliance with institutional controls and report groundwater sampling results.
- If no Raymark waste left in place (complete removal of Raymark waste):
  - No institutional controls required.
  - Quarterly groundwater monitoring for two years, then no further groundwater monitoring may be required.
- Five-year reviews.

<u>Alternative 6 – Excavation to Water Table with Out-of-Town Disposal</u>

- Excavate Raymark waste to the depth of the seasonal high water table on the property (complete removal of Raymark waste would occur on eight of the properties).
- Excavated Raymark waste transported to an out-of-Town disposal facility.
- Backfill Raymark waste excavations with clean fill.
- Monitoring well installations.
- If Raymark waste is left in place below the water table:
  - Institutional controls placed on the property to prohibit groundwater use and activities that would enable contact with Raymark waste contaminants.
  - Annual inspections to verify effectiveness of institutional controls
  - Quarterly groundwater monitoring for two years, after which groundwater monitoring may no longer be required.
  - Annual reporting to document compliance with institutional controls and report groundwater sampling results.
- If no Raymark waste left in place (complete removal of Raymark waste):
  - No institutional controls required.
  - Quarterly groundwater monitoring for two years, then no further groundwater monitoring maybe required.
- Five-year reviews.

Alternative 7 – Excavation to Either 2 Feet or 4 Feet with In-Town Disposal

- Excavate Raymark waste to two feet below ground surface in paved areas, and to four feet below ground surface in unpaved areas.
- Excavated Raymark waste transported to an in-Town consolidation unit.
- Backfill Raymark waste excavations with clean fill, and repave as necessary.
- Institutional controls placed on the property to prohibit groundwater use and activities that would enable contact with Raymark waste contaminants.
- Annual inspections to verify effectiveness of institutional controls
- Quarterly groundwater monitoring for two years, annual groundwater monitoring thereafter.
- Annual reporting to document groundwater sampling results, compliance with institutional controls, and.cover inspection/repair activities.
- If no Raymark waste left in place (complete removal of Raymark waste):
  - No institutional controls required.
  - Quarterly groundwater monitoring for two years, then no further groundwater monitoring may be required.
- Five-year reviews.

Alternative 8 – Excavation to 2 Feet or 4 Feet with Out-of-Town Disposal

- Excavate Raymark waste to two feet below ground surface in paved areas, and to four feet below ground surface in unpaved areas.
- Excavated Raymark waste transported to an out-of-Town disposal facility.
- Backfill Raymark waste excavations with clean fill and repave as necessary..
- Institutional controls placed on the property to prohibit groundwater use and activities that would enable contact with Raymark waste contaminants.
- Annual inspections to verify effectiveness of institutional controls.
- Quarterly groundwater monitoring for two years, annual groundwater monitoring thereafter.
- Annual reporting to document groundwater sampling results, compliance with institutional controls, and.cover inspection/repair activities.
- If no Raymark waste left in place (complete removal of Raymark waste):

    - No institutional controls required.
    - Quarterly groundwater monitoring for two years, then no further groundwater monitoring may be required.
- Five-year reviews.

Alternative 9 – Excavation to 4 Feet with In-Town Disposal

- Excavate Raymark waste to 4 feet below ground surface (complete removal of Raymark waste would occur on eight of the properties).
- Excavated Raymark waste transported to an in-Town consolidation unit.
- Backfill Raymark waste excavations with clean fill, and repave as necessary.
- Institutional controls placed on the property to prohibit groundwater use and activities that would enable contact with Raymark waste contaminants.
- Annual inspections to verify effectiveness of institutional controls
- Quarterly groundwater monitoring for two years, annual groundwater monitoring thereafter.
- Annual reporting to document compliance with institutional controls and report groundwater sampling results.
- If no Raymark waste left in place (complete removal of Raymark waste):
    - No institutional controls required.
    - Quarterly groundwater monitoring for two years, then no further groundwater monitoring may be required.
- Five Year Reviews.

Alternative 10 – Excavation to 4 Feet with Out-of-Town Disposal

- Excavate Raymark waste to 4 feet below ground surface (complete removal of Raymark waste would occur on eight of the properties).
- Excavated Raymark waste transported to an out-of-Town disposal facility.
- Backfill Raymark waste excavations with clean fill and repave as necessary.
- Institutional controls placed on the property to prohibit groundwater use and activities that would enable contact with Raymark waste contaminants.
- Annual inspections to verify effectiveness of institutional controls.
- Quarterly groundwater monitoring for two years, annual groundwater monitoring thereafter.

- Annual reporting to document compliance with institutional controls and report groundwater sampling results.
- If no Raymark waste left in place (complete removal of Raymark waste):
  - No institutional controls required.
  - Quarterly groundwater monitoring for two years, then no further groundwater monitoring may be required.
- Five-year reviews.

APPENDIX C

SUMMARY OF POTENTIAL ARARS AND TBCS

Appendix C
Table A
Summary of ARARs and TBCs for All Alternatives
Raymark Industries Superfund Site
Stratford, Connecticut

AUTHORITY	REQUIREMENT	REQUIREMENT SYNOPSIS	CONSIDERATION
CHEMICAL-SPECIFIC ARARS			
State Regulatory Requirements	Connecticut Remediation Standard Regulations (22a-133k, Appendices A and B)	These regulations establish numeric direct exposure (DEC) and pollutant mobility (PMC) criteria for cleanup of soils.	Contaminated soil within the Raymark waste footprint exceeding the DEC and PMC values will be managed according to the RSR regulations by excavation and off-property disposal, land use restrictions, and/or construction of an engineered control (capping).
Criteria, Advisories, and Guidance	Toxic Substances Control Act (TSCA) PCB Spill Clean-up Policy (40 CFR 761.120-135)	This policy applies to recent PCB spills and establishes clean-up levels for PCB spills of 50 ppm or greater at 10 ppm for non-restricted access areas and 25 ppm for restricted access areas.	This document will be considered in responding to new and historical PCB spills.
	EPA Guidance on Remedial Actions for Superfund Sites with PCB Contamination (EPA/540/G-90/007)	This document describes the recommended approach for developing remediation goals and selecting remedies at Superfund sites with PCB contamination.	This document will be used as guidance for the development and selection of remedial alternatives.
	EPA Risk Reference Doses (RfDs)	RfDs are dose levels developed by EPA for use in estimating the non-carcinogenic effects of exposure to toxic substances.	EPA RfDs were used to assess health risks due to exposure to noncarcinogenic contaminants present at the site.
	Cancer Slope Factors (CSFs)	Guidance values used to evaluate the potential carcinogenic risk caused by exposure to contaminants.	CSFs were used to evaluate health risks associated with site-related contaminants.
Federal Regulatory Requirements	Fish and Wildlife Coordination Act (16 USC 661 et seq.; 50 CFR Parts 81, 226, 402)	This Act protects fish and wildlife when federal actions result in the control or structural modification of a natural stream of body of water.	Alternatives that involve actions that might impact fish and wildlife will require consultation with the Fish and Wildlife Service to develop appropriate measures to protect resources.

Table A
Summary of ARARs and TBCs for All Alternatives
Raymark Industries Superfund Site
Stratford, Connecticut

AUTHORITY	REQUIREMENT	REQUIREMENT SYNOPSIS	CONSIDERATION
Federal Regulatory Requirements (cont.)	National Historic Preservation Act (NHPA) (16 U.S.C. 470)	Pursuant to Sections 106 and 110(f) of the NHPA, as amended, CERCLA response actions are required to take into account the effects of the response activities on any historic property included or eligible for inclusion on the National Register of Historic Places.	Prior to any excavation or disturbance of soil or a structure, a review of potential impacts to historic structures or sites will be conducted. If any such impacts are identified, the substantive provisions of this ARAR will be complied with.
State Regulatory Requirements	Connecticut Coastal Management Act (Sec. 22a-92, 93, 94, 98 and 100)	This statute establishes Connecticut's enforceable coastal zone policies in accordance with the federal Coastal Zone Management Act.	Activities performed in coastal areas, particularly in wetlands and floodplains, will conform to the substantive provisions of the enforceable coastal zone policies.
ACTION-SPECIFIC ARARS			
Federal Regulatory Requirements	TSCA - PCB Storage, Capping and Disposal (40 CFR 761.61 (c))	These regulations establish standards for the storage, decontamination, capping, and response to PCB remediation waste.	The storage and response to PCB contaminated soil will be conducted with approval by the Regional Administrator pursuant to TSCA's risk-based approval provisions.
	CAA National Emission Standards for Hazardous Air Pollutants (NESHAPS) (40 CFR 61 – Subpart M; 61.150 and 61.151)	These regulations specify requirements regarding removal, management, and disposal of asbestos.	Handling, treatment, and disposal of soils containing asbestos will comply with the substantive provisions of these regulations. The removal and handling of asbestos will be managed through air monitoring and best management practices.
	Clean Water Act NPDES Regulations (Stormwater Discharges) (40 CFR 122.26(c)(ii)(C))	Discharges of stormwater associated with construction activities are required to implement measures, including best management practices, to control pollutants in stormwater discharges during and after construction activities.	Alternatives involving remedial construction will be designed and implemented to comply with the substantive provisions of the cited requirements and/or the requirements of the construction general permit for stormwater, such as best management practices.

Table A
Summary of ARARs and TBCs for All Alternatives
Raymark Industries Superfund Site
Stratford, Connecticut

AUTHORITY	REQUIREMENT	REQUIREMENT SYNOPSIS	CONSIDERATION
ACTION-SPECIFIC ARARS (CONTINUED)			
State Regulatory Requirements	Hazardous Waste Management: Generator & Handler Requirements – General Standards, Listing, and Identification (RCSA 22a-449(c)100-101)	These sections establish standards for listing and identification of hazardous waste. The standards of 40 CFR 260-261 are incorporated by reference.	Wastes that are generated during implementation of an alternative (i.e. excavated Raymark waste) will undergo testing for RCRA characteristics to determine the appropriate waste classification and disposal options.
	Hazardous Waste Management: Generator Standards (RCSA 22a-449(c)102)	This section establishes standards for various classes of generators. The standards of 40 CFR 262 are incorporated by reference. Storage requirements given at 40 CFR 265.15 are also included.	On-site storage of wastes determined to be RCRA hazardous (listed or characteristic) will comply with the substantive provisions of these requirements, including storage requirements.
	Connecticut Air Pollution Regulations – Fugitive Dust Emissions (Sec. 22a-174-18)	Requires that reasonable precautions be taken to prevent particulate matter from becoming airborne during demolition and construction activities and material handling operations.	Activities involving soil excavation or handling and cap construction will be conducted in a manner to minimize fugitive dust emissions. Air monitoring and best engineering practices will be employed to minimize fugitive dust emissions.
State Regulatory Requirements (cont.)	Control of Noise (RSCA Section 22a-69-1 to 69-7.4)	These Regulations establish allowable noise levels.	All remedial construction activities will comply with the substantive requirements of these regulations.
	CT Guidelines for Soil Erosion and Sediment Control (May 2002) (adopted pursuant to CGS 22a-328)	The Guidelines provide technical and administrative guidance for the development, adoption, and implementation of erosion and sediment control programs.	Remedial construction (for example soil excavation) will be designed and implemented to comply with the substantive provisions of these Guidelines by use of best management practices such as hay bales and silt fences.

Appendix C
Table B
ARAR Add-Ons for Remedial Actions Occurring In Wetlands
Raymark Industries Superfund Site
Stratford, Connecticut
Page 1 of 2

AUTHORITY	REQUIREMENT	REQUIREMENT SYNOPSIS	CONSIDERATION
LOCATION-SPECIFIC ARARS			
Federal Regulatory Requirements	Executive Order 11990 - Protection of Wetlands (40 CFR 6.302(a) and 40 CFR 6, App. A)	Federal agencies are required to minimize the destruction, loss, or degradation of wetlands, and the Order emphasizes the importance of avoiding harm to wetlands unless there is no practicable alternative to such construction.	Any alternative that includes activities within wetland areas that might result in the destruction, loss, or degradation of wetlands will need to comply with this order. EPA will seek public comment in the Proposed Plan regarding wetlands impacts. The Region will need to make a finding that there is no practical alternative to the selected remedy and that the selected remedy is the least environmentally damaging practical alternative.
	Federal Clean Water Act (CWA) Regulations governing dredge and fill activities in wetlands – Section 404. (33 USC 1344) (40 CFR 230) (33 CFR 320-323) (33 CFR 332)	Discharge of dredged or fill material is prohibited to wetlands or other US waters if there is a practical alternative which would have less adverse impact to the aquatic ecosystem, as long as the alternative does not have other significant impacts.	Design of excavation, capping, and/or consolidation alternatives will need to consider potential for disturbance of wetlands, and mitigate these disturbances accordingly. If there is no practicable alternative to disturbing wetlands, compensatory measures will be required.
State Regulatory Requirements	Tidal Wetlands Act and Regulations (CGS 22a-28 through 35) (RCSA 22a-30-2, 10, and 11)	Regulates activities that are conducted within the tidal wetlands of the State. Establishes permitting, approval, and restoration procedures for work conducted within tidal wetlands.	Any work conducted within tidal wetlands (i.e. excavation, removal of soil, filling) will be subject to compliance with the substantive provisions of these regulations.
	Connecticut Inland Wetlands and Watercourses Act and Regulations (CGS 22a-36 to 22a-45) (RCSA 22a-39-1 to 15)	Regulates activities that are conducted within inland wetlands and surface water bodies.	Any work conducted within inland wetlands or in rivers, streams, or ponds will be subject to compliance with the substantive provisions of these regulations.

Table B (Cont.)
ARAR Add-Ons for Remedial Actions Occurring In Wetlands
Raymark Industries Superfund Site
Stratford, Connecticut

AUTHORITY	REQUIREMENT	REQUIREMENT SYNOPSIS	CONSIDERATION
LOCATION-SPECIFIC ARARS			
State Regulatory Requirements (cont.)	Regulation of Dredging and Placement of Fill in Tidal, Coastal or Navigable Waters: (CGS 22a-359-363f)	This statute regulates dredging, the erection of structures, and placement of fill in tidal, coastal, or navigable waters waterward of the high tide line.	Any work conducted within tidal areas (i.e. excavation, removal of soil, filling) will be subject to compliance with the substantive provisions of these regulations.
Criteria, Advisories, and Guidance	USEPA Memorandum, "Policy on Floodplains and Wetland Assessments for CERCLA Actions" (August 6, 1985)	This memorandum details situations that would require preparation of floodplains or wetlands assessments and the factors which should be considered in preparing an assessment for actions taken under Section 104 or 106 of CERCLA.	Design of excavation and/or capping alternatives will need to consider the potential for disturbance of wetlands within or adjacent to Raymark waste areas, and mitigate any disturbance accordingly. EPA has delineated the wetlands on the OU6 properties. EPA will conduct further detailed assessments of wetland impacts, as necessary, as part of pre-design studies.

Appendix C
Table C
ARAR Add-Ons for Remedial Actions Occurring In Floodplains
Raymark Industries Superfund Site
Stratford, Connecticut

AUTHORITY	REQUIREMENT	REQUIREMENT SYNOPSIS	CONSIDERATION
LOCATION-SPECIFIC ARARS			
Federal Regulatory Requirements	Executive Order 11988 - Floodplain Management (40 CFR 6.302(b) and 40 CFR 6, App. A)	Federal agencies are required to avoid impacts associated with the occupancy and modification of a floodplain and avoid floodplain development wherever there is a practicable alternative.	Any alternative that includes activities within floodplain areas that might result in the occupancy or modification of the floodplain will need to comply with this order. Compensatory flood storage will be provided if necessary. EPA will seek public comment in the Proposed Plan regarding floodplain impacts.
	RCRA Floodplain Restrictions for Hazardous Waste Facilities (40 CFR 264.18(b))	A hazardous waste cap located in a 100-year floodplain must be designed, constructed, operated, and maintained to prevent washout or to result in no adverse effects on human health or the environment if washout were to occur.	Any caps of Raymark Waste located in a floodplain will be designed to prevent washouts or the accidental transport of contaminated media into floodplain areas.
State Regulatory Requirements	Flood Management Act and Regulations (CGS 2568d) (RCSA 25-68h-1 to 3)	These regulations govern activities in flood plains to minimize flood risk and prevent flood hazards. The regulations also contain stormwater management standards.	Any work in floodplains will comply with the substantive provisions of the regulations. Compensatory flood storage will be provided if necessary. Stormwater will be managed using best management practices such as hay bales and silt fences.
Criteria, Advisories, and Guidance	USEPA Memorandum, "Policy on Floodplains and Wetland Assessments for CERCLA Actions" (August 6, 1985)	This memorandum details situations that require preparation of floodplains or wetlands assessments and the factors which should be considered in preparing an assessment for actions taken under Section 104 or 106 of CERCLA.	Design of excavation and/or capping alternatives will need to consider the potential for disturbance of floodplains within or adjacent to Raymark waste areas, and mitigate any disturbance accordingly. EPA has delineated the floodplains on the OU6 properties. EPA will conduct further detailed assessments of floodplain impacts, as necessary, as part of pre-design studies.

Appendix C
Table D
ARAR Add-Ons for Remedial Actions Including Low-Permeability Caps
Raymark Industries Superfund Site
Stratford, Connecticut

AUTHORITY	REQUIREMENT	REQUIREMENT SYNOPSIS	CONSIDERATION
ACTION-SPECIFIC ARARS			
Federal Regulatory Requirements	RCRA Hazardous Waste Management: TSDF Standards 40 CFR Sections 264.19, 95, 96(a), 96(c), 97, 98, 99, 111, 114, 117, and 310. (Note that RCSA 22a-449(c)104 refers to the federal RCRA Regulations)	These sections establish standards for capping of hazardous substances. Specifically, they establish standards for a construction quality assurance program, groundwater monitoring, and closure/post-closure.	The construction and design of any cap of hazardous substances will comply with the substantive provisions of these requirements. Post-construction groundwater monitoring of the cap will also be conducted to comply with the substantive requirements.
	Connecticut Remediation Standard Regulations (22a-133k-2(f)(2)(B)(i-iv)	These provisions provide standards for the use of an engineered control (i.e., a cap) to cover polluted soils.	Any low-permeable cap will meet the substantive requirements of this provision.
Criteria, Advisories, and Guidance	Technical Memorandum: Revised Landfill Cap Design Guidance Proposed for Unlined Hazardous Waste Landfills in EPA Region 1 (February 5, 2001).	Provides guidance for landfill cap design for unlined hazardous waste landfills at Superfund sites in EPA Region 1.	Remedial alternatives involving on-property capping will consider this guidance during the design.
	EPA Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments (EPA/530-SW-89-047)	Presents technical specifications for the design of multi-barrier covers at landfills at which hazardous wastes are disposed.	Remedial alternatives involving on-property capping will consider this guidance during the design.

Appendix C
Table E
ARAR Add-Ons for Remedial Actions Including Corrective Action Management Units (Camus)
Raymark Industries Superfund Site
Stratford, Connecticut

AUTHORITY	REQUIREMENT	REQUIREMENT SYNOPSIS	CONSIDERATION
ACTION-SPECIFIC ARARS			
Federal Regulatory Requirements	RCRA Hazardous Waste Management, CAMU Standards: 40 CFR Section 264.552 (Note that RSCA 22a-449(c)104 refers to the federal RCRA Regulations.)	The CAMU provisions establish standards for the design of CAMUs and treatment of CAMU-eligible waste consolidated into a CAMU. CAMUs require liners and leachate collection unless the Regional Administrator approves alternative requirements. CAMU-eligible waste that would otherwise require treatment under the RCRA Land Disposal Restrictions and that contains "principal hazardous constituents" must be treated according to certain CAMU treatment standards. The Regional Administrator may adjust such treatment standards.	Any remediation waste containing principal hazardous constituents will be sent off-site for treatment and disposal at an out-of-Town location and not consolidated into the CAMU.
State Regulatory Requirements	Connecticut Remediation Standard Regulations (22a-133k-2(f)(2)(B)(i-iv)	These provisions provide standards for the use of an engineered control (i.e., a cap) to cover polluted soils.	Any CAMU cap will meet the substantive requirements of this provision.
Criteria, Advisories, and Guidance	Technical Memorandum: Revised Landfill Cap Design Guidance Proposed for Unlined Hazardous Waste Landfills in EPA Region 1 (February 5, 2001).	Provides guidance for landfill cap design for unlined hazardous waste landfills at Superfund sites in EPA Region 1.	This guidance will be considered during the design of the CAMU cap.
	EPA Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments (EPA/530-SW-89-047)	Presents technical specifications for the design of multi-barrier covers at landfills at which hazardous wastes are disposed.	This guidance will be considered during the design of the CAMU cap.

APPENDIX D

DEVELOPMENT OF VOLUME ESTIMATES

APPENDIX D

RAYMARK WASTE VOLUME ESTIMATE PROCEDURES FOR OU6
RAYMARK INDUSTRIES SUPERFUND SITE
STRATFORD, CONNECTICUT

Preliminary estimates of Raymark waste were made for each of the 24 properties that are part of the OU6 Feasibility Study. Adjacent properties were combined into property groups where prior disposal of Raymark waste may have spanned property lines. As a result, Raymark waste preliminary volume estimates were made using historical sampling data and GIS maps of 15 property groups. The 24 properties were organized into 15 **property groups** as follows for the purpose of estimating Raymark waste volumes:

1. Lockwood Avenue Property

2. 200 Ferry Boulevard

<u>Ferry Boulevard Properties</u>
3. 230 Ferry Boulevard
4. 250 Ferry Boulevard
5. 280 Ferry Boulevard
6. 300 Ferry Boulevard

<u>Ferry Creek Elbow Properties</u>
7. Lot Behind 326 Ferry Boulevard
8. Vacant Lot at Housatonic Avenue
9. 326 Ferry Boulevard

<u>Morgan Francis Properties</u>
10. 576 East Broadway
11. 600 East Broadway
12. Vacant DOT Lot Abutting I-95
13. Connecticut Right-of-Way

<u>East Main Street Properties</u>
14. 250 East Main Street
15. 304 East Main Street
16. 340 East Main Street
17. 380 East Main Street

<u>Frog Pond Road Properties</u>
18. 251 East Main Street
19. DPW Lot

<u>Beacon Point Properties</u>
20. 1 Beacon Point Road
21. Beacon Point Area
22. Airport Property North of Marine Basin
23. Wooster Park
24. Third Avenue Property

The procedure for making preliminary estimates of the volume of Raymark waste at each property involves two major steps: estimating the lateral extent (surface area) of Raymark waste on each propery/property group and estimating the average thickness of Raymark waste at each property/property group. Once estimated, these two values are multiplied to develop a preliminary volume estimate.

A description of the rationale and assumptions that were made to estimate each of these values is presented in the following pages along with some of the limitations of the procedures used.

Estimating the Lateral Extent of Raymark Waste

Drawing the Assumed Lateral Extent Line

The following procedures are used to draw the line depicting the assumed lateral extent of Raymark waste:

1. Assemble all of the soil sample analytical data that is available from the property/properties of interest.

2. Query the database to display soil sampling data for Raymark waste constituents (lead, chrysotile asbestos, Aroclor-1268, and copper).

3. Evaluate the analytical data for each soil sample to determine for which sample locations the Raymark waste definition is met.

4. On a map of the property of interest depicting every sample location for which data is available, mark those sample locations at which Raymark waste is present (from Step 3).

5. At each sample location containing Raymark waste, measure the halfway point between the location and any adjacent sample locations that do not contain Raymark waste. Mark this point with a dot.

6. After all of the halfway points have been marked, use judgment to connect the midpoints and develop an assumed limit to Raymark waste for the property.

7. Draw preliminary Raymark waste limits without regard to on-site buildings. After preliminary lines are drawn, subtract out building footprints by redrawing Raymark waste lines around the perimeter of each building so as to exclude the area beneath the building.

Limitations

The following are a few of the limitations of the method used to draw the lateral extent line. This is not a comprehensive list of limitations.

1. Assuming that all data is valid and complete, the accuracy of lateral extent lines is partially a function of the density of sample points on a particular property. The existence of a sparse or irregular distribution of sample points will tend to assign greater significance to these sample points over other points that are located within an area that is densely populated with sample points.

2. Soil samples were evaluated without regard to the depth from which the soil sample was collected. If a certain soil sampling location (i.e. soil boring or surface soil sample) contained Raymark waste, then it was assumed that the column of soil between the ground surface and the seasonal high water table at that location (and in the area influenced by that sample location) also contained Raymark waste. This will tend to overestimate the volume of Raymark waste present.

3. If a particular soil sample did not meet the definition of Raymark waste, even if the reason it did not meet the definition was that all constituents were not analyzed for, then it was not considered Raymark waste. This is consistent with the OU6 RI process. This limitation has ramifications for future estimates of Raymark waste or actual measurements of Raymark waste during implementation of a remedial action. First, if a soil sample satisfies two of the three Raymark waste criteria, but no data exists to determine whether it satisfies the third criteria, the soil sample was **not** considered to be Raymark waste. Second, if a soil sample did not satisfy the criteria for Raymark waste, but came close (i.e. lead=390 ppm), it was **not** considered Raymark waste. Each of these scenarios represents a case where it is possible that future analysis of soil samples from this area would qualify as Raymark waste. Therefore, sample locations where these cases apply should be expected to have a larger margin of error between the preliminary volume calculated by this method and the actual volume if measured in the field.

Calculating the Assumed Surface Area of Raymark Waste

Once the assumed lateral extent line has been drawn onto a map of the property/property group, AutoCAD is used to measure the surface area of Raymark waste. The surface area takeoffs are presented on a table for each property, which is included on the AutoCAD drawing for each property/property group. In most cases, only Raymark waste that is located within the property boundary is included in the total surface area for a particular property. In certain cases, where a soil sample containing Raymark waste was located near a property boundary, an area outside the property boundary was shown on the figure but the waste volume was not included in the total Raymark waste area for that property.

Estimating the Depth to Groundwater

In order to estimate the volume of Raymark waste present at each property (or property group), it is necessary to develop an estimate of the thickness of Raymark waste at each property group. For the purpose of this evaluation, the thickness of Raymark waste at each property group was assumed to be equivalent to the depth to the seasonal high water table at the property. Therefore, a method was developed to estimate the average depth to groundwater for each property group.

Depth to Groundwater Assumptions

Appendix E provides a detailed description of the methods used to estimate the depth to groundwater on each of the 24 OU6 properties.

Limitations

The following are a few of the limitations of the method used to estimate the depth to groundwater at individual property groups. This is not a comprehensive list of limitations.

1. The moisture condition of soils that are extracted from the ground through the advancement of soil borings is not always an accurate depiction of groundwater depth at that particular location.

2. Where properties are grouped (i.e. Ferry Boulevard Properties), observations from borings located throughout the entire property group were used and the average depth to groundwater was assumed to be uniform throughout the property group. Variations in topography over a property group make it likely that the depth to groundwater is not uniform over a property or property group, but the depth to groundwater that is estimated by this method is intended to be an average.

3. A high density of soil borings in one particular area may bias the estimate of depth to groundwater toward the depth to groundwater within this area. Since groundwater depth observations were taken from all available soil boring logs (even those that did not contain Raymark waste), it is possible that the average depth to groundwater determined through this method will be biased by a dense grouping of soil borings.

4. The average depth to groundwater determined by this method is not meant to be an absolute depth at any site location, nor is it meant to be used for the design of a remedial action. This method is intended only to aid in developing an estimate of Raymark waste volume that is located in the Town of Stratford so that preliminary cost estimates may be developed.

Presenting the Results

The property groups of interest for this evaluation (with assumed lateral extent lines) are depicted on Figures 4-1 through 4-18 of the FS. A summary of the soil boring moisture observations that were used to estimate the average depth to groundwater at each property group are included in Appendix E.

APPENDIX E

GROUNDWATER LEVELS

Appendix E
Raymark FS Depth to Groundwater Assumptions

In order to estimate the volume of Raymark waste that would be excavated and disposed or consolidated under Alternative 3/4 for each property (or property group), it was necessary to develop an estimate of the depth to the ***seasonal high*** water table at each property group. Historical groundwater depth observations from field investigations at Raymark were used to estimate the seasonal high water table depth.

On property groups where groundwater table depth measurements were available from permanent monitoring wells, this data was used as an estimate of the depth to groundwater at that property group.

On properties where there are no groundwater table depth measurements from permanent monitoring wells, estimates of the depth to groundwater at each property group were developed from moisture observations that were made during the advancement of soil borings on that property group. Historical soil boring logs from each property group were reviewed, and an assumed depth to groundwater (based on the depth at which "wet" or "saturated" soils were first noted) was estimated for each soil boring. The estimated depths to groundwater from each soil boring were compiled onto tables (one table per property group) and the borings located within the Raymark waste footprint were highlighted. In general, the average depth to groundwater that was utilized to develop cost estimates for the implementation of Alternatives 3 and 4 was based on the ***average*** of the estimated depths to groundwater for all of the soil borings located within the Raymark waste footprint on that property group.

Since many of the field observations were taken during the summer months, the ***average*** depth to groundwater calculated from soil boring moisture observations was modified in certain cases to provide an estimate of the ***seasonal high*** groundwater table. Modifications to the average depth to groundwater were made based on professional judgment through evaluation of the time of year during which the moisture observations were made. Moisture observations from soil borings located outside the Raymark waste footprint were considered as well.

Soil boring logs have been completed at several different times throughout the history of investigations at Raymark. This evaluation includes soil moisture observations that were made during subsurface explorations conducted at various points in 1994, 1999, 2000, 2002, and 2003. For certain property groups, soil moisture observations from more than one year were used to estimate the depth to groundwater. While this method has obvious limitations, it should be noted that the depth to groundwater determined through this method was intended solely for the purpose of developing cost estimate for the FS (with an accuracy of +50%/-30%), and not as a basis for the design of a remedial action. The estimated depth to groundwater developed by this method is not a guarantee of actual conditions that may be encountered during future subsurface explorations.

The attached tables provide a summary of the soil boring moisture observations that were used to develop depth to groundwater estimates for each property group. Soil boring logs that did not mention moisture conditions (i.e. shallow soil borings at which groundwater was not encountered) are not included on these tables. A complete collection of soil boring logs may be found in Appendix B of the Remedial Investigation for OU6 (TtNUS, 2005).

SOIL BORING MOISTURE OBSERVATIONS
LOCKWOOD AVENUE PROPERTY
RAYMARK INDUSTRIES SUPERFUND SITE
STRATFORD, CONNECTICUT

Boring ID	Property	WL (ft bgs)	Date
B2-SB01	Lockwood Avenue Property	7	8/4/1997
B2-SB02*	Lockwood Avenue Property	8	8/1/1997
B2-SB03*	Lockwood Avenue Property	5	7/31/1997
B2-SB04	Lockwood Avenue Property	11	7/31/1997
B2-SB05*	Lockwood Avenue Property	7	7/30/1997
B2-SB06*	Lockwood Avenue Property	3	7/31/1997
B2-SB07*	Lockwood Avenue Property	7	7/30/1997
B2-SB08	Lockwood Avenue Property	8	8/12/1997
B2-SB09*	Lockwood Avenue Property	3	7/30/1997
DBL-101	Lockwood Avenue Property	1	8/14/2002
DBL-103	Lockwood Avenue Property	11	8/15/2002
DBL-104*	Lockwood Avenue Property	9	8/15/2002
DBL-105	Lockwood Avenue Property	1	8/15/2002
DBL-108	Lockwood Avenue Property	3	8/16/2002
DBL-109	Lockwood Avenue Property	3	8/16/2002
MW-312S*	Lockwood Avenue Property	4.7	4/15/2003

* = within Raymark waste footprint

ASSUME 4.5 FEET BASED ON MW-312S

SOIL BORING MOISTURE OBSERVATIONS
200 FERRY BOULEVARD
RAYMARK INDUSTRIES SUPERFUND SITE
STRATFORD, CONNECTICUT

Boring ID	Property	WL (ft bgs)	Date
FB200-101*	200 Ferry Boulevard	7	6/24/2002
FB200-102	200 Ferry Boulevard	8	6/24/2002
FB200-103	200 Ferry Boulevard	5	6/26/2002
FB200-105	200 Ferry Boulevard	9	6/26/2002
FB200-106	200 Ferry Boulevard	5	6/27/2002
SP-MW-113M	200 Ferry Boulevard	4.35	3/24/1999

* = within Raymark waste footprint

ASSUME 5.5 FEET BASED ON FB200-101 AND MW-113M

SOIL BORING MOISTURE OBSERVATIONS
230/250/280/300 FERRY BOULEVARD
RAYMARK INDUSTRIES SUPERFUND SITE
STRATFORD, CONNECTICUT

Boring ID	Property	WL (ft bgs)	Date
A2-SB02	230 Ferry Boulevard	7	7/17/1997
A2-SB04	230 Ferry Boulevard	4.5	8/11/1997
A2-SB04A*	230 Ferry Boulevard	9	8/12/1997
SPVM-101*	230 Ferry Boulevard	5	7/19/2002
SPVM-102*	230 Ferry Boulevard	5	7/19/2002
SPVM-103	230 Ferry Boulevard	5	7/19/2002
SPVM-104	230 Ferry Boulevard	5	7/19/2002
SPVM-105	230 Ferry Boulevard	3	7/19/2002
SPVM-106	230 Ferry Boulevard	5	7/19/2002
FBSWL-101*	230 Ferry Boulevard	5	8/5/2002
FBSWL-102*	230 Ferry Boulevard	3	8/5/2002
FBSWL-103*	230 Ferry Boulevard	3	8/5/2002
SPDPS-102	250 Ferry Boulevard	3	6/27/2002
A2-SB03*	280 Ferry Boulevard	7	7/18/1997
SPHM-103*	280 Ferry Boulevard	5	7/9/2002
SP-MW111S	300 Ferry Boulevard	6.9	3/24/1999
SPSC-101*	300 Ferry Boulevard	9	7/11/2002
SPSC-102*	300 Ferry Boulevard	9	7/17/2002
SPSC-103	300 Ferry Boulevard	3	7/11/2002
SPSC-104*	300 Ferry Boulevard	5	7/11/2002

* = within Raymark waste footprint

ASSUME 6.0 FEET BASED ON AVERAGE WITHIN RW FOOTPRINT

SOIL BORING MOISTURE OBSERVATIONS
LOT BEHIND 326 FERRY BOULEVARD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES SUPERFUND SITE
STRATFORD, CONNECTICUT

Boring ID	Property	WL (ft bgs)	Date
SP-MW110S	Lot Behind 326 Ferry Boulevard	9.3	4/15/2003
A3-SB01*	Lot Behind 326 Ferry Boulevard	7.3	8/5/1997
SPBG2-101	Lot Behind 326 Ferry Boulevard	7	7/29/2002
SPBG2-102*	Lot Behind 326 Ferry Boulevard	7	7/29/2002
SPBG2-103*	Lot Behind 326 Ferry Boulevard	7	7/29/2002
SPBG2-104*	Lot Behind 326 Ferry Boulevard	5	7/29/2002
SPBG2-105*	Lot Behind 326 Ferry Boulevard	5	7/29/2002
A3-SB02*	Vacant Lot Housatonic Avenue	10	8/5/1997
SPDA-101	Vacant Lot Housatonic Avenue	7	7/29/2002
SPDA-104*	Vacant Lot Housatonic Avenue	7	7/29/2002
		6.26	

* = within Raymark waste footprint

ASSUME 6.0 FEET BASED ON AVERAGE WITHIN RW FOOTPRINT

SOIL BORING MOISTURE OBSERVATIONS
326 FERRY BOULEVARD
RAYMARK INDUSTRIES SUPERFUND SITE
STRATFORD, CONNECTICUT

Boring ID	Property	WL (ft bgs)	Date
SPBG1-104	326 Ferry Boulevard	5	7/15/2002
SPBG1-105	326 Ferry Boulevard	4	7/15/2002
SPBG1-201*	326 Ferry Boulevard	5.5	5/12/2003
SPBG1-202	326 Ferry Boulevard	5	5/12/2003

* = within Raymark waste footprint

ASSUME 5.0 FEET BASED ON SPBG1-201

SOIL BORING MOISTURE OBSERVATIONS
576/600 EAST BROADWAY
RAYMARK INDUSTRIES SUPERFUND SITE
STRATFORD, CONNECTICUT

Boring ID	Property	WL (ft bgs)	Date
A1-SB03*	576 East Broadway	9	7/24/1997
A1-SB11*	576 East Broadway	6	7/18/1997
MF-SB5	576 East Broadway	6	3/31/1994
MF-SB6*	576 East Broadway	6	3/31/1994
PP-101*	576 East Broadway	7	7/12/2002
PP-102	576 East Broadway	7	7/16/2002
PP-103	576 East Broadway	8	7/17/2002
PP-104	576 East Broadway	7	7/17/2002
MF-MW101S*	600 East Broadway	4.8	4/15/2003
MF-MW102S*	600 East Broadway	6.1	4/15/2003
MF-MW103M*	600 East Broadway	4.0	4/15/2003
MF-MW104S	600 East Broadway	4.9	4/15/2003
MF-SB1	600 East Broadway	12	3/30/1994
MF-SB3	600 East Broadway	5	3/31/1994
MF-SB4*	600 East Broadway	7	3/31/1994
MF-SB7*	600 East Broadway	7	4/25/1994
MF-SB8	600 East Broadway	7	4/24/1994
MF-101	600 East Broadway	7	7/31/2002
MF-102	600 East Broadway	7	8/1/2002
MF-103	600 East Broadway	11	8/1/2002
MF-104*	600 East Broadway	7	8/2/2002
MF-105	600 East Broadway	9	8/2/2002
MF-106	600 East Broadway	7	8/1/2002

* = within Raymark waste footprint

ASSUME 6.0 FEET BASED ON AVERAGE WITHIN RW FOOTPRINT

SOIL BORING MOISTURE OBSERVATIONS
VACANT DOT LOT ABUTTING I-95
RAYMARK INDUSTRIES SUPERFUND SITE
STRATFORD, CONNECTICUT

Boring ID	Property	WL (ft bgs)	Date
MW-212S	Vacant Lot Abutting I-95	3.9	4/15/2003
VPA95-101	Vacant Lot Abutting I-95	8	7/25/2002
VPA95-104	Vacant Lot Abutting I-95	8	8/14/2002
VPA95-105*	Vacant Lot Abutting I-95	8	8/14/2002
VPA95-106*	Vacant Lot Abutting I-95	7	8/14/2002
VPA95-107*	Vacant Lot Abutting I-95	3	8/14/2002

* = within Raymark waste footprint

ASSUME 8.0 FEET BASED ON VPA95-105/106

SOIL BORING MOISTURE OBSERVATIONS
CONNECTICUT RIGHT-OF-WAY
RAYMARK INDUSTRIES SUPERFUND SITE
STRATFORD, CONNECTICUT

Boring ID	Property	WL (ft bgs)	Date
FBROW-101	CT Right-of-Way	7	7/30/2002
FBROW-102	CT Right-of-Way	9	7/31/2002
FBROW-103	CT Right-of-Way	9	7/31/2002
FBROW-104	CT Right-of-Way	5	7/31/2002
FBROW-105*	CT Right-of-Way	9	7/31/2002
A1-SB01	CT Right-of-Way	4.7	7/22/1997
A1-SB02	CT Right-of-Way	8	7/22/1997

* = within Raymark waste footprint

ASSUME 10.0 FEET BASED ON FBROW-105

SOIL BORING MOISTURE OBSERVATIONS
250/304/340 EAST MAIN STREET PROPERTIES
RAYMARK INDUSTRIES SUPERFUND SITE
STRATFORD, CONNECTICUT

Boring ID	Property	WL (ft bgs)	Date
ES304-101	304 East Main Street	9	7/29/2002
ES304-103	304 East Main Street	7	7/31/2002
ES304-104*	304 East Main Street	6	7/30/2002
ES340-103*	340 East Main Street	6	7/17/2002
ES340-104*	340 East Main Street	6	7/17/2002
ES340-105	340 East Main Street	5	7/17/2002
ES340-107	340 East Main Street	3	7/31/2002

* = within Raymark waste footprint

ASSUME 5.0 FEET BASED ON AVERAGE WITHIN RW FOOTPRINT

SOIL BORING MOISTURE OBSERVATIONS
380 EAST MAIN STREET PROPERTIES
RAYMARK INDUSTRIES SUPERFUND SITE
STRATFORD, CONNECTICUT

Boring ID	Property	WL (ft bgs)	Date
ES380-101	380 East Main Street	5	8/13/2002

* = within Raymark waste footprint

ASSUME 5.0 FEET BASED ON ES380-101

SOIL BORING MOISTURE OBSERVATIONS
DPW LOT AND 251 EAST MAIN STREET
RAYMARK INDUSTRIES SUPERFUND SITE
STRATFORD, CONNECTICUT

Boring ID	Property	WL (ft bgs)	Date
DPW-101	DPW Lot	11.5	7/22/2002
DPW-102*	DPW Lot	8	7/22/2002
DPW-104*	DPW Lot	8	7/23/2002
DPW-106	DPW Lot	8	7/23/2002
DPW-203	DPW Lot	9	5/15/2003
DPW-204*	DPW Lot	7.5	5/15/2003

* = within Raymark waste footprint

DPW AOC 1 ASSUME 8.0 FEET (DPW-102/104)
DPW AOC 2 AND 251 EAST MAIN STREET ASSUME 7.5 FEET (DPW-204)

SOIL BORING MOISTURE OBSERVATIONS
BEACON POINT AREA
RAYMARK INDUSTRIES SUPERFUND SITE
STRATFORD, CONNECTICUT

Boring ID	Property	WL (ft bgs)	Date
D-SB01	1 Beacon Point Road	5	7/15/1997
D-SB02*	1 Beacon Point Road	7	7/14/1997
D-SB03*	Beacon Point Area	5.5	8/6/1997
D-SB04*	Beacon Point Area	4.6	7/10/1997
D-SB05	Beacon Point Area	5	7/11/1997
D-SB06	Beacon Point Area	8	7/16/1997
D-SB07*	Beacon Point Area	6	7/16/1997
D-SB08*	Beacon Point Area	4	7/11/1997
D-SB09	Beacon Point Area	2.5	7/10/1997
BPM-101	1 Beacon Point Road	7	8/2/2002
BPM-103	1 Beacon Point Road	5	8/7/2002
BPM-105	1 Beacon Point Road	9	8/7/2002
BPM-106	1 Beacon Point Road	13	8/8/2002
BPA-201	Beacon Point Area	4	5/27/2003
BPA-202	Beacon Point Area	2	5/27/2003
BPA-203	Beacon Point Area	5.5	5/27/2003
BPA-205	Beacon Point Area	5.8	5/27/2003
BPA-207	Beacon Point Area	4.8	5/29/2003
BPA-208	Beacon Point Area	6	5/29/2003
BPA-210*	Beacon Point Area	6	5/29/2003

* = within Raymark waste footprint

ASSUME 5.0 TO 6.0 FEET BASED ON AVERAGE WITHIN RW AREA

SOIL BORING MOISTURE OBSERVATIONS
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES SUPERFUND SITE
STRATFORD, CONNECTICUT

Boring ID	Property	WL (ft bgs)	Date
BA2-201	Area North of Marine Basin	7	5/8/2003
BA2-204	Area North of Marine Basin	7	5/8/2003
BA2-205*	Area North of Marine Basin	7.5	5/8/2003
BA2-206	Area North of Marine Basin	4	5/9/2003
BA2-207	Area North of Marine Basin	5.5	5/9/2003
BA2-208*	Area North of Marine Basin	4.5	5/9/2003
BA2-212	Area North of Marine Basin	3	5/15/2003
BA2-213*	Area North of Marine Basin	3	5/15/2003
BA2-214	Area North of Marine Basin	6	5/15/2003
BA2-215	Area North of Marine Basin	3.5	5/15/2003
BA2-216	Area North of Marine Basin	6.5	5/15/2003
BA2-217	Area North of Marine Basin	4	5/15/2003
BA2-218*	Area North of Marine Basin	2	5/21/2003
BA2-219*	Area North of Marine Basin	3	5/21/2003
BA2-220	Area North of Marine Basin	3	5/29/2003
BA2-221	Area North of Marine Basin	0.5	5/29/2003
BA2-223	Area North of Marine Basin	2.5	5/29/2003

* = within Raymark waste footprint

ASSUME 4.5 BASED ON AVERAGE ON PROPERTY

SOIL BORING MOISTURE OBSERVATIONS
WOOSTER PARK
RAYMARK INDUSTRIES SUPERFUND SITE
STRATFORD, CONNECTICUT

Boring ID	Property	WL (ft bgs)	Date
WP-201*	Wooster Park	4	5/20/2003
WP-206*	Wooster Park	8	5/20/2003

* = within Raymark waste footprint

ASSUME 6.0 BASED ON AVERAGE ON PROPERTY

SOIL BORING MOISTURE OBSERVATIONS
35 THIRD AVENUE
RAYMARK INDUSTRIES SUPERFUND SITE
STRATFORD, CONNECTICUT

Boring ID	Property	WL (ft bgs)	Date
3A35-201	35 Third Avenue	5	5/28/2003
3A35-202*	35 Third Avenue	7	5/28/2003
3A35-203	35 Third Avenue	7	5/28/2003
3A35-205	35 Third Avenue	8	5/28/2003
3A35-206	35 Third Avenue	6	5/28/2003

* = within Raymark waste footprint

ASSUME 6.5 BASED ON AVERAGE ON PROPERTY

APPENDIX F

IN-TOWN CONSOLIDATION/CAMU AREAS

APPENDIX F

As part of the evaluation of response actions to address the Raymark waste present at a number of locations throughout Stratford, one remedial approach is potential in-town consolidation of Raymark waste. Advantages of consolidation include fewer parcels that would need to be capped, monitored, or would need operations and maintenance in the long-term. Monitoring of one parcel would be more efficient and more effective than monitoring multiple capped parcels. Consolidation would also allow for fewer institutional controls and ensure the continued use of the parcels where Raymark waste is removed as well as the potential reuse of the consolidation locations themselves. Monitoring and operations and maintenance costs would also be reduced.

To capitalize on the advantages that may be realized via consolidation, potential locations were identified by an independent consulting firm that provided technical assistance to the Town-appointed Raymark Advisory Committee (RAC). These potential consolidation locations, which area evaluated in this Appendix, include: the former Raybestos Memorial Field (OU4), the Stratford Landfill and Short Beach Park Area (OU9), Lockwood Avenue, a portion of Ferry Creek (OU3), 576/600 East Broadway, and 230/250/280/300 Ferry Boulevard.

The primary objective of Appendix F is to screen, evaluate, and rank potential consolidation locations, known as Corrective Action Management Unit (CAMU) locations, for consolidation and containment of Raymark waste within the Town of Stratford, Connecticut. Appendix F consists of three parts. Section F-1 presents a preliminary screening of each of six potential CAMU locations based upon three criteria: effectiveness, implementability, and cost. A description of these three screening criteria is provided in Appendix F-1. The objective of the preliminary screening process is to reduce the number of alternatives that will undergo a more thorough and extensive analysis.

Section F-2 evaluates viable CAMU locations retained following the preliminary screening. Viable locations are independently evaluated in Section F-2 against the National Oil and Hazardous Substances Contingency Plan (NCP) criteria required for remedy selection in accordance with CERCLA. The criteria are listed below.

Threshold Criteria

- Overall protection of human health and the environment
- Compliance with ARARs

Primary Balancing Criteria

- Long-term effectiveness and permanence
- Reduction of toxicity, mobility or volume
- Short-term effectiveness
- Implementability
- Cost

Modifying Criteria

- State acceptance
- Community acceptance

Finally, Section F-3 presents a comparative analysis that ranks each viable potential CAMU option evaluated during the detailed analysis (Section F-2) relative to one another. This ranking is based on how fully each potential CAMU option meets the criteria of Section F-2. A brief description of each of the nine criteria is provided in Section 4.2 of Volume 1.

APPENDIX F-1

PRELIMINARY SCREENING

FOR

CONSOLIDATION AND CAMU AREAS

APPENDIX F-1 – PRELIMINARY SCREENING

The primary objective of Appendix F-1 is to conduct a preliminary screening of six potential CAMU areas within the Town of Stratford, Connecticut, and based on the findings of this screening, to reduce the number of alternatives that will undergo a more thorough and extensive analysis. In accordance with the interim *Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (EPA. October 1988), criteria promulgated under the National Oil and Hazardous Substances Contingency Plan (NCP) was employed to conduct the preliminary screening using the criteria of effectiveness, implementability, and cost. A brief description of each of the criteria is provided below.

Preliminary Screening Criteria

- Effectiveness
  - Protects human health and the environment in short-term (during construction and implementation period)
  - Protects human health and the environment in long-term (period after the remediation is complete)
  - Reduces the toxicity, mobility, volume of contaminants through treatment

- Implementability
  - Technical feasibility, i.e. ability to construct, reliably operates, and meets technology-specific regulations for process options until the remedial action is complete. Operation, maintenance, and monitoring of alternative also included

  - Administrative feasibility, i.e. ability to obtain the necessary permits for off-site actions; the availability of treatment, storage, and disposal services (including capacity)

- Cost
  - Relative capital costs
  - Relative operations and maintenance costs

APPENDIX F-1 A

FORMER RAYBESTOS MEMORIAL BALLFIELD (OU4 BALLFIELD) STUDY AREA

CAMU PRELIMINARY SCREENING

APPENDIX F-1 A

FORMER RAYBESTOS MEMORIAL BALLFIELD (OU4 BALLFIELD) STUDY AREA CAMU PRELIMINARY SCREENING

Property Description

The former Raybestos Memorial Ballfield (OU4 Study Area) property is adjacent to the former Raymark Facility (OU1) and encompasses a total area of 13.5 acres in Stratford, CT. The physical characteristics of the OU4 ballfield can be found in Appendix A-2-1.3.

OU4 was historically used as a gravel pit operation, then as a disposal area for industrial wastes. Contaminants found include asbestos, lead, arsenic, and polychlorinated biphenyls (PCBs).

In 1992, EPA placed a temporary soil cover (6 inches minimum thickness) throughout the entire Study Area, installed a security fence, and sampled and removed drummed wastes from OU4. This effort restricted access to OU4 as well as to the contamination found within the soil. In 1999, EPA performed a comprehensive remedial investigation that included test pits, soil borings, monitoring well installation, an electromagnetic (EM) survey, and ground penetrating radar to determine the presence, location, and character of buried wastes. A remedial investigation report was completed in August 1999. The report concludes that fill and natural soils throughout the OU4 Study Area are contaminated with asbestos, lead, barium, zinc, arsenic, polychlorinated biphenyls (PCBs) and semi-volatile organic compounds (SVOCs). In most cases, the concentration of contamination is higher in the subsurface soils than in the surface soils. EPA investigations estimate that over 200,000 cubic yards (CY) of Raymark waste is present and extends to depths up to 16 feet below ground surface. Potential risks are to human health. No ecological risks were identified.

CAMU Option

OU4 was identified by the RAC and its technical advisor as one of the locations in Stratford with the potential for the consolidation of Raymark waste. A description of this potential CAMU option is summarized below, and evaluated against preliminary screening criteria promulgated under the National Oil and Hazardous Substance Contingency Plan (NCP) in the following subsection.

- **Consolidation and Capping as a CAMU.** Raymark waste from other locations in Stratford would be transported to OU4 and capped in-place under a RCRA-compliant, low permeability cap ("RCRA" refers to the federal Resource Conservation and Recovery Act, which regulates the management of hazardous waste; a "RCRA-compliant" cap is a cap that is equivalent to a cap that covers a hazardous waste landfill). Consolidation of up to 100,000 CY of Raymark waste could occur while maintaining gentle slopes and topographic contours that would blend into the adjacent properties. The RCRA-compliant cap would be constructed over the existing Raymark waste footprint (approximately 8 acres) and slightly beyond (approximately 3 acres) resulting in an increase of elevation of 7 to 12 feet above the current ground surface, including the thickness of the cap and the consolidated Raymark waste. The cap would be designed to blend into the topography of adjacent properties. The resulting area would be consistent with reuse plans as conceptualized in the Superfund Redevelopment Initiative (SRI) report or other compatible use as determined by the Town. The Town is actively engaged in planning for reuse of the parcel that is consistent with overall Town objectives. See Figure F-1-1.

Assumptions for OU4 CAMU Option

Critical assumptions that facilitated the preliminary screening are provided below.

General:

- The design of the remedial option is conceptual and based on the information available from previous investigations at this property.

Capping with Consolidation

- Cap footprint assumed to include 13.5 (616,000 SF) acres of property.

- RCRA-compliant cap would be approximately 3 feet in thickness, and would meet the technical requirements contained in 40 CFR 264.310 and interpreted in the *Revised Alternative Cap Design Guidance Proposed for Unlined, Hazardous Waste Landfills in EPA Region 1* (Gagne and Choi, 2001).

- The final cap surface would be designed to meet Frog Pond Road at the existing elevation, and then slope gently upwards approximately 7-12 feet above current ground surface elevations (an elevation of 22 to 27 feet above msl). The center portion of the property would be relatively flat to permit reuse.

Up to 100,000 CY could be consolidated onto the property while retaining ground surface contours that are consistent with surrounding properties and are amenable to reuse consistent with the Strategic Redevelopment Initiative (SRI) report.

Preliminary Screening

Effectiveness

A. Short-Term Protection of Human Health and the Environment

Human Health: The CAMU option would be implemented in a manner that is protective of human health in the short-term (during the construction period). However, the CAMU option would involve earth-moving activities that would create the potential for exposure to Raymark waste contaminants. These potential exposures would be addressed through engineering controls (e.g.; dust control, personal protective equipment, decontamination facilities) to minimize human contact with contaminated materials. Truck decontamination stations would be constructed at property access ways to prevent the transport of contaminated material onto public roadways. A monitoring program would be used to verify that contaminants do not migrate beyond the perimeter of the work area. These types of controls are commonly used at remediation projects of this type, and would be very reliable to mitigate potential short-term human health impacts associated with the remedial action.

Environment: Short-term impacts to the environment would be controlled by employing erosion and sedimentation controls during the construction period to prevent the mobilization of contaminants during construction. These measures would reliably minimize environmental impacts from all earth-moving activities.

B. Long-Term Protection of Human Health and the Environment

Human Health: In the long-term, the CAMU option would protect human health by preventing direct contact with Raymark waste contaminants. Because Raymark waste would be left in-place at OU4, Institutional Controls would be placed on the property to prohibit groundwater use and/or activities that could result in future exposures. The long-term protection of human health would be ensured by the enforcement of these Institutional Controls.

The CAMU option would provide significant long-term protectiveness as up to 100,000 CY of Raymark waste from other locations in Town, which currently pose risks to human health, would be consolidated along with the almost 190,000 CY of Raymark waste estimated to already be present at OU4. The Raymark waste would be consolidated beneath the RCRA-compliant cap over OU4, which would render the material inaccessible. Reuse above the waste could occur ensuring additional long-term protectiveness.

Environment: The CAMU option would result in long-term protection of the environment. No wetlands or floodplains would be impacted. Contact between consolidated Raymark waste and precipitation would be minimized by the RCRA-complaint, low-permeability cap.

C. Reduction of Toxicity, Mobility, and Volume Through Treatment

This CAMU option entails leaving waste located in OU4 in-place for final disposition under a RCRA-compliant low-permeability cap. Under a CAMU option for OU4, a reduction in toxicity, mobility or volume will be realized if excavated Raymark waste from other locations requires treatment. Raymark waste transported to the CAMU would be subject to analytical sampling to determine compliance with the Principal Hazardous Constituents (PHCs) standard established by the CAMU regulations. Any waste found to be above PHC levels will require off-site treatment and disposal. Based upon historical sampling conducted throughout the OU6 property groups, it is assumed that approximately 10% of the excavated waste may require off-site treatment prior to disposal. Proposed remedial alternatives and corresponding volumes of waste assumed to require off-site treatment and disposal are provided in Section 4.0 (Volume 1 of this Feasibility Study) for each individual Property Group being addressed in OU6 (Nobis, 2010).

Implementability

A. Technical Feasibility

The CAMU option would be technically feasible at OU4. Excavation, sampling, stockpiling, transportation/disposal of contaminated material, and cap construction are commonly used remediation methods that could reliably achieve a wide range of remediation action objectives. Conventional construction equipment and techniques would be used to perform the work. The property is currently unoccupied, contains stable soil, and could be readily accessed by heavy equipment.

Wetland and floodplain mitigation would not be required. There are no wetlands on the property and the property does not lie within the 100-year floodplain.

Implementation and enforcement of institutional controls would be feasible.

B. Administrative Feasibility

No off-property permitting difficulties are anticipated. No administrative issues are anticipated.

Cost

A. Capital Costs

Capital costs would include mobilization/demobilization and site preparation costs, costs associated with the handling of Raymark waste, and costs associated with construction of the RCRA-compliant, low-permeability cap. As no additional capital costs are anticipated to be required for floodplain or wetland mitigation, the preliminary screening results for the OU4 CAMU option indicates that relative low-level costs would be associated with this option.

B. Operations, Maintenance, and Monitoring Costs

O&M costs would include: monthly inspections and annual reporting for the cap, quarterly sampling with annual reporting for groundwater for the first two years and annual sampling/reporting thereafter, annual maintenance/repairs of the RCRA-complaint cap, annual inspections and reporting for institutional controls and five-year reviews. The preliminary screening results indicate that O&M costs would be medium-level for OU4.

Preliminary Screening Summary

Based upon the preceding evaluation of the required screening criteria of effectiveness, implementability, and cost, utilizing OU4 as a CAMU location is a feasible and viable option. This option is retained for further evaluation in a detailed analysis, presented in Appendix F-2.

APPENDIX F-1 B

STRATFORD LANDFILL AND SHORT BEACH PARK (OU9) STUDY AREA

CAMU PRELIMINARY SCREENING

APPENDIX F-1 B

STRATFORD LANDFILL AND SHORT BEACH PARK (OU9) STUDY AREA CAMU PRELIMINARY SCREENING

Property Description

The OU9 Study Area, which includes the Stratford Landfill and Short Beach Park, is a former Raymark waste disposal location in the southern portion of the Town of Stratford. The physical characteristics of the OU9 Study Area can be found in Appendix A-3-1.3.

Both the Stratford Landfill and Short Beach Park areas were historically low lying marshes. Over the years, the areas were operated as a municipal landfill and were systemically filled in with residential, commercial, and industrial waste. The former Raymark Facility dumped manufacturing seconds (irregular or defective product) into the area and in the early 1980's six large disposal cells were excavated to specifically accept Raymark's manufacturing wastes. These disposal cells were temporarily capped with a geotextile membrane as an interim measure in 1993 by the Connecticut Department of Environmental Protection (CTDEP). More recently, the Town of Stratford has developed this area along Dorne Drive into soccer fields.

The perimeter of the Stratford Landfill is within the 100-year floodplain. Wetlands are present along the northern boundary of the property where it meets Marine Basin. The southern portion of Short Beach Park and areas adjacent to Long Island Sound are also within the 100-year floodplain. No wetlands are present within Short Beach Park. The 100-year frequency base flood elevation ranges from 10 to 12 feet in this area. EPA investigations estimate that over 1.8 million CY of waste are present within the Stratford Landfill (Raymark waste comingled with commercial and residential waste) and an additional 61,000 CY of Raymark waste is present in Short Beach Park. Potential risks are to human health. No ecological risks from Raymark waste were identified.

CAMU Option

OU9 was identified by the RAC and its technical advisor as one of the locations in Stratford with the potential for the consolidation of Raymark waste. A description of this potential CAMU option

is summarized below, and evaluated against preliminary screening criteria promulgated under the National Oil and Hazardous Substance Contingency Plan (NCP) in the following subsection.

- **Consolidation and Capping** – During the evaluation a CAMU design, it was determined that capping of the Stratford landfill would have to be done at the same time as a CAMU was constructed. The primary reason is that capping of the Stratford Landfill will likely result in the generation of additional material to be capped as a result of grading and slope development. This material could easily be placed within the footprint of a CAMU and both the landfill and CAMU capped at the same time. If, however, a CAMU was constructed before the landfill was capped, any extra material from grading and slope development of the landfill would have to be either shipped off-site, placed further within Short Beach Park and then capped, or placed above the already capped CAMU and then capped again. Because of these limitations, the evaluation of a CAMU at OU9 also includes capping of the Stratford Landfill.

  Raymark waste from Short Beach Park and from other locations within Stratford would be transported to the Dorne Drive and soccer field area at OU9. Consolidation of up to 50,000 CY of Raymark waste could occur on top of Dorne Drive and the soccer fields. Approximately 40,600 CY of Raymark waste would be excavated (to a depth of 4 feet) from the central portion of Short Beach Park and placed in the consolidation area. The remaining capacity of 10,000 CY would be transported from other locations in Stratford containing Raymark waste.

  Containment of Raymark waste would require a RCRA-compliant, low-permeability cap ("RCRA" refers to the federal Resource Conservation and Recovery Act, which regulates the management of hazardous waste; a "RCRA-compliant" cap is a cap that is equivalent to a cap that covers a hazardous waste landfill). A 1,500,000 SF (34.4 acres) RCRA-compliant cap would be placed over the Stratford Landfill and the consolidation area. Construction of this RCRA-compliant cap would result in an increase in elevation of 7 – 10 FT above existing grade, including the thickness of the cap and the consolidated Raymark waste. The final design would likely require steep grades that may not allow for use of the playing fields or active recreational use post-remedial action. Passive recreational uses (i.e. walking trails) would, however, still be possible.

Assumptions for Stratford Landfill and Short Beach Park (OU9) Study Area CAMU Option

Critical assumptions that facilitated the preliminary screening are provided below.

General:

- Raymark waste areas are based on the findings of the OU9 Remedial Investigations (TtNUS, 2005). The entire footprint of the Stratford Landfill is assumed to contain Raymark waste.

- On-property mitigation for approximately 25,000 square feet of wetlands that would be impacted by cap construction would be required.

- Flood storage mitigation and storm water detention could be performed at some location within the property.

- It is assumed that capping would have to comply with Federal Aviation Administration (FAA) restriction on objects affecting navigable airspace. These regulations require notification to the FAA, and approval to proceed, prior to constructing any object that extends above the imaginary plane that is formed by extended a line from the edge of the runway (in this case, Runway 29, at the Sikorsky Memorial Airport) and rises at a 34:1 slope for a distance of 10,000 feet. Figure F-1-2 shows the permissible ground surface elevations between the runway surface and the center of the landfill footprint based on extending a 34:1 line from the edge of Runway 29.

- Due to the FAA height restrictions, consolidation of Raymark waste to the west of the current Stratford Landfill footprint would not be technically feasible.

Capping with Consolidation

- Up to 50,000 CY of Raymark waste could be consolidated in a CAMU at OU9. Of this 50,000 CY capacity, 40,000 CY would be required for Raymark waste from Short Beach Park. This would leave 10,000 CY of consolidation capacity for Raymark waste from other locations in Town.

- Regrading of the landfill would be required for capping and likely to comply with FAA height restrictions.

- A RCRA-compliant, low-permeability cap would be approximately 3 feet in thickness, and would meet the technical requirements contained in the 40 CFR 264.310 and interpreted in the *Revised Alternative Cap Design Guidance Proposed for Unlined, Hazardous Waste Landfills in EPA Region 1* (Gagne and Choi, 2001).

- Final cap surface of Stratford Landfill would tie into the existing elevations along Short Beach Road to the west, marine Basin to the north, tennis courts to the east, and Short Beach Park to the south. Grades would be designed to rise gently, to the extent practical, so that the final contours of the landfill could be amenable to redevelopment for passive recreation (walking paths, etc.). Final grades, however, are not likely to be able to support reuse with playing fields or other active recreational uses.

- Dorne Drive would be relocated to the south to accommodate the expanded landfill footprint. The soccer fields to the south of Dorne Drive would need to be permanently relocated to another location.

- Stormwater runoff from the capped area would be managed on the property using detention basins.

Preliminary Screening

Effectiveness

A. Short-Term Protection of Human Health and the Environment

Human Health: The CAMU option would be implemented in a manner that is protective of human health in the short-term (during the construction period). However, the option would involve earth-moving activities that would create the potential for exposure to Raymark waste contaminants. These potential exposures could be addressed through engineering controls (such as dust control, personal protective equipment, decontamination facilities, etc.) to minimize human contact with contaminated materials. Truck decontamination stations could be constructed at property access ways to prevent the transport of contaminated material onto

public roadways. A monitoring program would be used to verify that contaminants do not migrate beyond the perimeter of the work area. These types of controls are commonly used at remediation projects of this type, and would be very reliable to mitigate potential short-term human health impacts associated with the remedial action.

Environment: Short-term impacts to the environment would be controlled by employing erosion and sedimentation controls during the construction period to prevent the mobilization of contaminants during construction. These measures would reliably minimize environmental impacts from all earth-moving activities.

B. Long-Term Protection of Human Health and the Environment

Human Health: In the long-term, the CAMU option would protect human health by preventing direct contact with Raymark waste contaminants. Because the option would involve leaving Raymark waste in-place at OU9, institutional controls would be placed on the property to prohibit groundwater use and/or activities that could result in future exposures. The long-term protection of human health would be dependent upon the enforcement of these institutional controls.

The CAMU option would provide significant long-term protectiveness as up to almost of 1.9 million CY of waste already present on OU9 will be contained below the RCRA compliant low-permeability cap. In addition, 10,000 CY of Raymark waste from other locations in Town, which currently pose risks to human health, would also be consolidated beneath the RCRA cap. Limited reuse above the waste could occur ensuring additional long-term protectiveness.

Environment: The CAMU option would result in long-term protection of the environment. Any wetlands that are impacted by construction activities would be restored to the extent practical on the property. Flood storage mitigation could be accomplished on the property (via backfill materials selected – to be specified during Remedial Design) to compensate for any flood storage volume that is lost by constructing a RCRA-compliant cap within the 100-year floodplain. Contact between consolidated Raymark waste and precipitation would be mitigated by the RCRA-compliant cap.

C. Reduction of Toxicity, Mobility, and Volume Through Treatment

This CAMU option entails leaving Raymark waste in-place at OU9 for final disposition under a RCRA compliant low-permeability cap. Under a CAMU option for OU9, a reduction in toxicity, mobility or volume will be realized if excavated Raymark waste from other locations requires treatment. Raymark waste transported to the CAMU would be subject to analytical sampling to determine compliance with the Principal Hazardous Constituents (PHCs) standard established by the CAMU regulations. Any waste found to be above PHC levels will require off-site treatment and disposal. Based upon historical sampling conducted throughout the OU6 property groups, it is assumed that approximately 10% of the excavated waste may require off-site treatment prior to disposal. Proposed remedial alternatives and corresponding volumes of waste assumed to require off-site treatment and disposal are provided in Section 4.0 (Volume 1 of this Feasibility Study) for each individual Property Group being addressed in OU6 (Nobis, 2010).

Implementability

A. Technical Feasibility

The CAMU option would be technically feasible at OU9. Excavation, sampling, stockpiling, transportation/disposal of contaminated material, and cap construction are commonly used remediation methods that could reliably achieve the remediation action objectives. Conventional construction equipment and techniques would be used to perform the work.

Wetland and floodplain mitigation could be accomplished within the property boundaries, since there are large areas of open space on the property that could be used for this purpose. Therefore, there are no technical issues that would present implementability limitations associated with a CAMU option at OU9.

Implementation and enforcement of institutional controls would be feasible.

B. Administrative Feasibility

No off-site permitting difficulties are anticipated. No administrative issues are anticipated.

Cost

A. Capital Costs

Capital costs would include mobilization/demobilization and site preparation costs, costs associated with excavation and the handling of Raymark waste, costs associated with construction of the RCRA-compliant, low-permeability cap, and costs for floodplain and wetland mitigation as necessary. Additional capital costs are anticipated to be required for floodplain and wetland mitigation. Because of this, the preliminary screening results for the OU9 CAMU option indicates that medium-level costs would be associated with this option.

C. Operations, Maintenance, and Monitoring Costs

O&M costs would include; monthly inspections and annual reporting for the cap, quarterly sampling with annual reporting for groundwater for the first two years and annual sampling/reporting thereafter, annual maintenance/repairs of the RCRA-complaint cap, annual inspections and reporting for institutional controls and five-year reviews. The preliminary screening results indicate that O&M costs would be medium-level for a CAMU option at OU9.

Preliminary Screening Summary

Based upon the preceding evaluation of the required screening criteria of effectiveness, implementability, and cost, utilizing OU9 as a CAMU location is a feasible and viable option although the majority of available consolidation capacity is required for Raymark waste excavated from Short Beach Park. This option is retained for further evaluation in a detailed analysis, presented in Appendix F-2.

APPENDIX F-1 C

LOCKWOOD AVENUE STUDY AREA

CAMU PRELIMINARY SCREENING

APPENDIX F-1 C

LOCKWOOD AVENUE STUDY AREA
CAMU PRELIMINARY SCREENING

Property Description

The Lockwood Avenue property consists of approximately 5.3 acres of commercially-zoned (partly waterfront business and partly retail) land, located east of Lockwood Avenue and Ferry Boulevard. The property is presently unoccupied and undeveloped, and contains no structures. The property is vegetated with common reed in the wetland areas and trees and shrubs in the upland areas. A soil berm is present along Lockwood Avenue and along a portion of Ferry Creek. Broad Street is located to the north, with Ferry Creek and the Housatonic River to the east, residential properties on Stratford Avenue to the south, and commercial and residential properties on Lockwood Avenue to the west.

Sixty percent of the Lockwood Avenue property is occupied by tidal wetlands that, in their current state, are periodically inundated with tidal or flood waters. This property is located at the extreme southern end of Ferry Creek, where the creek flows into the Housatonic River (Figure 4-1 in Volume 1). As such, this parcel plays a role in mitigating the rise of floodwaters and tidal waters in the lower Ferry Creek Area. Implementation of a CAMU option to address Raymark waste on this parcel will be highly dependent upon the feasibility of compensating for floodplain and wetland impacts. The entire property lies within the 100-year floodplain.

The functional value of the wetland on the property was assessed in the “Technical Memorandum on Wetlands Evaluation dated June 1998.” As stated in this document, the Lockwood Avenue wetlands is part of a larger wetlands evaluation (approximately 9 acres that includes the 5.3 acres of the Lockwood Avenue Property; shown in the wetlands evaluation document as Ferry Creek OU3 Area B wetlands). This area has an overall functional value index ranging from 0.1 to 0.78 (out of 1.0 for 10 functions) using the Coastal Method of evaluation. Based on this assessment, the functional value of this wetland is considered moderately to severely degraded partially due to the presence of Raymark waste.

EPA investigations estimate that approximately 35% of the parcel contains 24,000 cubic yards (CY) of Raymark waste. Potential risks to both ecological and human health receptors were identified.

CAMU Option

Lockwood Avenue was identified by the RAC and its technical advisor as one of the locations in Stratford with the potential for the consolidation of Raymark waste. A description of this potential CAMU option is summarized below, and evaluated against preliminary screening criteria promulgated under the National Oil and Hazardous Substance Contingency Plan (NCP) in the following subsection.

- **Consolidation and Capping.** Raymark waste from other locations in Stratford would be transported to Lockwood Avenue and capped in-place under a RCRA-compliant, low permeability cap ("RCRA" refers to the federal Resource Conservation and Recovery Act, which regulates the management of hazardous waste; a "RCRA-compliant" cap is a cap that is equivalent to a cap that covers a hazardous waste landfill). Consolidation of up 12,500 CY of Raymark waste could occur while maintaining gentle slopes and topographic contours that would blend into the adjacent properties. The RCRA-compliant low-permeability cap would be constructed over the existing Raymark waste footprint (approximately 1.8 acres) and would be divided by an open drainage channel in the southern portion of the property. The cap would result in an increase of elevation of 9 to 13 feet above the current ground surface, including the thickness of the cap and the consolidated Raymark waste. The final design would blend into the topography of adjacent properties. The resulting area would be consistent with reuse plans as conceptualized in the Superfund Redevelopment Initiative (SRI) report, or other compatible use as determined by the Town. See Figure F-1-3. Loss of floodplain storage capacity would require compensation and impacted wetlands would require mitigation either on- or off-property to ensure pre-existing hydraulic characteristics of the parcel are maintained following implementation.

Assumptions for the Lockwood Avenue Study Area CAMU Option

Critical assumptions that facilitated the preliminary screening are provided below.

General:

The size of the cap for a CAMU that is constructed on the Lockwood Avenue Property will have a significant impact on the magnitude of wetland and floodplain mitigation for compliance with Executive Order 11990 (Protection of Wetlands) and Executive Order 11988 (Floodplain Management). The area of wetlands disturbed for cap construction and floodplain loss would need to be replicated at some location outside of the Lockwood Avenue property boundary.

A cap that occupies the entire area of the Lockwood Avenue Property would not enable replication of lost wetlands on the property; therefore, all wetlands mitigation would need to be performed at an off-property location. The benefits of this approach would be the ability to leave Raymark waste in-place, which would minimize the chance of mobilizing contamination that is currently relatively immobile. It would also provide an opportunity to receive waste from other properties in Stratford which would reduce overall potential exposures to Raymark waste and ultimate disposal costs. These benefits must be weighed against the costs of the approach, which would include redirecting wetland mitigation efforts to an off-property location and increase O&M costs and liabilities. While the mitigation wetland area may not necessarily need to achieve a 1:1 replacement of wetlands loss (since fully-functional wetlands would be constructed to replace moderately impaired wetlands), the feasibility of acquiring large parcels of land in an area nearby to the Lockwood Avenue Property for the purposes of wetland mitigation becomes lower and lower as the capped area of the property increases.

Floodplain mitigation issues can be evaluated in much the same manner, with the exception being that floodplain mitigation options are even more restrictive since, in order to maintain flood storage capacity and hydrological function, flood storage mitigation must be located in close proximity to the lost floodplain resources. Where some flexibility in location is possible when siting compensatory wetlands, this flexibility does not exist when evaluating floodplain mitigation options.

Capping with Consolidation

The CAMU option presented below includes provisions for wetland and flood storage mitigation because the cap on this property would have significant impacts to each. These measures are preliminary and not necessarily adequate to satisfy the requirements of Executive Order 11990 (Protection of Wetlands) or Executive Order 11988 (Floodplain Management), which prohibit impacts to wetlands and floodplains without compensation for lost resources. A more detailed

evaluation of the compensation requirements would need to be performed to ensure that full compliance could be attained.

The CAMU option was developed using the following set of constraints:

- Raymark waste would only be consolidated onto the southern portion of the property, in the areas where Raymark waste has been identified. A triangular northern portion of the property would be utilized to stage equipment and field support facilities during construction. Given the fact that only a small portion of the property is located outside of wetlands, no excavated Raymark waste would be stockpiled on-site.

- The final ground surface of the western portion of the CAMU (including consolidated Raymark waste and a 3-foot cap thickness) would tie into the existing ground surface elevation at Lockwood Avenue (9 feet above msl).

- The proposed contours of the Lockwood Avenue CAMU (both consolidation areas) would be designed to facilitate reuse of the property:

    - The final ground surface of the western consolidation area would rise gradually from Lockwood Avenue at an approximate slope of 25:1 toward the center of the property, reaching a maximum elevation of approximately 13 feet (4 feet above the existing grade) at the center of the property and sloping back down toward the east to meet the drainage channel that currently bisects the property. The estimated capacity available in this portion of the property for consolidation of Raymark waste from other Raymark properties is 2,500 CY.

    - A second consolidation “cell” would be constructed in the lower eastern portion of the property, to the immediate west of the drainage channel. A 300 foot by 300 foot area would be filled using Raymark waste originating from other locations within Stratford so that the final elevation of the RCRA-compliant cap reaches approximately 13 feet above sea level and slopes gently from the center of this cell to the drainage channel to the west, Ferry Creek to the north, the Housatonic River to the east, and created wetlands to the south. The estimated capacity available in this portion of the property for consolidation of Raymark waste from other Raymark properties is 10,000 CY.

- An open waterway (the above-mentioned drainage channel) would be maintained through the center of the property to allow tidal water and flood waters to pass through the property in a north-south direction between Ferry Creek and Selby Pond. Stone retaining walls would be constructed on either side of this waterway to enable gentle grades despite raised elevations of either side of the waterway.

- An approximately 5 foot stone revetment would be constructed along the shorelines of the property to enable redevelopable grades on the property despite a large increase in ground surface elevation throughout the property.

- Raymark waste in the southern portion of the site would be excavated and consolidated within the on-site CAMU so that the existing wetlands could be returned to their full function. This area would provide temporary storage for flood waters to mitigate, in part, for the loss of floodplain areas that would result from constructing the CAMU.

The objective of this preliminary CAMU evaluation was to maximize the consolidation capacity on the Lockwood Avenue Property while permitting a future reuse scenario that is compatible with the recommendations made in the Strategic Redevelopment Initiative (SRI) Report that was prepared for the Town of Stratford in 2003 (HRP Associates, 2003).

Preliminary Screening

Effectiveness

A. Short-Term Protection of Human Health and the Environment

Human Health: The CAMU option would be implemented in a manner that is protective of human health in the short-term (during the construction period). However, the option would involve earth-moving activities that could create the potential for exposure to Raymark waste contaminants. These potential exposures would be addressed through engineering controls (such as dust control, personal protective equipment, decontamination facilities, dewatering equipment, etc.) to minimize human contact with contaminated materials. Truck decontamination stations would be constructed at property access ways to prevent the transport of contaminated material onto public roadways. A monitoring program would be used to verify

that contaminants do not migrate beyond the perimeter of the work area. These types of controls are commonly used at remediation projects of this type, and would be very reliable to mitigate potential short-term human health impacts associated with the remedial action.

Environment: The CAMU option would result in significant short-term impacts to the environment due the presence of floodplains and wetlands within the Raymark waste area. Performing earth-moving activities in wetland and floodplain areas would not be protective of the environment in the short-term and would entail a temporary loss of these resources due to not only the movement of waste in these areas, but also potentially from the engineering measures that would be required to gain access to the area (i.e. placement of gravel fill or utilization of swamp mats to stabilize the ground surface beneath heavy equipment).

These impacts would be temporary and controlled through the use of erosion and sedimentation controls during the construction period. Cofferdams or other containment structures could also be used to prevent flooding of work areas. These measures would minimize impacts to sensitive areas to the extent practical but significant short-term impacts would be unavoidable. Restoration of the area following construction activities would require that lost floodplain storage is compensated and that wetland functionality is restored to the extent practical.

B. Long-Term Protection of Human Health and the Environment

Human Health: In the long-term, the CAMU option would protect human health by preventing direct contact with Raymark waste contaminants. Because Raymark waste would be left in-place, institutional controls would be placed on the property to prohibit groundwater use and/or activities that could result in future exposures. The long-term protection of human health would be dependent upon the enforcement of these institutional controls.

The CAMU option would provide long-term protectiveness from approximately 24,000 CY of Raymark waste currently located on Lockwood Avenue as well as up to an additional 12,500 CY of Raymark waste from other locations in Town, which currently pose risks to human health. Raymark waste would be consolidated beneath the RCRA-compliant low-permeability cap. Reuse above the waste could occur ensuring additional long-term protectiveness.

Environment: The CAMU option would result in long-term protection of the environment. Contact between Raymark waste and precipitation would be mitigated by a RCRA-compliant, low-permeability cap. Impacted floodplains and wetlands would require mitigation/restoration as necessary to ensure protectiveness following implementation. Any mitigation that could not be accomplished on the property would be constructed in an area immediately surrounding the property, to the extent practical.

C. Reduction of Toxicity, Mobility, and Volume through Treatment

This CAMU option entails leaving Raymark waste in-place at Lockwood Avenue for final disposition under a RCRA compliant low-permeability cap. Under a CAMU option, a reduction in toxicity, mobility or volume will be realized if excavated Raymark waste from other locations requires treatment. Raymark waste transported to the CAMU would be subject to analytical sampling to determine compliance with the Principal Hazardous Constituents (PHCs) standard established by the CAMU regulations. Any waste found to be above PHC levels will require off-site treatment and disposal. Based upon historical sampling conducted throughout the OU6 property groups, it is assumed that approximately 10% of the excavated waste may require off-site treatment prior to disposal. Proposed remedial alternatives and corresponding volumes of waste assumed to require off-site treatment and disposal are provided in Section 4.0 (Volume 1 of this Feasibility Study) for each individual Property Group being addressed in OU6 (Nobis, 2010).

Implementability

A. Technical Feasibility

The CAMU option would be technically feasible with regard to construction activities that would be employed. Excavation, sampling, stockpiling, transportation/disposal of contaminated material, and cap construction are commonly used remediation methods that could reliably achieve the remediation action objectives. Conventional construction equipment and techniques would be used to perform the work.

However, existing wetlands present at Lockwood Avenue would make access and occupancy for heavy equipment challenging. Stabilization of ground surfaces would be necessary in order to operate heavy equipment. Engineering measures required to access the work areas would increase the environmental impacts and decrease the productivity of excavation. In addition, the

area is tidally influenced which would have to be addressed during and after CAMU development. These obstacles could be overcome with a reasonable degree of certainty, but the excavations and construction would not be routine. The consolidation capacity for additional Raymark waste at Lockwood Avenue is limited to 12,500 CY based upon the hydraulic function of the property that would need to be preserved following remedial action.

The CAMU option would require wetland/floodplain mitigation. Mitigation on adjacent properties would be challenging because of extensive land use and limited real estate availability, as well as the existing regional hydrology. However, if land could be found, mitigation would be technically feasible.

Implementation and enforcement of institutional controls would be feasible.

B. Administrative Feasibility

Disturbance of floodplains/wetlands would require coordination with the State and local entities to ensure that impacts are not permanent and that adequate mitigation is conducted.

Cost

A. Capital Costs

Capital costs would include mobilization/demobilization and site preparation costs, costs associated with excavation and the handling of Raymark waste, costs associated with construction of the RCRA-compliant, low-permeability cap, costs for floodplain restoration, and wetland mitigation, as necessary. Significant additional capital costs are anticipated to be required for wetland/floodplain mitigation. The preliminary screening results for the Lockwood Avenue CAMU option indicates that high-level costs would be associated with the development of a CAMU at this location.

B. Operations, Maintenance, and Monitoring Costs

O&M costs would include; monthly inspections and annual reporting for the cap, quarterly sampling with annual reporting for groundwater for the first two years and annual sampling/reporting thereafter, annual maintenance/repairs of the RCRA-complaint cap in a tidally influenced area, annual inspections and reporting for institutional controls, and five-year

reviews. The preliminary screening results indicate that O&M costs would be high-level for a CAMU option at Lockwood Avenue.

Preliminary Screening Summary

Based upon the preceding evaluation of the required screening criteria of effectiveness, implementability and cost, utilizing Lockwood Avenue as a CAMU location is not considered to be a viable option. The primary issues are the technical and administrative difficulties anticipated for construction within significant wetlands/floodplains, significant additional capital costs associated with such construction activities, and the overall limited capacity (12,500 CY) available for consolidation of Raymark waste from other properties in Stratford. The wetlands and floodplain mitigation will be very costly if not impracticable. This option is not being retained for further evaluation in a detailed analysis presented in Appendix F-2.

APPENDIX F-1 D

FERRY CREEK (OU3) STUDY AREA

CAMU PRELIMINARY SCREENING

APPENDIX F-1 D

FERRY CREEK (OU3) STUDY AREA
CAMU PRELIMINARY SCREENING

Property Description

The OU3 Study Area is located south of and hydraulically down gradient of the former Raymark Facility. The physical characteristics of the OU3 Study Area is described in Appendix A-1-1.3.

EPA investigations estimate that the proposed CAMU area contains over 38,600 cubic yards (CY) of waste. Although the Ferry Creek area was sampled and evaluated prior to the development of the current definition of Raymark waste (see Section 2.2.2.1 of Volume 1 of this FS), significant analytical and visual evidence (brake pads, etc.) was found to confirm the presence of Raymark waste. Because of this, and because of the historical evidence of filling the Ferry Creek area with Raymark waste, all of the waste in the proposed CAMU area is considered to be either Raymark waste or waste comingled with Raymark waste. Potential risks to both ecological and human health receptors were identified.

CAMU Option

Ferry Creek was identified by the RAC and its technical advisor as one of the locations in Stratford with the potential for the consolidation of Raymark waste. A description of this potential CAMU option is summarized below, and evaluated against preliminary screening criteria promulgated under the National Oil and Hazardous Substance Contingency Plan (NCP) in the following subsection.

- **Consolidation and Capping.** Raymark waste currently within the portion of Ferry Creek being evaluated as a potential CAMU location would be excavated to an average depth of approximately 2 feet below the current creek bottom (estimated 4,000 CY), then clean base material would be placed along the creek bed for stabilization. The excavated Raymark waste from the creek bed (7,620 CY) plus Raymark waste from other locations in Stratford would be placed above the bedding material with a culvert/channel included in the construction design. Additional consolidation capacity (7,000 CY) also exists for

consolidation of Raymark waste into the wetland adjacent to Ferry Creek (Figure F-1-4). The total capacity for consolidation of Raymark waste from other locations within Stratford is dependent upon the selected conceptual design but ranges from approximately 9,200 to 12,600 CY (See Attachment F-1D below). All consolidated Raymark waste would be capped in place with a RCRA-compliant, low-permeability cap ("RCRA" refers to the federal Resource Conservation and Recovery Act, which regulates the management of hazardous waste; a "RCRA-compliant" cap is a cap that is equivalent to a cap that covers a hazardous waste landfill).

Cap construction would include gentle slopes and contours that would blend into adjacent properties. The resulting area would be consistent with reuse plans as conceptualized in the Superfund Redevelopment Initiative (SRI) report, or other compatible use as determined by the Town. Loss of floodplain storage capacity and impacted wetlands (would be incurred under all conceptual designs evaluated to varying degrees) would require mitigation either on- or off-property to ensure pre-existing hydraulic characteristics of the parcel are maintained following implementation.

Because of complexities associated with a consolidation approach at this location, three separate conceptual designs were evaluated that include: a cylindrical pipe culvert; a trapezoidal open channel; and a pipe arch culvert. Each of these approaches were developed to determine the technical feasibility of consolidation within Ferry Creek and are presented below as FC-1 Scenario A, FC-1 Scenario B, and FC-1 Scenario C, respectively.

1. **FC-1 Design Scenario A (Cylindrical Pipe Culvert):** The cylindrical pipe culvert scenario involves directing the existing Ferry Creek through two cylindrical concrete pipes, which would be placed into the center of the existing Ferry Creek channel between Ferry Boulevard and the 230 Ferry Boulevard parcel (Figure F-1-4). The Ferry Creek channel would be backfilled around the pipes with clean material and Raymark waste, and covered with a RCRA-compliant, low-permeability cap (Figure F-1-5) approximately 148,000 SF (3.4 acres) in size with a capacity for consolidation of an additional 5,600 CY of Raymark waste from other locations in Stratford.

2. **FC-2 Design Scenario B (Trapezoidal Open Channel):** The trapezoidal open channel scenario involves the construction of a concrete-lined channel between Ferry Boulevard and the 230 Ferry Boulevard parcel (Figure F-1-4) in the center of the existing bed of Ferry Creek. The area beneath the trapezoidal channel would be backfilled with clean material and Raymark waste (Figure F-1-6) approximately 100,000 SF (2.3 acres) in size with a capacity for consolidation of an additional 5,600 CY of Raymark waste from other locations in Stratford.

3. **FC-3 Design Scenario C (Pipe Arch Culvert):** The pipe arch culvert scenario involves directing the existing Ferry Creek through a pipe arch culvert, which would be placed into the center of the existing Ferry Creek channel between Ferry Boulevard and the 230 Ferry Boulevard parcel (Figure F-1-4). The Ferry Creek channel would be backfilled around the arch culvert with clean material and Raymark waste, and covered with a vegetated RCRA-complaint low-permeability cap (Figure F-1-7) approximately 148,000 SF (3.4 acres) in size with a capacity for consolidation of an additional 9,000 CY of Raymark waste from other locations in Stratford.

Assumptions for the Ferry Creek (OU3) Study Area CAMU Designs/Options (Scenarios A, B, and C)

Critical assumptions that facilitated the preliminary screening are provided below.

General:

- The configuration of each design/option is conceptual and based on the information available from previous investigations at these areas. If construction of a CAMU in the OU3 Study Area is a selected remedy, a more complete screening and evaluation of sediment remedial alternatives is needed to ensure that hydrologic complexities that have been identified can be fully addressed.

- Construction equipment and field support facilities would be staged on the Lot Behind 326 Ferry Boulevard. Any impacts to the environment resulting from staging of equipment and materials on this parcel would be restored following the remedial action.

- Saturated material would not be transported on public roads. If dewatering of excavated Raymark waste (soil or sediment) is required prior to transportation, the material would be stockpiled on the Lot Behind 326 Ferry Boulevard. Soil/sediment stockpiling for the purposes of waste characterization and disposal/consolidation would not occur within the OU3 Study Area, but at some other location within the Town of Stratford.

- The lateral limits of the 100-year floodplain were assumed to consist of the area below 10 feet msl (as a FEMA designation), as depicted on topographical maps available from the Town of Stratford.

- Volume estimates are preliminary and based on existing data. Confirmation sampling during the selected cleanup action will modify estimated waste volumes.

Capping with Consolidation (Scenarios A, B and C) – General Assumptions

- Each consolidation design (see below) includes consolidation of approximately 7,000 CY of Raymark waste into the wetland bounded by Ferry Creek to the west, Vacant Lot at Housatonic Avenue to the north, and the residential properties along Housatonic Avenue to the south and east.

- The 7,000 CY consolidation capacity for the wetland was estimated based on the assumption that this area would be filled to an elevation that would tie into the cap that is constructed over the OU3 Study Area (CAMU) (elevation = 10 feet above msl at edge of creek). The current elevation of this wetland is assumed to be 4 to 5 feet above msl. Allowing for a 3-foot cap thickness, the thickness of Raymark waste was assumed approximately 3 feet over an area of approximately 60,000 square feet.

- Each consolidation design includes capping of Raymark waste at the Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue. In each case, these caps would be constructed to be continuous between properties and between the Ferry Creek culvert/cap.

- Hydraulic calculations for culvert design were performed using a flow rate of 800 cubic feet per second (based on a 100-year storm event) as calculated by the Army Corps of

Engineers (Hydrologic and Hydraulic Analysis, 1998). It should be noted that this peak flow rate does not take into account the construction of an low-permeability cap over 600 East Broadway, which would add considerable runoff volume to Ferry Creek upstream from the culverted area. Slope of the culvert/channel was assumed to be 1 foot vertical to 1,000 feet horizontal (S = 1/1000). If any of the CAMU designs/scenarios were to be selected, the hydraulic assumptions would need to be updated/re-evaluated.

- The design connection between the pipe running under Ferry Boulevard and a new culvert/open channel has not been engineered for this screening analysis.

- The construction of each of the consolidation designs would require temporary diversion of Ferry Creek around work areas so that the culvert construction could be accomplished on dry ground. This could be accomplished by damming the Creek upstream from the work area, then diverting flow through temporary piping that is placed along the tip of the existing banks of the Creek. Water would be discharged back into the Creek at a location downstream from the work area. An alternative dewatering system (for instance, well points) may also be required to keep the Creek bed dry if groundwater discharge to the Creek generates enough water to disrupt construction activities.

- Geotechnical borings advanced into Ferry Creek along the proposed culvert section (A3-SD01 through A3-SD06 have shown the material beneath the creek bottom to be very loose sand or organic material (peat) to a depth of 10 to 18 feet below the creek bottom. Blow counts recorded during boring advancement indicated that spoons were frequently advanced six inches into the subsurface under the weight of the rod or hammer or in fewer than five blows. Figure F-1-8 shows a cross sectional interpretation of the borings that were advanced six inches to the subsurface under the weight of the rod or hammer, or in fewer than five blows. Figure F-1-8 shows a cross sectional interpretation of the borings that were advanced along the length of the Creek bed. As shown on this figure (F-1-8), the upstream half (600 LF) of the culvert consists of approximately 10 feet of very loose material that would not support the weight of the culvert or fill. The downstream half of the culvert area contains between 12 and 18 feet of very loose material. Since excavation to these depths to stabilize the subsurface (through replacement with structural fill) is not a practical options, it was assumed for this evaluation that buried culverts (FC-3 Scenario A and FC-3 Scenario C) would be

installed on piles to provide the structural support necessary to prevent differential settlement, which could enable shifting of the culvert and ultimately failure.

- For all three designs, it was assumed that an average of approximately 2 feet of sediment currently located at the creek bottom would be excavated and temporarily stockpiled on the adjacent OU6 properties. After placement of clean base material, this Raymark waste would be consolidated into the OU3 Study Area CAMU. The volume of material assumed is 7,6000 CY. The volume calculation assumed a square footage of 102,858 SF within Ferry Creek. An average excavation depth of 2 feet across the channel width was assumed for all three designs/scenarios, however the actual depth of excavation required would vary based on the geometry of the culvert/channel being constructed.

- Implementation of each consolidation design/scenario would involve the destruction of up to 150,000 square feet (3.4 acres) of wetlands or aquatic habitat. In order to achieve long-term protection of the environment and comply with ARARs (Executive Order 11990: Protection of Wetlands and Connecticut Coastal Wetland Regulations), loss of these wetlands would need to be mitigated through the creation of new wetlands or restoration of poorly functioning wetlands. For the purpose of this evaluation, it is assumed that wetlands mitigation would be feasible if not on adjacent properties, then elsewhere within the Town of Stratford. The location of wetland mitigation is not critical to the effectiveness of the action (as is the case for floodplain mitigation); therefore it may be more easily achieved than floodplain mitigation.

- Each of the three consolidation design/scenarios is described below and specific assumptions provided for hydraulic design requirements, constructability, Raymark waste consolidation capacity, and floodplain mitigation requirements.

Scenario –Specific Assumptions

Scenario A (Cylindrical Pipe Culvert):

A. <u>Hydraulic Design</u>

- Concrete pipe was assumed. Corrugated steel/aluminum was not considered because of concerns related to corrosion.

- Calculations using Manning Equation determined pipe diameter for a single pipe system to be approximately 12 feet. Due to the anticipated difficulties of fabricating, transporting, handling, and installing this size concrete pipe, a two-pipe approach was evaluated. The required diameter of each pipe was determined to be 9 feet.

- Drainage swale(s) would be constructed at the final ground surface (parallel to the culvert – See Figure F-1-5) to facilitate the collection and management of storm water runoff. Swale(s) would be designed to collect stormwater runoff from the Ferry Boulevard properties, Vacant Lot at Housatonic Avenue, Lot Behind 326 Ferry Boulevard, the adjacent wetland, and the residential properties along Housatonic Avenue and divert it to Ferry Creek downstream of the culvert

B. Constructability

- The bottom of the creek would be excavated to an average depth of approximately 2 feet and backfilled with gravel and crushed stone prior to placement of pipes. Cylindrical culvert pipes would be installed onto the creek bed (approximately 1 to 2 feet below existing surface) and supported by piles. Pile spacing was assumed to be one per 10 linear feet of pipe for the purposes of developing cost estimates for this scenario, but a technical basis for the spacing of piles was not developed for this presentation.

- Clean fill would be used as pipe bedding and to backfill around the pipe to a thickness of approximately 1 foot. Raymark waste would then be consolidated around the outsides of the pipe backfill and along the sides of the current creek channel (See Figure F-1-5).

- Consolidated Raymark waste would be encapsulated using a low-permeability geomembrane to prevent groundwater from passing through contaminated fill. The top 3 feet of the final cover would be a RCRA-complaint cap as described in the *Revised Alternative Cap Design Guidance Proposed of Unlined, Hazardous Waste Landfills in EPA Region 1* (Gagne and Choi, 2001).

- The final grade of the system would rise to a maximum elevation of approximately 11 feet above msl at the center of the Creek channel and slope gently to meet the elevation of the adjacent properties (assumed 10 feet above msl) along the creek –

residential lots along Housatonic Avenue, Vacant Lot at Housatonic Avenue, Lot behind Ferry Boulevard, and 230/250/280/300 Ferry Boulevard.

- The capped area under this Scenario was assumed to be 148,000 square feet (60,000 in wetland; 40,000 on OU6 properties; 48,000 in Ferry Creek). Volume of capping (clean) material required (3 foot thick cap) assumed 16,500 CY. Approximately 1,000 CY assumed clean fill around culvert pipes and 7,600 CY clean material for base material. Total required volume of clean fill assumed 25,100 CY.

C. Raymark Waste Consolidation Capacity

- Approximately 9,200 CY of Raymark waste from other OU6 properties could be placed within the Ferry Creek channel and adjacent wetland under Scenario A (Cylindrical Pipe Culvert). Consolidation capacity has been determined as follows:

  - Capacity for approximately 7,000 CY exists in the wetland adjacent to Ferry Creek. This capacity is available under all consolidation design/scenarios and not dependent upon culvert/channel design (see bullet under General Assumptions above).

  - The total volume of space available around the culvert pipes would be approximately 6,200 CY (Figure F-1-5). However assuming an average of 2-foot excavation along the creek bottom (to place a bed of crushed stone and gravel), approximately 7,620 CY of sediment would need to be displaced in order to construct the culvert. All excavated stream bed materials are assumed to be contaminated and would be placed back into the channel.

  - Therefore the total available capacity for consolidation of Raymark waste from other OU6 properties is approximately 5,600 CY. (7,000 + [6,200-7,620] = 9,200 CY).

- Figure F-1-5 shows the cross-sectional area of Raymark waste that could be placed into an average width (assumed 40 feet) of the Ferry Creek channel after placement of the culvert pipes. For the purpose of this evaluation, the length of the filled portion of the Creek was assumed to be 1,200 linear feet. The cross-sectional area of the Ferry Creek channel available for Raymark waste consolidation is assumed to be 138 square feet.

D. Floodplain Mitigation

- Ground surface elevation throughout the entire area would be graded to at least 10 feet above msl (the current 100-yr floodplain elevation), which would result in the complete loss of flood storage below the current 100-yr flood elevation. Off-property floodplain mitigation would be required to avoid the creation of flood hazards on the properties adjacent to Ferry Creek and to comply with ARARs.

- Preliminary estimated volume of flood storage lost under this scenario = 660,000 CF (330,000 CF in wetland; 330 CF in Ferry Creek channel).

- Assume 60,000 SF*5.5 FT = 330,000 CF for wetland.

- Assume 1,200 FT * 50 FT* 7FT = 336,000 CF for Ferry Creek channel.

Scenario B (Trapezoidal Open Channel):

A. Hydraulic Design

- A concrete-lined trapezoidal configuration was assumed, with 60 degree sidewall slopes and three equal-length channel sides (see Figure F-1-6).
- Calculations using Manning Equation determined required dimensions of channel to be 9 feet wide at base, with 9 foot sloping sides to accommodate peak flow (800 cfs).

B. Constructability

- Consolidated Raymark waste would en encapsulated using a low-permeability geomembrane to prevent groundwater from passing through contaminated fill, as shown on Figure F-1-6.

- Concrete channel would be case in place over approximately 2-feet of clean base material that would isolate consolidated Raymark waste from the bottom of the concrete channel. Excavation of sediments along the existing creek bottom would be necessary (in the center of the current channel) so that the new channel could be set at or below

the existing channel elevation. This material was assumed to be consolidated along the sides of Ferry Creek (4,000 CY assumed – See General Assumptions).

- The final grade of the concrete-lined channel would slope upward to meet the existing grade of the adjacent properties. The concrete channel bottom would tie into low-permeability caps on the adjacent properties.

- The capped area under this Scenario was assumed to be 100,000 square feet (60,000 in wetland; 40,000 on the two OU6 properties). Volume of capping (clean) material required (3 foot thick cap) assumed 11,100 CY. Approximately 2,000 CY assumed clean fill below concrete channel and 7,600 CY of clean material for base material in creek. Total required volume of clean fill assumed 20,700 CY.

C. Raymark Waste Consolidation Capacity

- Approximately 9,200 CY of Raymark waste from other OU6 properties could be placed within the Ferry Creek channel and adjacent wetland under FC-3 Scenario B (Trapezoidal Open Channel). Consolidation capacity has been determined as follows:

  - Capacity for approximately 7,000 CY exists in the wetland adjacent to Ferry Creek. This capacity is available under all FC-3 scenarios and not depended upon culvert/channel design (see bullet under General Assumptions above).

  - The total volume of space available below the concrete channel would be approximately 6,200 CY (Figure F-1-6). However, assuming an average 2-foot excavation along the creek bottom (to place a bed of crushed stone and gravel), approximately 7,600 CY of sediment would need to be displayed in order to construct the culvert. All excavated stream bed materials are assumed to be contaminated and would be placed back into the channel.

  - Total available capacity for consolidation of Raymark waste from other OU6 properties is approximately 5,600 CY. (7,000 + [6,200 – 7,600] = 5,600 CY).

- Figure F-1-6 shows the cross-sectional area of Raymark waste that could be placed into an average width (assumed 40 feet) of the Ferry Creek channel below the trapezoidal open channel. For the purpose of this evaluation, the length of the filled portion of the Creek was assumed to be 1,200 linear feet. The cross-sectional area of the Ferry Creek channel available for Raymark waste consolidation is assumed to be 140 square feet.

D. Floodplain Mitigation

- Drainage swales would not be included along the sides of the channel, since the open channel design would permit drainage of storm water runoff directly into the concrete-lined Ferry Creek channel.

- Preliminary estimated volume of flood storage lost under this scenario = 420,000 CF (330,000 CY in wetland; 90,000 CF in Ferry Creek channel).

- Assume 60,000 SF * 5.5 FT = 330,000 CF for wetland.

- Assume 1,200 FT * 77 SF = 92,400 CF for Ferry Creek channel.

FC-3 Scenario C (Pipe Arch Culvert):

A. Hydraulic Design

- An alternative culvert type to the cylindrical concrete pipes was considered for the culvert and fill scenario. Some consideration was given to precast concrete box culvert, but a metal corrugated arch culvert was selected instead because it would be less expensive and easier to handle. Furthermore, the metal arch culvert would be more flexible and, therefore, better able to accommodate minor imperfections in the creek bottom. Aluminum was selected over steel because of its greater resistance to oxidation and corrosion.

- The required dimensions of the aluminum arch culvert were determined to be 14 feet wide by 10 feet high (See Figure F-1-7) to accommodate peak flow during a 100-year event. Sizing information based on vendor-supplied literature assuming aluminum pipe-arch.

B. Constructability

- Arch culvert would be installed onto the creek bed (approximately 1 to 2 feet below existing surface) and supported by pipes. Pile spacing was assumed to be one per 10 linear feet of pipe for the purposes of developing cost estimates for this scenario, but a technical basis for the spacing of piles was not developed for this presentation.

- Raymark waste would be consolidated along the sides for the culvert as shown on Figure F-1-7. Approximately 1 foot of clean fill would be placed around the arch culvert pipe to provide a buffer between consolidated Raymark wastes and the aluminum pipe.

- Consolidated Raymark waste would be encapsulated using an low-permeability geomembrane to prevent groundwater from passing through contaminated fill. The top 3 feet of the final cover would be a low-permeability cap as described in the Revised Alternative Cap Design Guidance Proposed for Unlined, Hazardous Waste Landfills in EPA Region 1 (Gagne and Choi, 2001).

- The final grade of the system would rise to a maximum elevation of approximately 10 feet above msl at the center of the creek channel and slope gently to meet the elevation of the adjacent properties (assumed 10 feet above msl) along the creek – residential lots along Housatonic Avenue, Vacant Lot at Housatonic Avenue, Lot behind Derry Boulevard, and 230/250/280/300 Ferry Boulevard. The final surface completion would be identical to FC-3 Scenario (Cylindrical Pipe Culvert).

- The capped area under this Scenario was assumed to be 148,000 square feet (60,000 in wetland; 40,000 on OU6 properties; 48,000 in Ferry Creek). Volume of capping (clean) material required (3 foot thick cap) assumed 16,500 CY. Approximately 1,000 CY assumed clean fill around arch culvert pipe and 7,600 CY clean material for base material. Total required volume of clean fill assumed 25,100 CY.

C. Raymark Waste Consolidation Capacity

- Approximately 9,000 CY of Raymark waste from other OU6 properties could be placed within the Ferry Creek channel and adjacent wetland under FC-3 Scenario C (Pipe Arch Culvert). Consolidation capacity has been determined as follows:

  - Capacity for approximately 7,000 CY exists in the wetland adjacent to Ferry Creek. This capacity is available under all FC-3 scenarios and not dependent upon culvert/channel design (see bullet under General Assumptions above).

  - The total volume of space available around the culvert pipe would be approximately 9,600 CY (Figure F-1-7). However, assuming a 2-foot average excavation along the Creek bottom (to place a 2-foot bed of crushed stone and gravel below the centerline of the pipe, extending to the width of the channel), approximately 7,600 CY of sediment would need to be displaced in order to construct the culvert. All excavated stream bed materials are assumed to be contaminated and would be placed back into the channel.

  - Total available capacity for consolidation of Raymark waste from other OU6 properties is approximately 9,000 CY (7,000 + [9,600 – 7,600] – 9,000 CY).

- Figure 4 shows the cross-sectional area of Raymark waste that could be placed into an average width (assumed 40 feet) of Ferry Creek channel after placement of the arch culvert. For the purpose of this evaluation, the length of the filed portion of the Creek was assumed to be 1,200 linear feet. The cross-sectional area of the ferry Creek channel available for Raymark waste consolidation is assumed to be 216 square feet.

D. Floodplain Mitigation

- Ground surface elevation throughout the entire area would be graded to at least 10 feet above msl (the current 100-year floodplain elevation), which would result in the complete loss of flood storage below the current 100-year flood elevation. Off-property floodplain mitigation would be required to avoid the creation of flood hazards on the properties adjacent to Ferry Creek and to comply with ARARs.

- Preliminary estimated volume of flood storage lost under this scenario = 660,000 CY (330,000 CF in wetland; 330,000 CF in Ferry Creek channel).

- Assume 60,000 SF * 5.5 FT – 330,000 CF for wetland.

- Assume 1,200 FT * 40FT * 7FT – 336,000 CF for Ferry Creek channel.

Preliminary Screening

Effectiveness

A. Short-Term Protection of Human Health and the Environment

Human Health: Each of the CAMU designs could be implemented in a manner that is protective of human health in the short term (during the construction period). The designs would involve earth-moving activities that would create the potential for exposure to Raymark waste contaminants. These potential exposures would be addressed through engineering controls (e.g.; dust control, personal protective equipment, decontamination facilities, dewatering equipment, etc.) to minimize human contact with contaminated materials. However, a significant amount of sediment handling and work in wet or saturated areas would be required, making these controls more difficult than normal to implement, since by nature wet or saturated materials are more difficult to contain than dry materials.

Truck decontamination stations could be constructed at property access ways to prevent the transport of contaminated material onto public roadways. A monitoring program would be used to verify that contaminants do not migrate beyond the perimeter of the work area. These types of controls are commonly used at remediation projects of this type, and would be very reliable to mitigate potential short-term human health impacts associated with the remedial action.

Environment: All three conceptual designs for the CAMU option would result in significant short-term impacts to the environment. Ferry Creek would need to be diverted during culvert or channel placement for each of the three designs which would significantly impact the hydrology of the area, potentially creating short-term flood hazards. Removal of sediment from the creek bottom would destroy the aquatic habitat covering the creek sediments which would take time to regenerate.

Performing earth-moving activities in wetland and floodplain areas would not be protective of the environment in the short-term and would entail a temporary loss of these resources due to not only the movement of waste in these areas, but also potentially from the engineering measures that would be required to gain access to the area (i.e. placement of gravel fill or utilization of swamp mats to stabilize the ground surface beneath heavy equipment). Cofferdams or other containment structures could also be used to prevent flooding of work areas. These measures would minimize impacts to sensitive areas to the extent practical but significant short-term impacts would be unavoidable.

B. Long-Term Protection of Human Health and the Environment

Human Health: In the long term, all three conceptual designs could protect human health by preventing direct contact with Raymark waste contaminants. Because all three options leave some Raymark waste in place, institutional controls would be placed on the properties to prohibit groundwater use and/or activities that could result in future exposures. The long-term protection of human health would be dependent upon the enforcement of these institutional controls.

The CAMU options would provide long-term protectiveness from approximately 38,600 CY of waste currently located at the OU3 Study Area as well as up to an additional 5,600 to 9,000 CY of Raymark waste from other locations in Town, which currently pose risks to human health. Raymark waste would be consolidated beneath the RCRA-compliant low-permeability cap. Reuse above the waste could occur ensuring additional long-term protectiveness.

Environment: Each of the CAMU designs could result in long-term protection of the environment. Contact between Raymark waste and human and ecological receptors would be mitigated by a RCRA-compliant, low-permeability cap. Impacted floodplains and wetlands would require mitigation/restoration as necessary to ensure protectiveness following implementation. Any mitigation that could not be accomplished on the property would be constructed in an area immediately surrounding the property, to the extent practical.

Because of the complexities in the hydrology of the area, both the surface water and ground water of the area would need to be more fully evaluated to ensure that filling Ferry Creek could be accomplished in a manner that protects the environment in the long term.

C. Reduction of Toxicity, Mobility, and Volume through Treatment

The CAMU option entails excavating Raymark waste and leaving waste in-place within the OU3 Study Area for final disposition under a RCRA compliant low-permeability cap. Under a CAMU option, a reduction in toxicity, mobility or volume will be realized if excavated Raymark waste from other locations requires treatment. Raymark waste transported to the CAMU would be subject to analytical sampling to determine compliance with the Principal Hazardous Constituents (PHCs) standard established by the CAMU regulations. Any waste found to be above PHC levels will require off-site treatment and disposal. Based upon historical sampling conducted throughout the OU6 property groups, it is assumed that approximately 10% of the excavated waste may require off-site treatment prior to disposal. Proposed remedial alternatives and corresponding volumes of waste assumed to require off-site treatment and disposal are provided in Section 4.0 (Volume 1 of this Feasibility Study) for each individual Property Group being addressed in OU6 (Nobis, 2010).

Implementability

A. Technical Feasibility

The CAMU option designs for the OU3 Study Area would be technically feasible with regard to construction activities that would be employed. Excavation, sampling, stockpiling, transportation/disposal of contaminated material, and cap construction are commonly used remediation methods that could reliably achieve the remediation action objectives. Conventional construction equipment and techniques would be used to perform the work.

However, existing wetlands present at the OU3 Study Area would make access and occupancy for heavy equipment challenging. Stabilization of ground surfaces would be necessary in order to operate heavy equipment. Engineering measures required to access the work areas would increase the environmental impacts and decrease the productivity of excavation. In addition, the area is tidally influenced which would have to be addressed during and after CAMU development. These obstacles could be overcome with a reasonable degree of certainty, but the excavations and construction would not be routine.

The greatest technical limitation is floodplain mitigation. Each of the designs/scenarios would include filling a significant portion of Ferry Creek which currently provides a large volume of

flood storage capacity in the area between the Ferry Boulevard and the Housatonic River. In order to be effective, floodplain mitigation would need to be conducted in close proximity in the flood storage area that is being lost. Because the flood storage volume required for mitigation is so large and because available property to provide such mitigation is severely limited, the ability to implement these options would be very challenging and potentially infeasible.

If an assumption is made that areas for floodplain mitigation could be identified and utilized, then all three design scenarios would be technically feasible from a construction standpoint. While construction of a culvert/channel in Ferry Creek would be complicated, settlement over the long term is a larger concern. Geotechnical borings advanced into the Creek's sediment have indicated over 10 feet of organic material, which would not support a culvert (Figure F-1-8). This material would need to be excavated and replaced with soil/stone material or the culvert would need to be placed on pilings. Even after stabilization of the creek bed, differential settlement is likely to occur, resulting in a potential failure, slippage of the culvert, and/or extensive settling of the area from the weight of the culvert and backfill materials. Therefore, for the purposes of evaluating these scenarios, it was assumed that both FC-3 Scenario A (cylindrical pipe culvert) and FC-3 Scenario C (arch pipe culvert) would be supported by piles driven into consolidated materials located at depth within the channel.

The technical feasibility (constructability) of these options would be further complicated by the need to perform work on or around active commercial properties (Ferry Boulevard Properties). This would be difficult as the most efficient access point to the lower portions of the Creek for each of these options require access to 230, 250, 280, and 300 Ferry Boulevard. Storage of consolidated waste or clean material, as well as maneuvering of equipment in and out of the area would be difficult.

Implementation and enforcement of institutional controls would be feasible.

B. Administrative Feasibility

Disturbance of floodplains and wetlands would require coordination with the State and local entities to ensure that impacts are not permanent and that adequate mitigation is conducted. The consolidation capacity for additional Raymark waste at the OU3 Study Area is limited to

less than 9,000 CY based upon the hydraulic function of the property that would need to be preserved following remedial action.

Cost

C. Capital Costs

Capital costs would include mobilization/demobilization and site preparation costs, costs associated with excavation and the handling of Raymark waste, costs associated with stabilization of the bed of Ferry Creek and construction of a culvert/channel, construction of the RCRA-compliant, low-permeability cap, costs for floodplain and wetland mitigation as necessary. As additional capital costs (including potential land acquisition) are anticipated to be required for wetland/floodplain mitigation, the preliminary screening results for the OU3 Study Area CAMU options indicates that high-level costs would be associated with this action.

D. Operations, Maintenance, and Monitoring Costs

O&M costs would include; monthly inspections and annual reporting for the cap, quarterly sampling with annual reporting for groundwater for the first two years and annual sampling/reporting thereafter, annual maintenance/repairs of the RCRA-complaint caps in a tidally influenced area, annual inspections and reporting for institutional controls, and five-year reviews. The preliminary screening results indicate that O&M costs would be high-level for a CAMU option at the OU3 Study Area.

Preliminary Screening Summary

Based upon the preceding evaluation of the required screening criteria of effectiveness, implementability and cost, utilizing the OU3 Study Area as a CAMU location is not considered to be a viable option. The primary issues are the technical and administrative difficulties anticipated for construction within wetlands/floodplains, the additional capital costs associated with such construction activities, maintenance of the cap in a tidally influenced area, and the overall limited (5,600-9,000 CY) capacity for consolidation of Raymark waste from other properties within Stratford.This option is not being retained for further evaluation in a detailed analysis presented in Appendix F-2.

APPENDIX F-1E

576/600 EAST BROADWAY STUDY AREA

CAMU PRELIMINARY SCREENING

APPENDIX F-1E

576/600 EAST BROADWAY STUDY AREA
CAMU PRELIMINARY SCREENING

Property Description

576 and 600 East Broadway is a single parcel of commercially-zoned (light industrial) land totaling approximately 5.8 acres located on East Broadway, Stratford, Connecticut. The physical characteristics of 576/600 East Broadway is described in Section 4.3.6 of Volume 1.

Based on EPA's investigations, a portion of the property was originally wetlands. The entire area has been filled with both natural and manmade materials with Raymark waste found throughout the property at depths of up to 18 feet below grade. EPA investigations estimate that 43,000 cubic yards (CY) of Raymark waste is present on the property. Potential risks are to human health. No ecological risks from Raymark waste were identified.

CAMU Option

576/600 East Broadway was identified by the RAC and its technical advisor as one of the locations in Stratford with the potential for the consolidation of Raymark waste. A description of this potential CAMU option is summarized below, and evaluated against preliminary screening criteria promulgated under the National Oil and Hazardous Substance Contingency Plan (NCP) in the following subsection.

- **Consolidation and Capping as a CAMU.** The approach for developing a CAMU at 576/600 East Broadway would be to transport Raymark waste from other locations in Stratford and place them under a RCRA-compliant, low-permeability cap ("RCRA" refers to the federal Resource Conservation and Recovery Act, which regulates the management of hazardous waste; a "RCRA-compliant" cap is a cap that is equivalent to a cap that covers a hazardous waste landfill). However, approximately 8,000 CY of Raymark waste is located within the 100-year floodplain at 576/600 East Broadway which would need to be excavated and placed within the portion of the property located above the 100-year floodplain. Elevations evaluated during this preliminary screening

found that consolidation capacity of up to an additional 24,000 CY is possible at this location while maintaining gentle slopes and topographic contours that would blend into the adjacent properties. Because of this limitation, 576/600 East Broadway does not appear to have consolidation capacity for any additional Raymark waste from other locations in Stratford.

The low-permeability cap would be constructed over the existing Raymark waste footprint (approximately 2.8 acres) that does not lie within the 100-year floodplain, resulting in a maximum increase in elevation of 22 feet above the current ground surface, including the thickness of the cap. Again, the cap would be designed to blend into the topography of adjacent properties. The resulting area would be consistent with reuse plans as conceptualized in the Superfund Redevelopment Initiative (SRI) report or other compatible use as determined by the town. The town is actively engaged in planning for reuse of the parcel that is consistent with overall town objectives. See Figure 4-6 from Volume 1.

Assumptions for the 576/600 East Broadway Study Area CAMU Option

Critical assumptions that facilitated the preliminary screening are provided below.

General:

- The design of each option is conceptual and based on the information available from previous investigations at these properties. Construction equipment and field support facilities would be staged in the northeast portion of these properties. Any impacts to the environment resulting from staging of equipment and materials in this area would be restored following the remedial action.

- The lateral limits of the 100-year floodplain were assumed to consist of the area below 10 feet msl, as depicted on topographical maps available from the Town of Stratford. Therefore, the cap configuration is designed to be above the delineated floodplain.

CAMU Option:

- An RCRA-compliant cap with a footprint of approximately 120,000 square feet (2.8 acres) would be constructed over Raymark waste areas on the property (Figure 4-6 from Volume 1). The RCRA-compliant, low-permeability cap would be approximately 3 feet in thickness and would meet the technical requirements contained in 40 CFR 264.310 and interpreted in the *Revised Alternative Cap Design Guidance Proposed for Unlined, Hazardous Waste Landfills in EPA Region I* (Gagne and Choi, 2001).

- The entire cap footprint would be above the existing 10 foot msl elevation, so that the current flood storage of these properties is not impacted by the remedial action.

- Approximately 8,000 CY of Raymark waste would be excavated from the floodplain areas within the property and placed beneath the RCRA cap. The capped area of the property would be above the 100-year floodplain.

- The final property contours would be designed to meet East Broadway at its current elevation and rise gently toward the center of 600 East Broadway, never reaching a height in excess of 22 feet msl (the highest point on the property is currently approximately 14.5 feet above msl).

Preliminary Screening

Effectiveness

A. Short-Term Protection of Human Health and the Environment

Human Health: The consolidation of Raymark waste currently present at 576/600 East Broadway would be implemented in a manner that is protective of human health in the short-term (during the construction period). However, the option would involve earth-moving activities that would create the potential for exposure to Raymark waste contaminants. These potential exposures would be addressed through engineering controls (e.g.; dust control, personal protective equipment, decontamination facilities) to minimize human contact with contaminated materials. Truck decontamination stations would be constructed at property access ways to prevent the transport of contaminated material onto public roadways. A monitoring program would be used to verify that contaminants do not migrate beyond the perimeter of the work area. These types of

controls are commonly used at remediation projects of this type, and should be very reliable to mitigate potential short-term human health impacts associated with the remedial action.

Environment: The consolidation of Raymark waste currently present at 576/600 East Broadway would result in short-term impacts to the environment due the presence of floodplains within the Raymark waste area. Performing earth-moving activities in floodplain areas would not be protective of the environment in the short-term and would entail a temporary loss of this resource. These impacts would be temporary as the conceptual design limits the extent of the cap to non-floodplain portions of the Study Area, and would be controlled through the use of erosion and sedimentation controls during the construction period. Cofferdams or other containment structures could also be used to prevent flooding of work areas. These measures would minimize impacts to sensitive areas to the extent practical and backfilling of disturbed floodplain areas following construction activities would require that the hydraulic functionality of the floodplain is restored to pre-existing conditions following Raymark waste removal.

B. Long-Term Protection of Human Health and the Environment

Human Health: In the long-term, consolidation of Raymark waste currently present at 576/600 East Broadway would protect human health by preventing direct contact with Raymark waste contaminants. Because Raymark waste would be left in-place, institutional controls would be placed on the property to prohibit groundwater use and/or activities that could result in future exposures. The long-term protection of human health would be dependent upon the enforcement of these institutional controls.

The consolidation of Raymark waste currently present at 576/600 East Broadway would provide long-term protectiveness from the approximately 18,700 CY of Raymark waste currently on the property within the 100-year floodplain in addition to 8,000 CY that could be consolidated from other properties within Stratford or portions of 576/600 East Broadway that lie within the floodplain. Raymark waste would be consolidated beneath the RCRA-compliant low-permeability cap. Reuse above the waste could occur ensuring additional long-term protectiveness.

Environment: The consolidation of Raymark waste currently present at 576/600 East Broadway would result in long-term protection of the environment. Contact between Raymark waste and precipitation would be mitigated via construction of a RCRA-compliant, low-permeability cap.

Impacted floodplains would require restoration (in-place) as necessary to ensure protectiveness following implementation to ensure that no flood storage capacity is lost.

C. Reduction of Toxicity, Mobility, and Volume Through Treatment

This option entails leaving Raymark waste in-place at the 576/600 East Broadway Study Area for final disposition under a RCRA compliant low-permeability cap. If any additional capacity for Raymark waste from other locations in Stratford could be found, under a CAMU option, a reduction in toxicity, mobility or volume would be realized if excavated Raymark waste from those other locations required treatment. Raymark waste transported to the CAMU would be subject to analytical sampling to determine compliance with the Principal Hazardous Constituents (PHCs) standard established by the CAMU regulations. Any waste found to be above PHC levels would require off-site treatment and disposal. Based upon historical sampling conducted throughout the OU6 property groups, it is assumed that approximately 10% of the excavated waste may require off-site treatment prior to disposal. However, based upon the maximum capacity available at 576/600 East Broadway, no additional Raymark waste from other locations would be included, therefore, no reduction of toxicity, mobility and volume through treatment would be anticipated.

Implementability

A. Technical Feasibility

The consolidation of Raymark waste currently present at 576/600 East Broadway would be technically feasible with regard to construction activities that would be employed. Excavation, sampling, stockpiling, transportation/disposal of contaminated material, and cap construction are commonly used remediation methods that could reliably achieve the remediation action objectives. Conventional construction equipment and techniques would be used to perform the work.

Wetland and floodplain mitigation would not be required. There are no wetlands on the property and the portion of the property that lies within the 100-year floodplain will not be included under the cap.

However, based upon the conceptual designs that were employed for this evaluation, the maximum consolidation capacity available within the Study Area at 576/600 East Broadway is

limited to 8,000 CY. This maximum capacity only provides adequate space to consolidate Raymark waste that must be excavated from within the floodplains on the property.

Implementation and enforcement of institutional controls would be feasible.

B. Administrative Feasibility

No off-property permitting difficulties are anticipated. No administrative issues are anticipated.

Cost

A. Capital Costs

Capital costs would include mobilization/demobilization and site preparation costs, costs associated with the excavation and handling of Raymark waste, costs associated with construction of a RCRA-compliant, low-permeability cap and costs for floodplain restoration as necessary. Additional capital costs are not anticipated to be required for wetland/floodplain mitigation based upon the assumption that disturbed floodplains would be restored in-place with no lost flood storage capacity. The preliminary screening results for the 576/600 East Broadway Study Area, which is only for consolidation of Raymark waste already present on the property, indicates that medium-level costs would be associated with this option.

B. Operations, Maintenance, and Monitoring Costs

O&M costs would include; monthly inspections and annual reporting for the cap, quarterly sampling with annual reporting for groundwater for the first two years and annual sampling/reporting thereafter, annual maintenance/repairs of the RCRA-complaint cap, annual inspections and reporting for institutional controls, and five-year reviews. The preliminary screening results indicate that O&M costs would be medium-level at the 576/600 East Broadway Study Area.

Preliminary Screening Summary

Based upon the preceding evaluation of the required screening criteria of effectiveness, implementability, and cost, utilizing the 576/600 East Broadway Study Area as a CAMU location is not a viable option as consolidation capacity is not sufficient to accept Raymark waste from

other locations within Stratford. The conceptual design indicates capacity for only on-property consolidation of Raymark waste that must be excavated from within the floodplain areas of the property. Because of capacity limitations, a CAMU option for 576/600 East Broadway is not retained for further evaluation in a detailed analysis, presented in Appendix F-2.

APPENDIX F-1 F

230/250/280/300 FERRY BOULEVARD STUDY AREA

CAMU PRELIMINARY SCREENING

APPENDIX F-1 F

230/250/280/300 FERRY BOULEVARD STUDY AREA
CAMU PRELIMINARY SCREENING

Property Description

The 230/250/280/300 Ferry Boulevard Study Area (Ferry Boulevard Properties or Study Area) consist of four separate parcels of commercially-zoned land totaling approximately 7.7 acres. The physical characteristics of the 230/250/280/300 Ferry Boulevard Study Area is described in Section 4.3.3.

Based on EPA's investigations, much of the area was originally wetlands. The entire area has been filled with both natural and manmade materials with Raymark waste found throughout the area at depths of up to 16 feet below grade. EPA investigations estimate that over 100,000 cubic yards (CY) of Raymark waste is present on the Ferry Boulevard Properties. Potential risks are to human health. No ecological risks from Raymark waste were identified.

CAMU Option

The Study Area was identified by the RAC and its technical advisor as one of the locations in Stratford with the potential for the consolidation of Raymark waste. A description of this potential CAMU option is summarized below and evaluated against preliminary screening criteria promulgated under the National Oil and Hazardous Substance Contingency Plan (NCP) in the following subsection.

Consolidation and Capping. The approach for developing a CAMU at Ferry Boulevard Properties would be to transport Raymark waste from other locations in Stratford and place them under a RCRA-compliant, low-permeability cap ("RCRA" refers to the federal Resource Conservation and Recovery Act, which regulates the management of hazardous waste; a "RCRA-compliant" cap is a cap that is equivalent to a cap that covers a hazardous waste landfill). Approximately 9,000 CY of Raymark waste would be excavated from the areas located in the western portion of these properties. 1,000 CY would be consolidated beneath a RCRA-compliant cap on the properties; and 8,000 CY

would be transported to either an in-town stockpiling area (and ultimately out-of-town for disposal) or directly to an in-town CAMU located elsewhere within the Town of Stratford. A RCRA-complaint cap with a footprint of approximately 240,000 square feet (5.5 acres) would be constructed over Raymark waste areas on these properties. The RCRA-compliant cap would be approximately 2.5 feet in thickness. The ground surface would be finished with asphalt in most areas to match the existing ground surface conditions. The final property contours would be raised in the eastern portion of these properties to accommodate consolidated Raymark waste originating from the western portion of the properties. A loss in flood storage would be realized from this rise in topography since this area is within the 100-year floodplain. Off-property floodplain mitigation of approximately 100,000 CF would be required. Off-property floodplain mitigation could be performed in the wetland area to the east (opposite side) of Ferry Creek across from 250, 208, and 300 Ferry Boulevard or potentially on the Lockwood Avenue property.

As a result of this preliminary screening, however, it was quickly determined that sufficient capacity does not exist to handle the volume of Raymark waste that would be generated from placing a cap on the Ferry Boulevard properties. Accordingly, there also is no capacity to accept consolidation of Raymark Waste from other locations. As each of the Ferry Boulevard properties have an active commercial building at current grades, raising the overall elevations within the area is not practicable. In addition, addressing lost floodplain storage capacity (approximately 45% of the Study Area lies within the 100-year floodplain) resulting from placing the excavated Raymark within the 100-year floodplain along Ferry Creek will be significant. Because of these obstacles it has been determined that developing a CAMU at the Ferry Boulevard Properties would be infeasible. See Figure 4-3 from Volume 1.

Assumptions for the 230/250/280/300 Ferry Boulevard Properties CAMU Option

Critical assumptions that facilitated the preliminary screening are provided below.

General:

- The design of each option is conceptual and based on the information available from previous investigations at these properties.

- Construction equipment and field support facilities would be staged in the eastern portions of these properties during implementation of these options. Any impacts to the environment resulting from staging of equipment and materials in this area would be restored following the remedial action (including wetland impacts, as necessary).

- A RCRA-compliant, low-permeability cap would be approximately 2.5 feet in thickness, and would meet the technical requirements contained in the 40 CFR 264.310 and interpreted in the *Revised Alternative Cap Design Guidance Proposed for Unlined, Hazardous Waste Landfills in EPA Region 1* (Gagne and Choi, 2001).

- The lateral limits of the 100-year floodplain were assumed to consist of the area below 10 feet msl, as depicted on topographical maps available from the Town of Stratford.

- Capping over both 230 and 250 Ferry Boulevard would require that the drainage swale located along the property boundary between these two parcels be culverted to maintain a drainage pathway between Ferry Boulevard and Ferry Creek. The loss of this wetland area would need to be mitigated at an on-property location, if possible, or at an off-property location.

Consolidation and Capping:

- Consolidation and capping was determined to not be viable at the Ferry Boulevard Properties. Because of current land use, construction of a CAMU that meets the existing grade at the base of existing structures and rises to a reasonable height before meeting the current shoreline of Ferry Creek would not allow for a significant consolidation volume of Raymark waste.

Preliminary Screening

Effectiveness

A. Short-Term Protection of Human Health and the Environment

Human Health: The CAMU option could be implemented in a manner that is protective of human health in the short term (during the construction period). The options would involve earth-moving activities that would create the potential for exposure to Raymark waste contaminants. These potential exposures would be addressed through engineering controls (e.g.; dust control, personal protective equipment, decontamination facilities) to minimize human contact with contaminated materials. However, a marginal amount of sediment handling and work in wet or saturated areas would be required, making these controls more difficult than normal to implement, since by nature wet or saturated materials are more difficult to contain than dry materials.

Truck decontamination stations could be constructed at property access ways to prevent the transport of contaminated material onto public roadways. A monitoring program would be used to verify that contaminants do not migrate beyond the perimeter of the work area. These types of controls are commonly used at remediation projects of this type, and should be very reliable to mitigate potential short-term human health impacts associated with the remedial action.

The entire area of the Ferry Boulevard Properties contains active commercial businesses that would be impacted during construction. These impacts would be minimized to the extent practicable, but construction would likely require closure of several of these businesses for a significant period of time while excavations and capping were occurring.

Environment: The CAMU option would result in significant short-term impacts to the environment due to the presence of significant floodplains within the Study Area. The drainage swale located along the property boundary between 230 and 250 Ferry Boulevard would be culverted to maintain a drainage pathway between Ferry Boulevard and Ferry Creek. The loss of this wetland area would need to be mitigated, and due to a lack of identified open space within the Study Area, mitigation would likely be required at an off-property location.

Performing earth-moving activities in wetland and floodplain areas would not be protective of the environment in the short-term and would entail a temporary loss of these resources due to not

only the movement of waste in these areas, but also potentially from the engineering measures that would be required to gain access to the area (i.e. placement if gravel fill or utilization of swamp mats to stabilize the ground surface beneath heavy equipment). Cofferdams or other containment structures could also be used to prevent flooding of work areas. These measures would minimize impacts to sensitive areas to the extent practical.

Some impacts could be limited to a certain extent using engineering controls, and flood storage capacity and habitat restoration could be achieved through off-site mitigation but the short-term loss of wetlands and floodplains would be unavoidable given the location of the work area. Significant flood storage capacity (volume needed – same a above) lost due to cap construction would require off-site mitigation as no available open space within the Study Area is available for onsite compensation.

B. Long-Term Protection of Human Health and the Environment

Human Health: In the long term, the CAMU option could protect human health by preventing direct contact with Raymark waste contaminants. Because this option leaves some Raymark waste in place, institutional controls would be placed on the properties to prohibit groundwater use and/or activities that could result in future exposures. The long-term protection of human health would be dependent upon the enforcement of these institutional controls.

The CAMU options would provide long-term protectiveness from approximately 100,000 CY of Raymark waste currently located at the Study Area, which currently pose risks to human health. On-property Raymark waste would be consolidated beneath the RCRA-compliant cap. Reuse above the waste could occur ensuring additional long-term protectiveness.

Environment: The CAMU option would result in long-term protection of the environment. Contact between Raymark waste and precipitation would be mitigated via construction of a RCRA-compliant, low-permeability cap. Impacted wetlands would require mitigation/restoration as necessary to ensure protectiveness following implementation. Any mitigation that could not be accomplished on the property would be constructed in an area immediately surrounding the property, to the extent practical. Floodplain storage capacity lost would be a significant obstacle to mitigate. On-site compensation is not available and extensive surrounding land use limits

available land for off-site floodplain compensation. As the entire area is within the 100 year floodplain, flooding is a significant concern.

C. Reduction of Toxicity, Mobility, and Volume through Treatment

This option entails leaving Raymark waste in-place at the Study Area for final disposition under a RCRA compliant cap. Under a CAMU option, a reduction in toxicity, mobility or volume will be realized if excavated Raymark waste from other locations requires treatment. Raymark waste transported to the CAMU would be subject to analytical sampling to determine compliance with the Principal Hazardous Constituents (PHCs) standard established by the CAMU regulations. Any waste found to be above PHC levels will require off-site treatment and disposal. Based upon historical sampling conducted throughout the OU6 property groups, it is assumed that approximately 10% of the excavated waste may require off-site treatment prior to disposal. However, based upon the maximum capacity allowed for consolidation of Raymark waste above the conceptual cap design, no additional waste is anticipated to be included under the cap; therefore, no reduction of toxicity, mobility and volume through treatment are anticipated.

Implementability

A. Technical Feasibility

The CAMU option for the Study Area would be technically feasible with regard to construction activities that would be employed. Excavation, sampling, stockpiling, transportation/disposal of contaminated material, and cap construction are commonly used remediation methods that could reliably achieve the remediation action objectives. Conventional construction equipment and techniques would be used to perform the work.

However, existing floodplains and wetlands present at the Study Area would make access and occupancy for heavy equipment challenging. Stabilization of ground surfaces would be necessary in order to operate heavy equipment. Engineering measures required to access the work areas would increase the environmental impacts and decrease the productivity of excavation. These obstacles could be overcome with a reasonable degree of certainty, but the excavations would not be routine. Because of existing land use, there is no consolidation capacity for additional Raymark waste from other locations within Stratford at the Ferry Boulevard Properties.

A CAMU option would require wetland mitigation. Off-property wetland mitigation would be feasible at this location due to the availability of degraded or poorly-functioning wetlands in adjacent areas. Any loss of wetland resources that could not be mitigated on the properties could likely be mitigated through the restoration of wetlands to the east of Ferry Creek (adjacent to 250/280/300 Ferry Boulevard) or potentially on the Lockwood Avenue Property which is located just downstream of the properties. These two wetland areas have been determined to be poorly functioning and mitigation efforts could increase their overall ecological value.

Floodplain mitigation would also be required which would be very challenging because of extensive land use and limited real estate availability, as well as the existing regional hydrology of Ferry Creek. However, if land could be found, mitigation would be technically feasible.

Implementation and enforcement Institutional Controls would be feasible.

D. Administrative Feasibility

Disturbance of floodplains/wetlands would require coordination with the State and local entities to ensure that impacts are not permanent and that adequate mitigation is conducted.

Cost

E. Capital Costs

Capital costs would include mobilization/demobilization and site preparation costs, costs associated with excavation and the handling of Raymark waste, costs associated with construction of the RCRA-compliant, low-permeability cap, costs for floodplain restoration, and significant wetland mitigation, as necessary. As additional capital costs are anticipated to be required for wetland/floodplain mitigation, the preliminary screening results for the Ferry Boulevard Properties CAMU option indicates that high-level costs would be associated with this option.

F. Operations, Maintenance, and Monitoring Costs

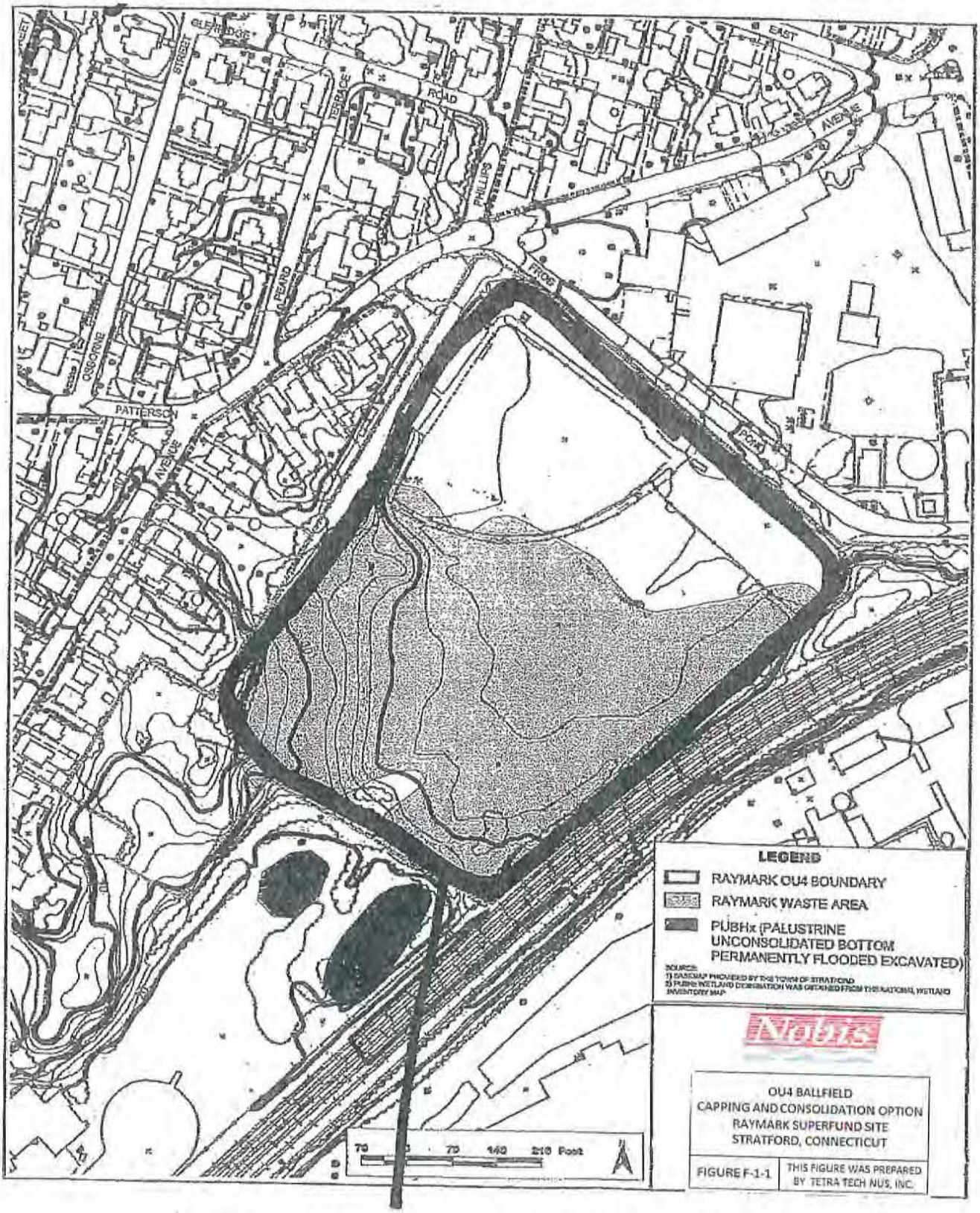
O&M costs would include; monthly inspections and annual reporting for the cap, quarterly sampling with annual reporting for groundwater for the first two years and annual sampling/reporting thereafter, annual maintenance/repairs of the RCRA-complaint cap, annual

inspections and reporting for institutional controls and five-year reviews. The preliminary screening results indicate that O&M costs would be medium-level for a CAMU option at the Study Area.

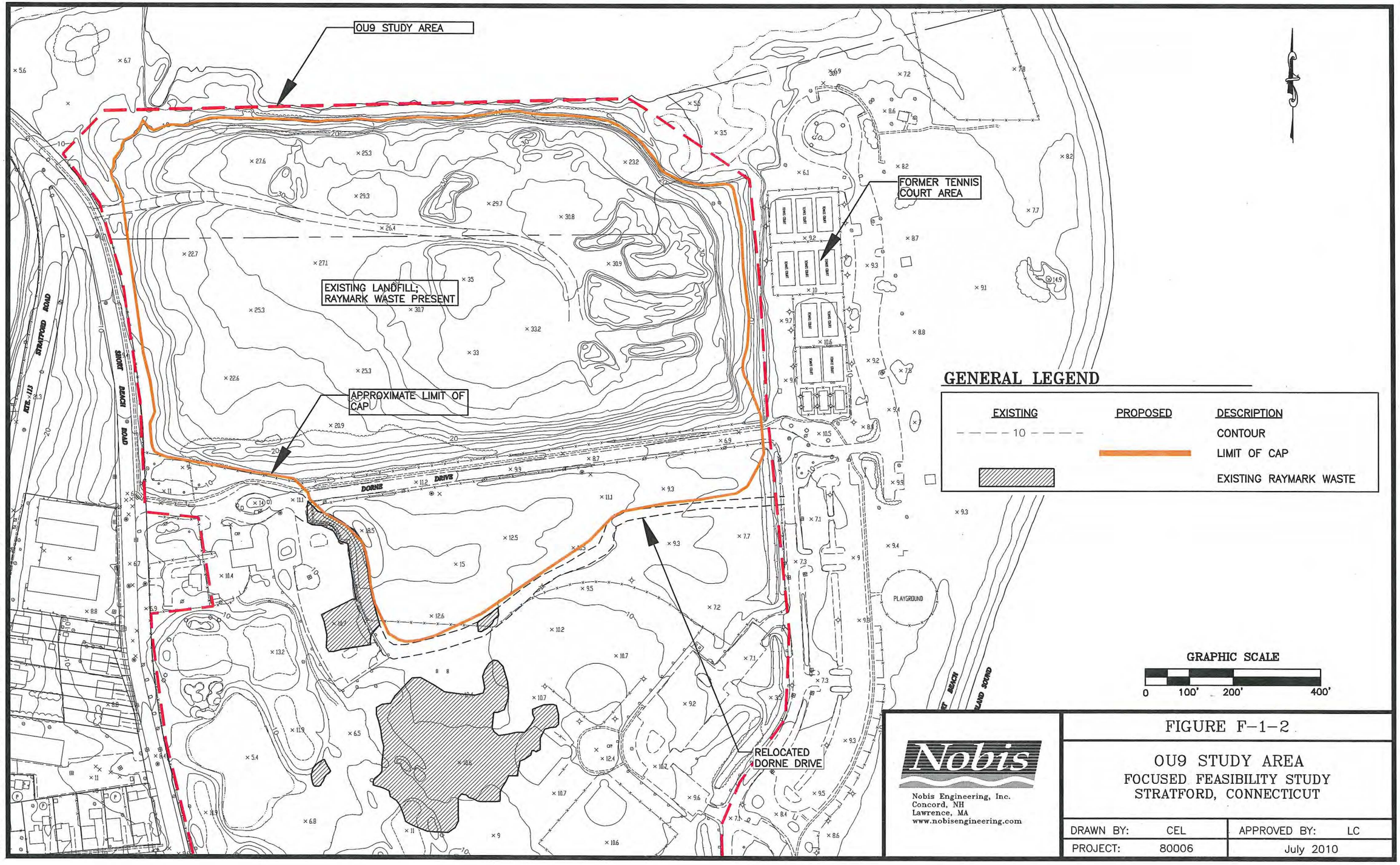
Preliminary Screening Summary

Based upon the preceding evaluation of the required screening criteria of effectiveness, implementability and cost, utilizing the Ferry Boulevard Properties as a CAMU location is not considered to be a viable option. At this location, construction of a cap within the 100 year floodplain would be unavoidable, therefore, the screening assumed that floodplain mitigation would need to be part of any reasonable CAMU scenario. The primary restriction on consolidation capacity on these properties is the presence of on-site buildings that are currently utilized to support commercial businesses. The proposed CAMU location would be sited between these buildings and Ferry Creek. Construction of a CAMU that meets the existing grade at the base of these structures and rises to a reasonable height before meeting the current shoreline of Ferry Creek would not allow for a significant consolidation volume of Raymark waste.

Because of the above reason and due to the technical and administrative difficulties anticipated for construction within wetlands/floodplains, the additional capital costs associated with such construction activities, the inability to provide capacity for consolidation of Raymark waste from other properties in Stratford, and the required floodplain compensation, a CAMU option is not being retained for further evaluation in a detailed analysis presented in Appendix F-2.



ASSUMED CAP FOOTPRINT



Nobis

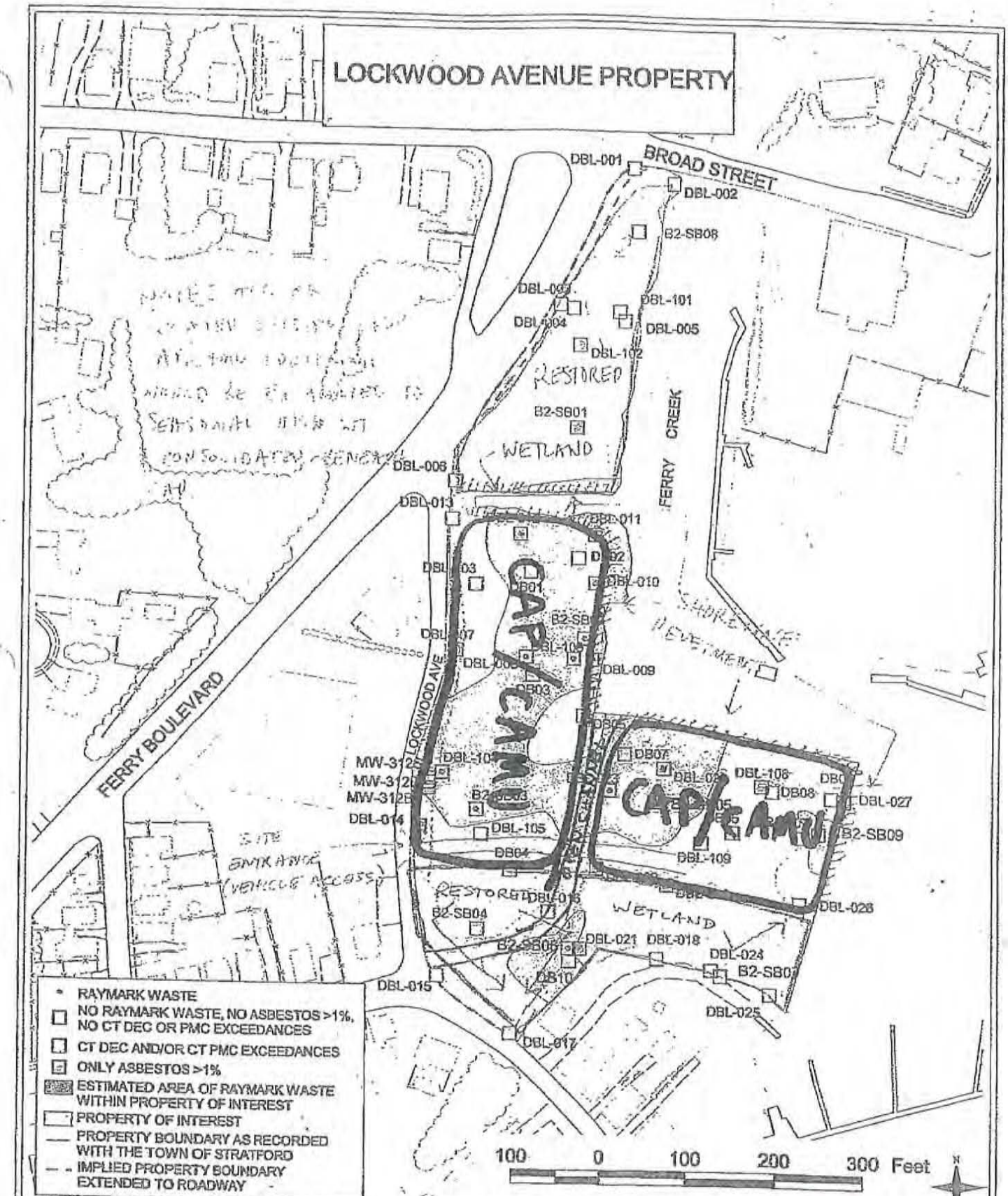
Nobis Engineering, Inc.
Concord, NH
Lawrence, MA
www.nobisengineering.com

FIGURE F-1-2

OU9 STUDY AREA
FOCUSED FEASIBILITY STUDY
STRATFORD, CONNECTICUT

DRAWN BY:	CEL	APPROVED BY:	LC
PROJECT:	80006	July 2010	

K:\80000 Task Orders\80000 Raymark\Raymark CAD\FS Figures\Final_FS\Figure_F-1-2.dwg



NOTES:
1) PLAN NOT TO BE USED FOR DESIGN
2) ALL LOCATIONS TO BE CONSIDERED APPROXIMATE
3) PROPERTY BOUNDARIES ARE APPROXIMATE BASED ON TOWN OF STRATFORD ENGINEERING DEPARTMENT PLANS
4) DUE TO UNCERTAINTIES OF PROPERTY BOUNDARIES DURING THE SAMPLING PROCESS, SAMPLES LOCATED ADJACENT TO THE PROPERTY ARE UNDERSTOOD TO BE ON THE PROPERTY
5) CT DIRECT EXPOSURE CRITERIA (CT DEC) FOR INDUSTRIAL/COMMERCIAL SOILS AND CT POLLUTANT MOBILITY CRITERIA (CT PMC) USED TO DETERMINE EXCEEDANCES

SOIL SAMPLE LOCATIONS	
RAYMARK - OU8	
STRATFORD, CONNECTICUT	
DRAWN BY: L. BEYDEWITZ	DATE: APRIL 27, 2004
CHECKED BY: D. CRISHOLM	FILE: 01_1OU8_01_2003APR

Nobis

LOCKWOOD AVENUE PROPERTY
CAPPING AND CONSOLIDATION OPTION
RAYMARK SUPERFUND SITE
STRATFORD, CONNECTICUT

FIGURE F-1-3 | THIS FIGURE WAS PREPARED BY TETRA TECH NUS, INC.

Figure F-1-4

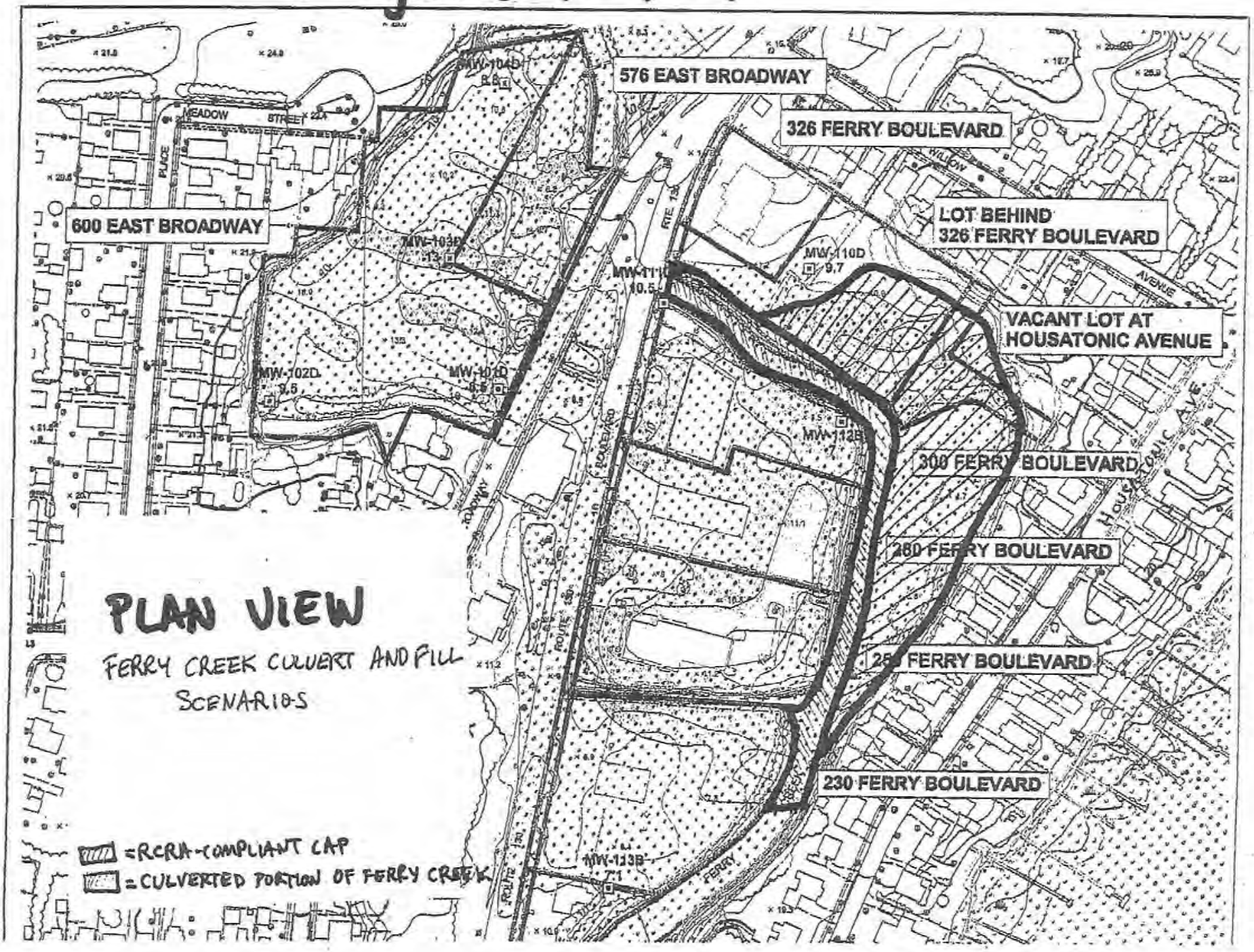
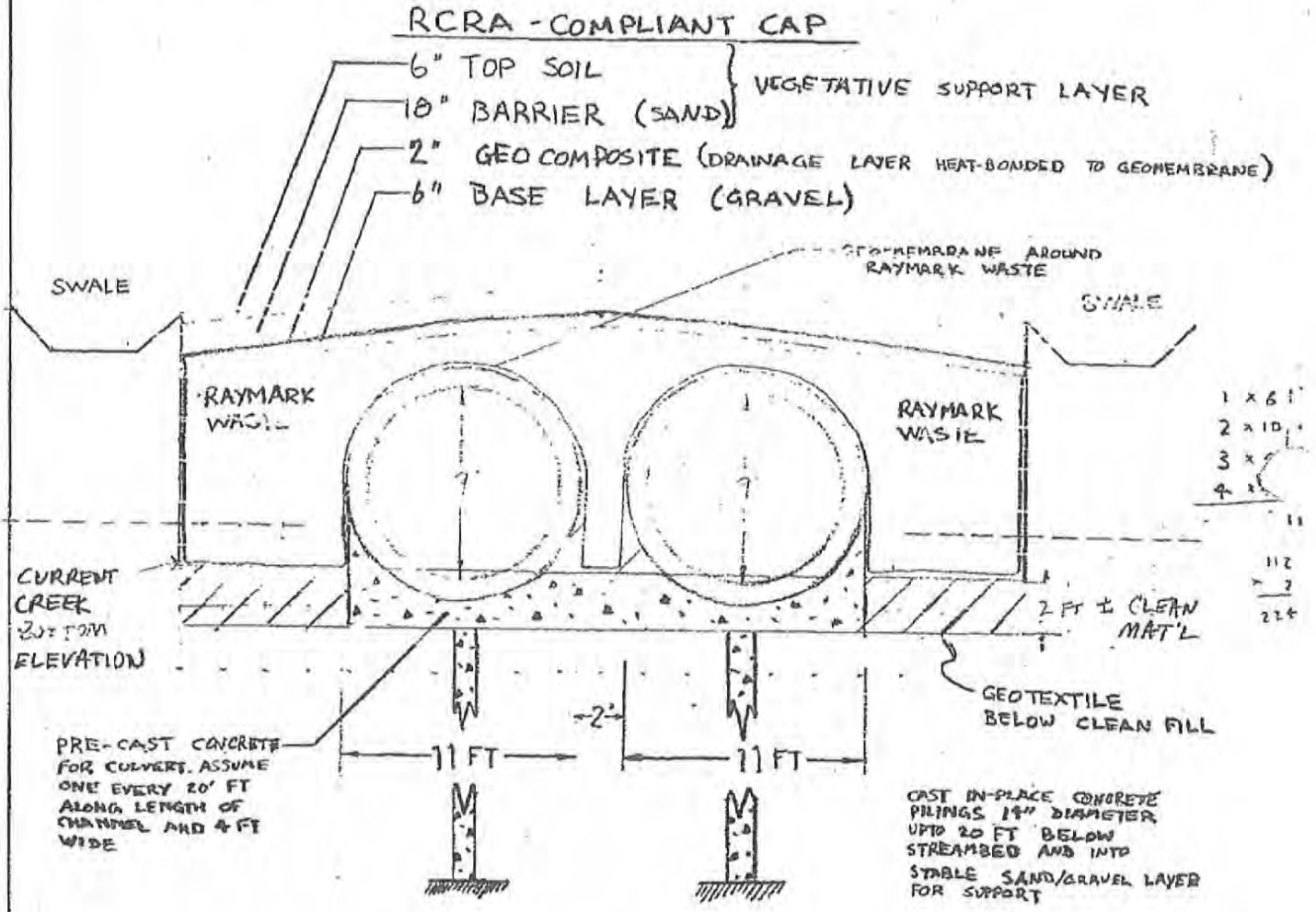

576 EAST BROADWAY
326 FERRY BOULEVARD
LOT BEHIND
326 FERRY BOULEVARD
600 EAST BROADWAY
VACANT LOT AT
HOUSATONIC AVENUE
300 FERRY BOULEVARD
280 FERRY BOULEVARD
230 FERRY BOULEVARD
MEADOW STREET
PLACE
WILLOW
AVENUE
HOUSATONIC AVE
ROADWAY
ROUTE 130
FERRY
MW-104D
MW-103D
MW-102D
MW-101D
MW-110D
9.7
MW-112B
MW-113B
PLAN VIEW
FERRY CREEK CULVERT AND FILL
SCENARIOS
=RCRA-COMPLIANT CAP
=CULVERTED PORTION OF FERRY CREEK

Figure F-1-5
7/10

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE 1 OF 1

CLIENT: US EPA	JOB NUMBER: N4106 - 1200
SUBJECT: FC-3 SCENARIO A — CYLINDRICAL CULVERTS	
BASED ON:	DRAWING NUMBER: FIGURE 2
BY: D. HARTIGAN / CHECKED BY: SAV	APPROVED BY: / DATE: 12/12/2005

SCALE : 1 SQUARE = 2FT × 2FT



- CROSS-SECTIONAL AREA OF WASTE LAYER ON BOTH SIDES OF THE DUAL CYLINDRICAL CULVERTS = 224 FT²
- ASSUME LENGTH OF PROPOSED PIPE AND FILL IS 1,200 FT
  APPROXIMATE VOLUME OF WASTE IS 268,800 FT³ OR 9,955 CY

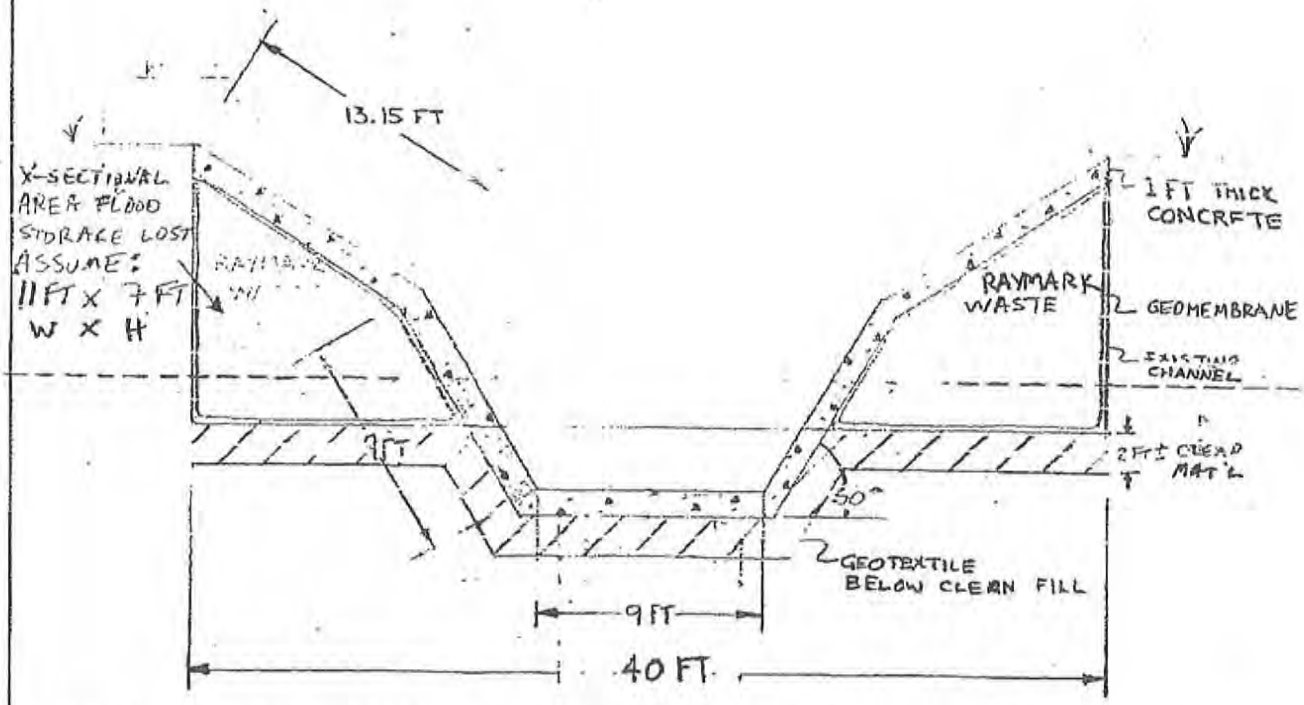
USE **10,000 CY**

Figure F-1-6
7/10

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE 1 OF 1

CLIENT: US EPA	JOB NUMBER: N 4106 -1200
SUBJECT: FC-3 SCENARIO B - TRAPEZOIDAL OPEN CHANNEL	
BASED ON:	DRAWING NUMBER: FIGURE 3
BY: D. HARTIGAN / CHECKED BY: SAV	APPROVED BY: / DATE: 12/12/2005

SCALE: 1 SQUARE = 2FT x 2FT



CROSS-SECTIONAL AREA OF WASTE LAYER ON BOTH SIDES OF CHANNEL = 140 FT²

ASSUME LENGTH OF PROPOSED CHANNEL AND FILL IS 1,200 FT

APPROXIMATE VOLUME OF WASTE IS 168,000 FT³ OR 6222 CY

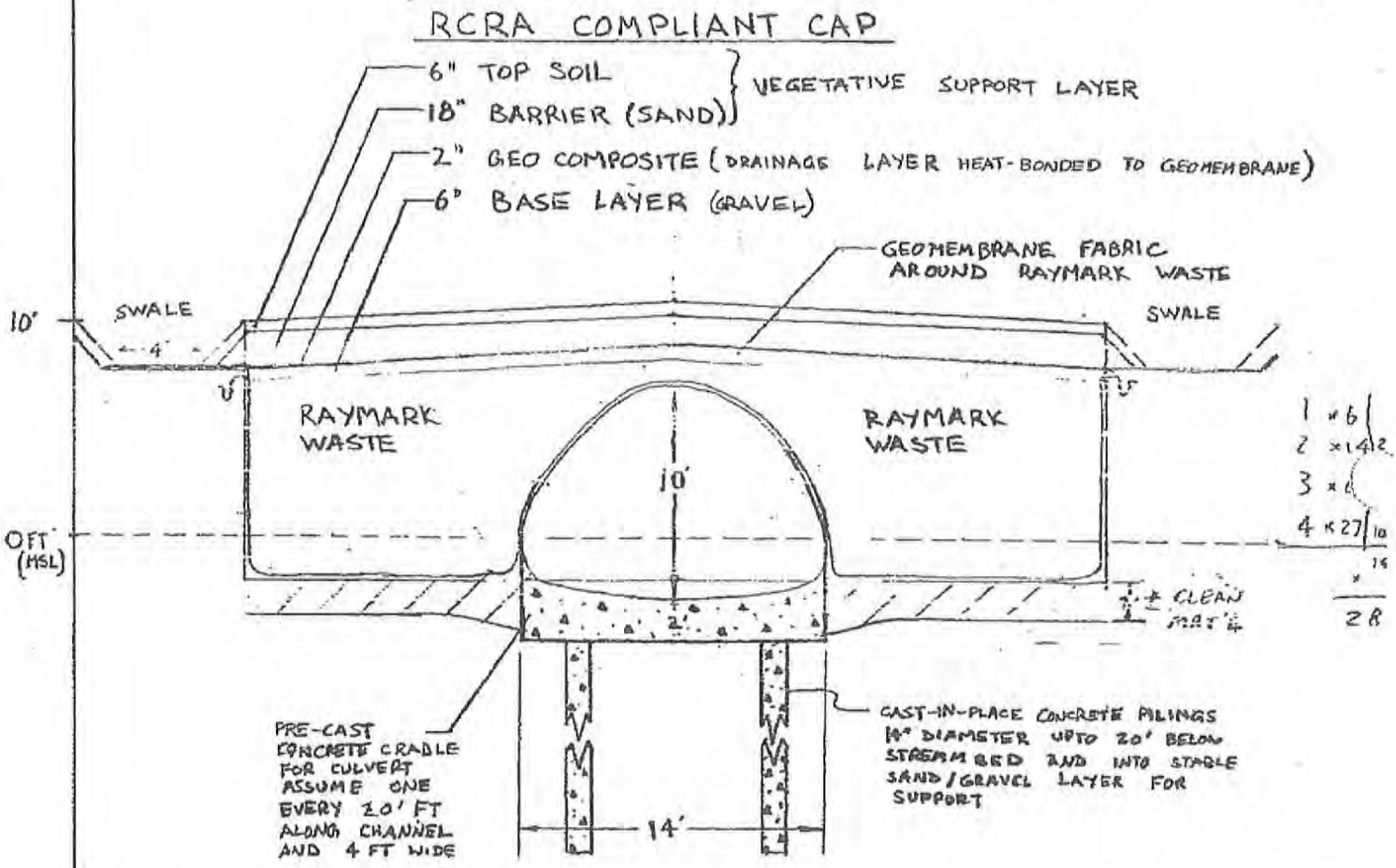
USE 6,200 CY

Figure F-1-7
7/10

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE 1 OF 1

CLIENT: US EPA - RAYMARK	JOB NUMBER: N4106-1200
SUBJECT: FC-3 SCENARIO C - PIPE-ARCH CULVERT	
BASED ON:	DRAWING NUMBER: FIGURE 4
BY: D. HARTIGAN / CHECKED BY: SAV	APPROVED BY: / DATE: 12/12/2005

SCALE: 1 SQUARE = 2 FT × 2 FT



CROSS-SECTIONAL AREA OF WASTE LAYER ON BOTH SIDES OF PIPE-ARCH CULVERT = 284 FT²

ASSUME LENGTH OF PROPOSED PIPE AND FILL IS 1,200 FT

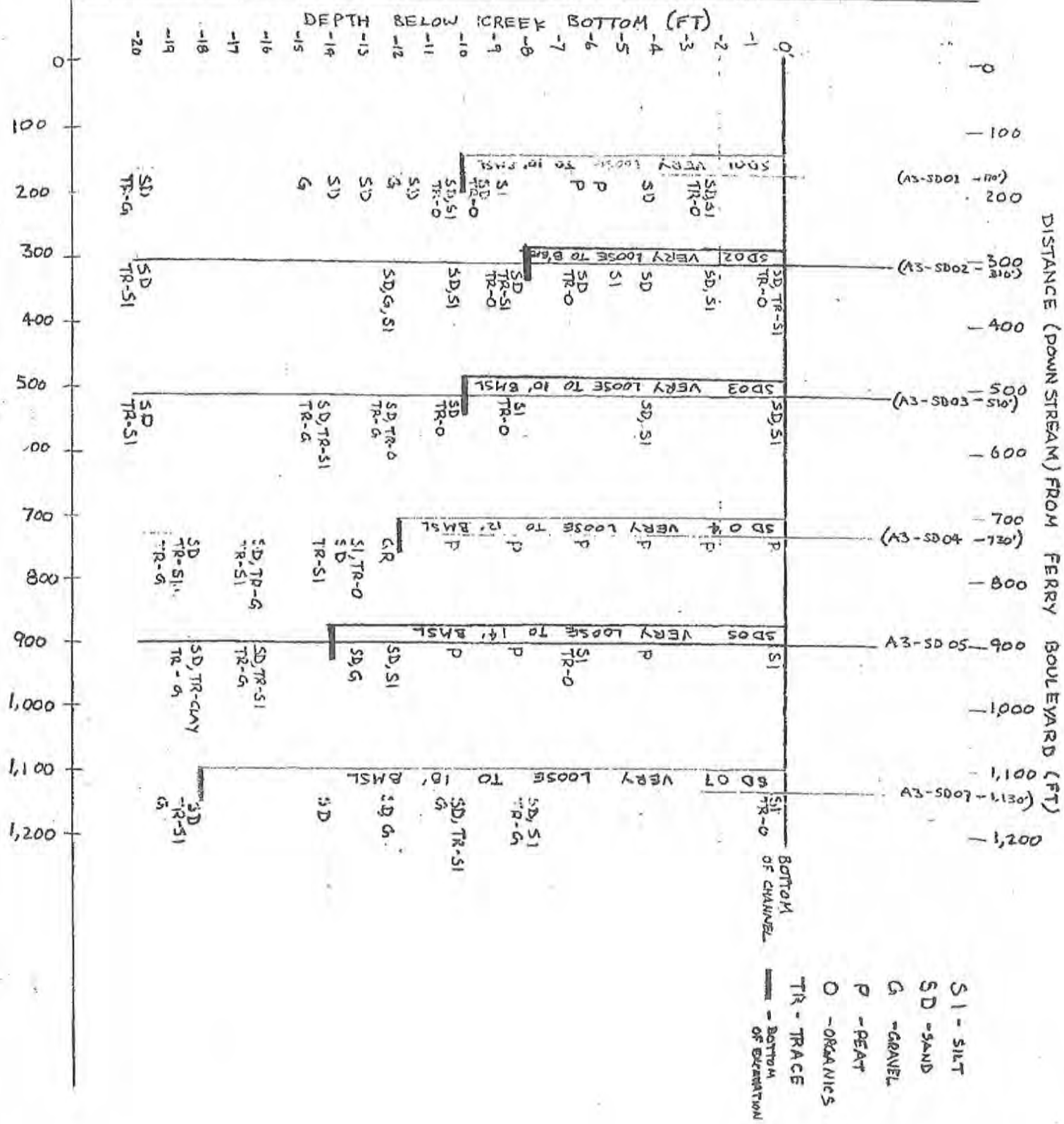
APPROXIMATE VOLUME OF WASTE IS 340,800 FT³ OR 12,622 CY

USE **12,600 CY**

Figure F-1-8
7/10

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE 1 OF 1

CLIENT: USEPA	JOB NUMBER: N4106-1200
SUBJECT: FERRY CREEK SUBSURFACE STABILITY	
BASED ON: BORING LOGS	DRAWING NUMBER: FIGURE 5
BY: D. HARTIGAN / CHECKED BY: SAV	APPROVED BY: / DATE: 12/12/2005



APPENDIX F-2

DETAILED ANALYSIS OF ALTERNATIVES

FOR

CONSOLIDATION AND CAMU AREAS

APPENDIX F-2 – DETAILED ANALYSIS

The primary objective of Appendix F-2 is to conduct a detailed analysis of consolidation alternatives for potential Corrective Action Measures Unit (CAMU) areas within the Town of Stratford, Connecticut. Based upon the preliminary screening present in Appendix F-1, only two of the potential six CAMU locations are further considered during the detailed analysis presented herein in Appendix F-2. Both the former Raybestos Memorial Ballfield (OU4), and the Stratford Landfill and Short Beach Park (OU9) were found to be feasible CAMU locations with viable consolidation and capping opportunities with regard to effectiveness, implementability and costs associated with implementing a CAMU option. Both OU4 (includes three variations of consolidation and capping alternatives) and OU9 are evaluated in detail in subsections, Appendix F-2A and Appendix F-2B, respectively.

Following the detailed analysis for OU4 and OU9, a comparative analysis of potential consolidation and capping alternatives is presented in Appendix F-3 to identify to most feasible option for In-Town disposal of Raymark waste per the recommended criteria promulgated under the National Oil and Hazardous Substances Contingency Plan (NCP) for remedial alternative selection.

In accordance with the interim *Final Guidance for conducting Remedial Investigations and Feasibility Studies Under CERCLA* (EPA, October 1988), the NCP criteria employed to conduct the detailed and comparative analysis of potential consolidation and capping alternatives for each CAMU location included the following:

Detailed and Comparative Analysis Criteria

Threshold Criteria

- Overall protection of human health and the environment
- Compliance with ARARs

Primary Balancing Criteria

- Long-term effectiveness and permanence
- Reduction of toxicity, mobility or volume
- Short-term effectiveness
- Implementability
- Cost

Modifying Criteria

- State acceptance
- Community acceptance

At a minimum, the selected alternative is expected to attain the Threshold Criteria while the Primary Balancing Criteria provide a basis for comparison between the alternatives. The last two criteria, State and Community acceptance, pertain to public input that is typically received during the formal public comment period. A brief description of each of the nine criteria is provided in Section 4.2 of Volume 1.

APPENDIX F-2 A

FORMER RAYBESTOS MEMORIAL BALLFIELD (OU4 BALLFIELD) STUDY AREA CAMU DETAILED ANALYSIS

Property Description

The former Raybestos Memorial Ballfield (OU4 Study Area) is located adjacent to the Raymark Facility property (OU1) and encompasses a total area of 13.5 acres. The physical characteristics of the OU4 ballfield can be found in Appendix A-2-1.3.

Historical sand and gravel removal activities that were conducted in the area ceased during approximately 1940, and the excavated area was used for disposal purposes. The former Raymark Industries, Inc. company disposed of unknown quantity of wastes containing asbestos and non-asbestos materials, metals, phenol-formaldehyde resins, and various adhesives within this Study Area. As a result of the disposal activities, soils at the OU4 Study Area are known to be contaminated with asbestos, lead, polychlorinated biphenyls (PCBs), and other pollutants, which were disposed of from the early 1940s to 1977 (US EPA, 1992). Reportedly, the Town of Stratford also used the OU4 Study Area as a dumping and temporary storage area for asphalt, road salt, dirt, and trash (EAI, 1990).

In the 1970s, Raymark Industries, Inc. performed two cleanup activities and placed a 2-foot soil cover over identified areas of surficial asbestos contamination. The OU4 Study Area was purchased by the Daley Development Corporation of Stratford in 1986.

In 1992, EPA installed a security fence around the area and a temporary soil cover (6 inches minimum thickness) in addition to sampling and removing drummed wastes at the Study Area. This effort restricted access to the area as well as to the contamination found within the soil. In 1999, EPA performed a comprehensive remedial investigation that included test pits, soil borings, monitoring well installation, an electromagnetic (EM) survey, and ground penetrating radar to determine the presence, location, and character of buried wastes. A remedial investigation report was completed in August 1999. The report concludes that fill and natural soils throughout the OU4 Study Area are contaminated with asbestos, lead, barium, zinc,

arsenic, polychlorinated biphenyls (PCBs) and semi-volatile organic compounds (SVOCs). In most cases, the concentration of contamination is higher in the subsurface soils than in the surface soils. EPA investigations estimate that over 190,000 cubic yards (CY) of Raymark waste is present and extends to depths up to 16 feet below ground surface. Potential risks are to human health. No ecological risks were identified.

A screening analysis of the OU4 Study Area as a potential CAMU location was conducted and presented in Appendix F-1A. Based on an analysis of the effectiveness, implementability, and cost, the CAMU option was retained for detailed analysis. Based on the screening and design parameters, as well as the desired future use of the parcel, the OU4 Study Area cap is assumed to cover the entire parcel. This will allow for adequate consolidation of Raymark Waste from other properties within the Town of Stratford as well as potential future reuse of the parcel.

A single footprint was designed for the OU4 Study Area; however, calculations for three separate consolidation volumes within this footprint are presented. These calculations are for consolidation volumes of 100,000, 40,000 and 20,000 CY of Raymark waste from other locations within Stratford. This Section provides the basis for the detailed analysis of the OU4 Study Area as a potential CAMU as described in the following sub-sections.

Design Parameters

This sub-section provides the details on the existing design parameters and assumptions used to convert the OU4 Study Area into a CAMU. Using the OU4 Study Area as a CAMU would consolidate the existing Raymark Waste within the OU4 Study Area, in addition to consolidating Raymark Waste from other locations within Stratford. The Raymark waste that would be transported to, and consolidated at, the OU4 Study Area would come from various locations from within the Town of Stratford. The exact cap placement and amount of Raymark Waste that would be brought to the CAMU will be determined during the Proposed Plan that includes OU4 and further refined during the remedial design phase.

CAMU Design Standards

As previously discussed, the CAMU will extend throughout the OU4 Study Area. The minimum design standards for a new, replacement, or laterally expanded CAMU require a cap, liner, and a leachate collection system. An alternate design, however, is being proposed for this CAMU.

Under Section 40 CFR 264.552(e)(3)(ii) of the CAMU regulations, a CAMU without a liner system may be established if an alternative design will prevent the migration of contamination at least as well as a CAMU with a liner and leachate collection system or if a CAMU is to be established in an area with significant existing contamination and the alternate design would prevent migration that would exceed long-term remedial goals.

Based on the technical information available, the OU4 Study Area meets the requirements of the alternative CAMU design provisions, based upon the following:

- The OU4 Study Area contains "significant" levels of existing contamination, both for the Raymark waste and non-Raymark waste areas. The non-Raymark Waste areas contain contamination above the State RSRs.

- There would be minimal leaching of any consolidated Raymark Waste because it will be placed above the water table and covered by a low permeable cap.

- Raymark Waste does not appear to present a significant leaching threat; however, there would be even less of a leaching threat since any Raymark Waste brought to the OU4 Study Area which is above the Principal Hazardous Constituents (PHCs) criteria [see Section 3 and 4 of Volume one of this FS (Nobis, 2010)]) would be taken to an out-of-town licensed facility for treatment and disposal.

- Raymark Waste underlies about 2/3 of the capped area.

- The proposed CAMU is located within a classified GB aquifer. There are no drinking water wells or other private use wells in the area. The only potential exposure is to surface water receptors, and these exposures would not increase if a liner system was not present. In fact, potential future exposures would likely be reduced from current levels because of the placement of a low permeable cap.

Accordingly, installing a liner for the OU4 CAMU would not materially increase protectiveness and would not be the best use of cleanup resources. A CAMU without a liner and leachate collection system will function at least as effectively as a CAMU with a liner. Also, the OU4

CAMU will be created in an area with existing significant contamination and should prevent migration from the CAMU that will exceed long-term remedial goals.

General Design Information and Assumptions

For the design of this CAMU, the following were assumed:

- Given the large volume of Raymark Waste already present at the OU4 Study Area, the only viable alternative is capping. Additionally, due to the lack of final grade restrictions on elevation due to floodplains (design elevations require only to blend into existing terrain at adjacent property), there are three options under consideration for consolidation combined with capping, which are based on the volume of Raymark waste to be consolidated. The final height of the cap would be a function of how much Raymark Waste is brought to the OU4 Study Area (20,000, 40,000 or 100,000 CY) for consolidation and capping and would result in a maximum final grade elevation 7 to 12 feet above existing grade (including the cap thickness).

- The CAMU would encompass the entire 13.5-acre OU4 Study Area (shown on Figure F-2-1). A low-permeable cap would be installed over the entire OU4 Study Area/CAMU, which would lessen the potential for contaminant migration from both Raymark Waste and the non-Raymark Waste areas.

- A storm water detention basin would be constructed in the OU4 Study Area to minimize runoff during large rain events. The size and location of the basin would be determined during the design phase.

- Excavated Raymark waste from other properties in Stratford would be subject to analytical testing prior to placement in the CAMU. Waste containing PHCs that exceed the threshold criteria in 40 CFR 264.552(e)(4) would be transported to an out-of-town licensed facility for treatment and disposal.

- Wetlands are not present within the OU4 Study Area CAMU; therefore, wetlands mitigation measures are not needed.

- The OU4 Study Area CAMU is not within the 100-year floodplain; therefore, floodplain mitigation issues are not necessary.

- If a sufficient volume of Raymark waste is transported for disposition within the OU4 Study Area CAMU, it is anticipated that the area would have the potential to be re-used in the future in accordance with local zoning regulations and town approval, as well as state and federal approvals, regulations and standards.

- As part of the design basis, assumptions and justifications will need to be detailed including:

  - calculations supporting the assumptions;
  - evaluation of how ARARs will be met; and
  - a plan for minimizing potential negative effects on the environment and community during the construction and O&M phases.

- The RCRA-compliant, low-permeability cap to be placed over the CAMU will be 3 feet in thickness and would meet the technical requirements contained in the 40 CFR 264.310 and interpreted in the *Revised Alternative Cap Design Guidance Proposed for Unlined, Hazardous Waste Landfills in EPA Region 1* (Gagne and Choi, 2001). Final design will require a waiver to exclude the liner system. The basic design parameters (shown on Figure F-2-2, fulfill the design requirements for a CAMU, based on the cap requirements under 40 CFR 264.552(e)(6)(iv). The cap design includes (listed from top to bottom):

  - Vegetative Cover
  - 6 inch "Topsoil Layer"
  - 24 inch "Protective Soil Layer" (Common Fill)
  - Geotextile fabric, orange, non-woven (“Warning Layer” to prevent future intrusive activity)
  - Lower Protective Soil Layer
  - Geocomposite Drainage Layer ("Drainage Layer")
  - Geomembrane Liner ("Top Low Permeability Layer")
  - Geosynthetic Clay Liner (“Bottom Low Permeability Layer”)
  - 6 inches Liner Sub Base Material ("Base Leveling Layer")

Consolidation and Capping Alternatives

The three consolidation and capping alternatives for the OU4 Study Area that are presented in this CAMU write-up include:

- Capping with consolidation of approximately 100,000 CY of Raymark waste from other in-town locations (Option A);
- Capping with consolidation of approximately 40,000 CY of Raymark waste from other in-town locations (Option B); and
- Capping with consolidation of approximately 20,000 CY of Raymark waste from other in-town locations (Option C).

Each option would allow for some level of re-use for the OU4 Study Area. Figures F-2-3 through F-2-5-, corresponding to Options A through C, respectively, are maps that delineate the three proposed cap options being evaluated. Figures F-2-6 to F-2-8 depict the corresponding cross sections. It was assumed that the 100,000 CY (Alternative A) is approximately the maximum volume of Raymark waste that could be consolidated at the OU4 Study Area and while still having a full range of options for reuse of the area. The 40,000 CY volume option (Alternative B) was selected for evaluation as it would provide enough volume to raise the grades sufficiently to enable potential future reuse of the OU4 Study Area. Finally, the 20,000 CY volume option (Alternative C) was selected as a comparison for backfill and surrounding topographic impacts. These three volumes provide a range for CAMU considerations at the OU4 Study Area.

The assumed area of the cap for the OU4 Study Area alternatives is 615,000 square feet. This cap size would accommodate any of the potential volumes of consolidated Raymark Waste (100,000 CY (Alternative A), 40,000 (Alternative B), and 20,000 (Alternative C), respectively). The cap design assumes the existing ground surface topography would be retained to the extent practicable; however, ground surface elevations would increase with waste volume options. Figures F-2-6 through F-2-8, corresponding to Alternatives A through C, respectively, are cross-sections depicting both the existing and proposed ground surface topographies.

Off-site monitoring well clusters, installed during Raymark site investigations, are currently situated down gradient of the OU4 Study Area. These wells have various depths ranging from shallow overburden to bedrock and would be suitable for future long-term groundwater

monitoring regardless of the consolidation option selected. Unless they can be saved, the on-site monitoring wells would be closed in accordance with State and federal policies.

Since Raymark Waste would remain on the property for all three consolidation options, institutional controls would be required. The required operations and maintenance (O&M) efforts would include semi-monthly cap inspections; annual repairs and reporting to summarize inspection findings and verify the effectiveness of institutional controls; groundwater sampling (quarterly for two years and annually thereafter); and five-year reviews.

Site Preparation

Site preparation includes the activities necessary to prepare the OU4 Study Area for subsequent consolidation/capping including establishing site support services, preparing and implementing the erosion and sedimentation control plan, establishing air monitoring stations, clearing and grubbing, and constructing access roads and staging areas.

Utilities – Temporary electricity and water would be required during the construction activities.

- Electrical power would be required for at least one office trailer (project engineering office). In addition, electricity may be required to power equipment.

- Temporary power poles would be established and power would be distributed throughout the OU4 Study Area where lighting is required.

- Water would be required to routinely decontaminate vehicles, equipment, and personnel, and for dust control. Decontamination would occur on a daily basis. Dust suppression would be required. A temporary water service could be installed to provide water for OU4 Study Area use. Consumption volumes are uncertain.

Property Boundary Survey – A property boundary survey by a licensed surveyor would be required. The property survey would need to include obtaining and reviewing previous surveys, researching the tax assessor's maps, researching of deeds for the OU4 Study Area and for all adjoining properties, researching deed changes, and establishing monuments at the OU4 Study

Area to identify the property lines. Monuments would consist of iron rods and granite, depending on regulatory requirements.

Environmental Protection Plan (EPP) – A specification would be prepared requiring the General Contractor to prepare a site-specific Environmental Protection Plan. The specification would dictate minimum requirements and would need to be reviewed and approved by the oversight engineer. At a minimum, the plan would consist of an erosion and sediment control plan, traffic control plan, a work area plan, a spill control plan, a storm water pollution prevention plan, a non-hazardous solid waste disposal plan, a recycling and solid waste minimization plan, an air monitoring plan, and a waste water management plan.

Grubbing and Clearing – Clearing and grubbing includes removing vegetation, trees, stumps, roots, and brush. Grubbing would consist of completely removing roots, stumps, trash, and other debris from all areas to be graded. Any brush and small trees may be chipped and stored temporarily for future onsite use. However, in the event that on-site storage area is unavailable, the cleared brush, vegetation, and trees would be sent off-site to a composting facility.

Decontamination Stations – For the purpose of the conceptual design, it is assumed that one decontamination station will be constructed during the site preparation phase.

Temporary Storage

Raymark waste transported to the OU4 Study Area for consolidation within the CAMU may require temporary staging prior to placement.

Backfilling, Grading, and Compaction

During the design phase of this project, the exact grades of the final OU4 Study Area CAMU would be determined. One goal in backfilling is to create a finished surface that would be suitable for the potential future land use, such as commercial or recreational use. The final grades would be designed to allow for sheet flow of stormwater runoff. The cap design would include stormwater retention and/or discharge to local storm sewers. A pre-design study would need to be conducted to ascertain pipe sizes and design parameters for the retention area and storm sewers. Parking areas would be designed to support representative traffic loads.

The final grade of the cap has been conceptualized to rise approximately 7 to 12 feet above existing ground surface (including the thickness of capping materials) and will be contoured such that a relatively flat area exists at the top surface for potential future re-use. The final elevation of the CAMU would reach 22 to 27 feet msl.

RCRA-Compliant Cap

As discussed previously, a 3-foot thick, RCRA-compliant, low-permeable cap would be constructed on top of the Raymark waste material. The cap would be constructed to provide long-term minimization of migration of liquids through the closed CAMU, promote drainage, and minimize erosion.

Final Survey and Markers

Upon completion of final grading, the topography of the OU4 Study Area CAMU would be surveyed to determine the finish grade contours. A benchmark would be established and set at an accessible location adjacent to the cap for future settlement measurements. This benchmark would be adequately protected and marked for ease in future location and reference.

Post-Closure Maintenance

Some settlement of the cap system is assumed within 2 years after the cap construction. Visual observations and maintenance of the cap system would be performed on a quarterly basis for the first 2 years after completion. After two years, it is assumed that maintenance would be performed annually in the Spring. Additional topsoil may be required to fill low areas resulting from settlement and to maintain drainage slopes. Areas of the cover affected by localized erosion would be repaired by the addition of topsoil and re-grading. Deep rooted plant species (trees and shrubs) growth over the cap system would be avoided to minimize root extension into the cap. The final cap system would be maintained so that the cap remains free of areas of excessive ponding, distressed vegetation (grasses) and free from tree growth.

Analysis of Alternatives

This section presents the analysis of the consolidation volumes and cap design options for the OU4 Study Area CAMU using seven of the nine criteria promulgated for use by the NCP and as

described in the preface for Appendix F-2. This analysis of alternatives is summarized in tabular form on Table F-2A-1.

Overall Protection of Human Health and the Environment

All three consolidation alternatives would be protective based on the comprehensive area of the cap design. A low-permeability cap, which will be constructed to contain Raymark waste regardless of volume consolidated, would protect human health and the environment through engineering controls and institutional controls.

Institutional controls, such as deed restrictions and local ordinances, would be used to restrict groundwater use and future OU4 Study Area activities that could damage or intrude into the cap system.

The long-term groundwater monitoring program (possibly using existing off-site wells) would alert the responsible agency of changes in groundwater contamination, which may indicate changes in soil contaminant status or the capping system's effectiveness.

Compliance with ARARs

The Applicable or Relevant and Appropriate Requirements (ARARs) are presented in Appendix C. The potential consolidation and capping alternatives A (100,000 CY), B (40,000 CY), and C (20,000 CY) each comply with all chemical-specific, action-specific, and location-specific ARARs. EPA has determined that the RCRA-modified low-permeability cap would fulfill the CAMU alternative design standards and would effectively result in preventing direct exposures; thereby, achieving the Remedial Action Objective (i.e.; to prevent direct contact with Raymark waste) for the OU4 Study Area CAMU.

For consistency with the To Be Considered (TBCs) requirements, the cap design and construction would be consistent with the technical specifications contained in the *Revised Alternative Cap Design Guidance Proposed for Unlined, Hazardous Waste Landfills in EPA Region 1* (Gagne and Choi, 2001).

Long-Term Effectiveness and Permanence

Under all three potential CAMU alternatives, the potential for direct exposures would be eliminated in the long term, if the cap is maintained. A greater degree of protection to human health in the long term would be realized with larger volumes of Raymark waste placed beneath a RCRA cap, as the cap and institutional controls would prevent any exposures. Any potential for leaching of contaminants waste would essentially be eliminated/minimized in the long term, if the cap is maintained. No ecological risks were identified for the OU4 Study Area given the gross disposal of Raymark Waste over the years and the current absence of ecological features. Exposure risks to ecological receptors would be further reduced over the long term by capping contaminated soils and maintaining the cap system.

Some minor residual human health risks would remain because some Raymark waste will be left in-place above the water table; however, there would be no direct human exposures. This CAMU alternative would be protective based on the comprehensive area of the cap design.

All three consolidation and capping alternatives would be effective in the long term and are considered permanent. However, regular maintenance of the cap system would be required to avoid any potential problems into the future and extend the life of the cap.

Five-year reviews would be required (40 CFR 300.430 (f)(4)(ii)) to assess the cap system's effectiveness in reducing contaminant leaching and preventing exposures to contaminated materials. Review of the effectiveness of institutional controls such as deed restrictions and ordinances in preventing damage to the cap system would be required as well.

To ensure long-term effectiveness, O&M efforts consisting of cap inspections and repairs (as necessary), long-term groundwater monitoring, and inspections/reporting for compliance with institutional controls would be required.

Reduction of Toxicity, Mobility, and Volume through Treatment

A CAMU does not provide inherent reductions in toxicity, mobility or volume of waste as no treatment processes are utilized and existing Raymark waste within the Study Area will be contained in-place under the constructed cap. However, a reduction in toxicity, mobility and volume through treatment may be realized during the consolidation process prior to cap

construction as transported waste from other properties in Stratford will be subject analytical testing to determine compliance with the Principal Hazardous Constituents (PHCs). Any waste found to exceed the PHC standards would be subject to transportation off-site for treatment and/or disposal. Based upon historical sampling within OU6, approximately 10% of excavated waste may be in excess of the PHC standards.

The CAMU alternatives would not fully satisfy the statutory preference for treatment to reduce risks posed by contaminated soils as only Raymark waste from other properties in Stratford that is transported to the CAMU for disposition under the cap would be subject to analytical testing and potential off-site treatment and disposal.

Short-Term Effectiveness

Short-term impacts to the community, workers, and the environment from the implementation of the capping alternative would generally be similar and could be mitigated using engineering controls. Implementation of any of these options is not expected to pose any significant risks to the local community, but residents could be impacted due to noise and the inherent construction-type work.

Increased truck and heavy equipment traffic through sections of Stratford would occur as the result of mobilization, site preparation, excavation, consolidation, and the import and placement of Raymark waste from some OU6 properties and the eventual capping materials. Coordination with the town, residents, and businesses to schedule truck and heavy equipment traffic on public roads would be required. Dust suppression and air monitoring would be ongoing during all construction activities.

Implementability

As stated previously, development of a CAMU is considered technically feasible regardless of the consolidation volume that is selected. Capping could readily be accomplished given the predominantly flat topography of the OU4 Study Area, the significant quantity of Raymark waste already existing within the property boundary and the lack of any wetlands or floodplains that may be impacted. No anticipated difficulties or uncertainties exist in constructing a cap system since common construction techniques are required. However, the handling of contaminated

soils would require specially trained workers and supervisors. Weather conditions and the location of the OU4 Study Area are likely to impact the duration of the construction season.

Cost

Detailed costs developed for this detailed analysis are presented in Attachment F-2A-2a through F-2A-2e.

TABLE F-2A-1
SUMMARY OF DETAILED ANALYSIS FOR THE OU4 STUDY AREA
CAMU DETAILED ANALYSIS
RAYMARK – OU6 – ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

Criterion	Option A – 1000,000 CY	Option B – 40,000 CY	Option C – 20,000 CY
Overall Protection of Human Health and the Environment	• Would protect human health through construction of an engineered barrier over Study Area to prevent direct contact. • RI did not identify ecological risks for this property group.	• Would protect human health through construction of an engineered barrier over Raymark waste areas to prevent direct contact. • RI did not identify ecological risks for this property.	• Would protect human health through construction of an engineered barrier over Raymark waste areas to prevent direct contact. • RI did not identify ecological risks for this property.
Compliance with ARARs	• Would comply with all chemical-specific, location-specific, and action-specific ARARs.	• Would comply with all chemical-specific, location-specific, and action-specific ARARs.	• Would comply with all chemical-specific, location-specific, and action-specific ARARs.
Long-Term Effectiveness and Permanence	• Residual risk within acceptable limits. • Risk reduction would be dependent upon proper execution of O&M program. • 5-year reviews required. • O&M of cap, deed restrictions (no excavation or use of groundwater), and groundwater monitoring would be required. • Controls would be adequate to ensure long-term effectiveness. • Capping technology reliable. • Cap will be protective of all wastes located under the OU4 cap footprint.	• Residual risk within acceptable limits. • Risk reduction would be dependent upon proper execution of O&M program. • 5-year reviews required. • O&M of cap, deed restrictions (no excavation or use of groundwater), and groundwater monitoring would be required. • Controls would be adequate to ensure long-term effectiveness. • Capping technology reliable. • Cap will be protective of all wastes located under the OU4 cap footprint.	• Residual risk within acceptable limits. • Risk reduction would be dependent upon proper execution of O&M program. • 5-year reviews required. • O&M of cap, deed restrictions (no excavation or use of groundwater), and groundwater monitoring would be required. • Controls would be adequate to ensure long-term effectiveness. • Capping technology reliable. • Cap will be protective of all wastes located under the OU4 cap footprint.
Reduction of Toxicity, Mobility, or Volume Through Treatment	• Treatment of waste from other properties assumed to occur prior to its arrival on-site to comply with disposal regulations (see assumptions). • On-site soil waste not disturbed from present environs.	• Treatment of waste from other properties assumed to occur prior to its arrival on-site to comply with disposal regulations (see assumptions). • On-site soil waste not disturbed from present environs.	• Treatment of waste from other properties assumed to occur prior to its arrival on-site to comply with disposal regulations (see assumptions). • On-site soil waste not disturbed from present environs.

TABLE F-2A-1
SUMMARY OF DETAILED ANALYSIS FOR THE OU4 STUDY AREA
CAMU DETAILED ANALYSIS
RAYMARK – OU6 – ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

Criterion	Option A – 1000,000 CY	Option B – 40,000 CY	Option C – 20,000 CY
Short-Term Effectiveness	• No adverse impacts to community or workers anticipated during implementation, assuming adequate implementation of controls. • No adverse impacts to environment anticipated during implementation. • Monitoring would be conducted during remedial action to verify effectiveness of controls. • Total imported volume of RW = 100,000 CY. • Approximately 15 months to complete remedial action. Assume 75 CY of soil to be imported per workday.	• No adverse impacts to community or workers anticipated during implementation, assuming adequate implementation of controls. • No adverse impacts to environment anticipated during implementation. • Monitoring would be conducted during remedial action to verify effectiveness of controls. • Total imported volume of RW = 40,000 CY. • Approximately 9 months to complete remedial action. Assume 75 CY of soil to be imported per workday.	• No adverse impacts to community or workers anticipated during implementation, assuming adequate implementation of controls. • No adverse impacts to environment anticipated during implementation. • Monitoring would be conducted during remedial action to verify effectiveness of controls. • Total imported volume of RW = 20,000 CY. • Approximately 7 months to complete remedial action. Assume 75 CY of soil to be imported per workday.
Implementability	• Considered technically feasible; wetlands and floodplain mitigation not required. • All potential exposure pathways could be monitored adequately. • Would require coordination with state/town officials and property owner to perform long-term O&M and inspections/reporting for compliance with deed restrictions. • Required equipment and specialists readily available. • Technology generally available and in full-scale use.	• Considered technically feasible; wetlands and floodplain mitigation not required. • All potential exposure pathways could be monitored adequately. • Would require coordination with state/town officials and property owner to perform long-term O&M and inspections/reporting for compliance with deed restrictions. • Required equipment and specialists readily available. • Technology generally available and in full-scale use.	• Considered technically feasible; wetlands and floodplain mitigation not required. • All potential exposure pathways could be monitored adequately. • Would require coordination with state/town officials and property owner to perform long-term O&M and inspections/reporting for compliance with deed restrictions. • Required equipment and specialists readily available. • Technology generally available and in full-scale use.
Cost	Capital: ***$19,945,700*** O&M (Years 1-2): ***$240,000*** O&M (Years 3-30): ***$204,300*** Five-Year Reviews: ***$10,000 each*** PV of O&M: ***$2,621,300*** PV of Alternative: ***$22,567,000***	Capital: ***$16,346,000*** O&M (Years 1-2): ***$239,400*** O&M (Years 3-30): ***$203,900*** Five-Year Reviews: ***$10,000 each*** PV of O&M: ***$2,616,200*** PV of Alternative: ***$18,962,100***	Capital: ***$15,665,700*** O&M (Years 1-2): ***$239,000*** O&M (Years 3-30): ***$203,500*** Five-Year Reviews: ***$10,000 each*** PV of O&M: ***$2,611,000*** PV of Alternative: ***$18,276,700***

TABLE F-2A-2a
PRESENT VALUE ANALYSIS
CAMU ALTERNATIVE OU4-20,000 CY
CAMU DETAILED ANALYSIS
RAYMARK - OU4 - BALLFIELD
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$15,665,732	$0	$0	$15,665,732	7.0%	$15,665,732
1	$0	$239,005	$0	$239,005	7.0%	$223,369
2	$0	$239,005	$0	$239,005	7.0%	$208,756
3	$0	$203,499	$0	$203,499	7.0%	$166,116
4	$0	$203,499	$0	$203,499	7.0%	$155,248
5	$0	$203,499	$10,000	$213,499	7.0%	$152,222
6	$0	$203,499	$0	$203,499	7.0%	$135,600
7	$0	$203,499	$0	$203,499	7.0%	$126,729
8	$0	$203,499	$0	$203,499	7.0%	$118,438
9	$0	$203,499	$0	$203,499	7.0%	$110,690
10	$0	$203,499	$10,000	$213,499	7.0%	$108,532
11	$0	$203,499	$0	$203,499	7.0%	$96,681
12	$0	$203,499	$0	$203,499	7.0%	$90,356
13	$0	$203,499	$0	$203,499	7.0%	$84,445
14	$0	$203,499	$0	$203,499	7.0%	$78,920
15	$0	$203,499	$10,000	$213,499	7.0%	$77,382
16	$0	$203,499	$0	$203,499	7.0%	$68,932
17	$0	$203,499	$0	$203,499	7.0%	$64,422
18	$0	$203,499	$0	$203,499	7.0%	$60,208
19	$0	$203,499	$0	$203,499	7.0%	$56,269
20	$0	$203,499	$10,000	$213,499	7.0%	$55,172
21	$0	$203,499	$0	$203,499	7.0%	$49,148
22	$0	$203,499	$0	$203,499	7.0%	$45,932
23	$0	$203,499	$0	$203,499	7.0%	$42,927
24	$0	$203,499	$0	$203,499	7.0%	$40,119
25	$0	$203,499	$10,000	$213,499	7.0%	$39,337
26	$0	$203,499	$0	$203,499	7.0%	$35,042
27	$0	$203,499	$0	$203,499	7.0%	$32,749
28	$0	$203,499	$0	$203,499	7.0%	$30,607
29	$0	$203,499	$0	$203,499	7.0%	$28,604
30	$0	$203,499	$10,000	$213,499	7.0%	$28,047
TOTAL	**$15,665,732**					**$18,276,730**
					PV O&M	**$2,610,998**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE F-2A-2b
PRESENT VALUE ANALYSIS
CAMU ALTERNATIVE OU4-40,000 CY
CAMU DETAILED ANALYSIS
RAYMARK - OU4 - BALLFIELD
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$16,345,993	$0	$0	$16,345,993	7.0%	$16,345,993
1	$0	$239,421	$0	$239,421	7.0%	$223,758
2	$0	$239,421	$0	$239,421	7.0%	$209,119
3	$0	$203,915	$0	$203,915	7.0%	$166,455
4	$0	$203,915	$0	$203,915	7.0%	$155,566
5	$0	$203,915	$10,000	$213,915	7.0%	$152,518
6	$0	$203,915	$0	$203,915	7.0%	$135,877
7	$0	$203,915	$0	$203,915	7.0%	$126,988
8	$0	$203,915	$0	$203,915	7.0%	$118,680
9	$0	$203,915	$0	$203,915	7.0%	$110,916
10	$0	$203,915	$10,000	$213,915	7.0%	$108,743
11	$0	$203,915	$0	$203,915	7.0%	$96,878
12	$0	$203,915	$0	$203,915	7.0%	$90,541
13	$0	$203,915	$0	$203,915	7.0%	$84,617
14	$0	$203,915	$0	$203,915	7.0%	$79,082
15	$0	$203,915	$10,000	$213,915	7.0%	$77,533
16	$0	$203,915	$0	$203,915	7.0%	$69,073
17	$0	$203,915	$0	$203,915	7.0%	$64,554
18	$0	$203,915	$0	$203,915	7.0%	$60,331
19	$0	$203,915	$0	$203,915	7.0%	$56,384
20	$0	$203,915	$10,000	$213,915	7.0%	$55,280
21	$0	$203,915	$0	$203,915	7.0%	$49,248
22	$0	$203,915	$0	$203,915	7.0%	$46,026
23	$0	$203,915	$0	$203,915	7.0%	$43,015
24	$0	$203,915	$0	$203,915	7.0%	$40,201
25	$0	$203,915	$10,000	$213,915	7.0%	$39,414
26	$0	$203,915	$0	$203,915	7.0%	$35,113
27	$0	$203,915	$0	$203,915	7.0%	$32,816
28	$0	$203,915	$0	$203,915	7.0%	$30,669
29	$0	$203,915	$0	$203,915	7.0%	$28,663
30	$0	$203,915	$10,000	$213,915	7.0%	$28,101
TOTAL	**$16,345,993**					**$18,962,152**
					PV O&M	**$2,616,159**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE F-2A-2c
PRESENT VALUE ANALYSIS
CAMU ALTERNATIVE OU4-100,000 CY
CAMU DETAILED ANALYSIS
RAYMARK - OU4 - BALLFIELD
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$19,945,731	$0	$0	$19,945,731	7.0%	$19,945,731
1	$0	$239,837	$0	$239,837	7.0%	$224,146
2	$0	$239,837	$0	$239,837	7.0%	$209,483
3	$0	$204,331	$0	$204,331	7.0%	$166,795
4	$0	$204,331	$0	$204,331	7.0%	$155,883
5	$0	$204,331	$10,000	$214,331	7.0%	$152,815
6	$0	$204,331	$0	$204,331	7.0%	$136,154
7	$0	$204,331	$0	$204,331	7.0%	$127,247
8	$0	$204,331	$0	$204,331	7.0%	$118,922
9	$0	$204,331	$0	$204,331	7.0%	$111,142
10	$0	$204,331	$10,000	$214,331	7.0%	$108,955
11	$0	$204,331	$0	$204,331	7.0%	$97,076
12	$0	$204,331	$0	$204,331	7.0%	$90,725
13	$0	$204,331	$0	$204,331	7.0%	$84,790
14	$0	$204,331	$0	$204,331	7.0%	$79,243
15	$0	$204,331	$10,000	$214,331	7.0%	$77,683
16	$0	$204,331	$0	$204,331	7.0%	$69,214
17	$0	$204,331	$0	$204,331	7.0%	$64,686
18	$0	$204,331	$0	$204,331	7.0%	$60,454
19	$0	$204,331	$0	$204,331	7.0%	$56,499
20	$0	$204,331	$10,000	$214,331	7.0%	$55,387
21	$0	$204,331	$0	$204,331	7.0%	$49,349
22	$0	$204,331	$0	$204,331	7.0%	$46,120
23	$0	$204,331	$0	$204,331	7.0%	$43,103
24	$0	$204,331	$0	$204,331	7.0%	$40,283
25	$0	$204,331	$10,000	$214,331	7.0%	$39,490
26	$0	$204,331	$0	$204,331	7.0%	$35,185
27	$0	$204,331	$0	$204,331	7.0%	$32,883
28	$0	$204,331	$0	$204,331	7.0%	$30,732
29	$0	$204,331	$0	$204,331	7.0%	$28,721
30	$0	$204,331	$10,000	$214,331	7.0%	$28,156
TOTAL	**$19,945,731**					**$22,567,052**
					PV O&M	**$2,621,321**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE F-2A-2d
CAPITAL COSTS
OU4 CAMU ALTERNATIVES (20,000, 40,000 and 100,000 CY)
CAMU DETAILED ANALYSIS
RAYMARK - OU4- BALLFIELD
STRATFORD, CONNECTICUT

DESCRIPTION		UNIT	UNIT COST	QUANTITY			TOTAL COST			SOURCE
				OU4 - 20,000	OU4 - 40,000	OU4 - 100,000	OU4 - 20,000	OU4 - 40,000	OU4 - 100,000	
1.0 Mobilization/Demobilization										
1.1	Equipment Mobilization	LS	$96,526	1	1	1	$96,526	$96,526	$96,526	see Appendix A cost assumptions
1.2	Field Support Facilities	LS	$37,538	1	1	1	$37,538	$37,538	$37,538	see Appendix A cost assumptions
1.3	Monthly Costs associated with Field Support	MONTH	$51,481	12	12	12	$617,766	$617,766	$617,766	see Appendix A cost assumptions
	Subtotal						**$751,830**	**$751,830**	**$751,830**	
2.0 Site Preparation										
2.1	Site Access Road Construction	SY	$23.06	1,100	1,100	1,100	$25,365	$25,365	$25,365	Means 2008 HC, 32 11 23.23 0300
2.2	Demolition and Disposal	LS	$550,000	1	1	1	$550,000	$550,000	$550,000	see Appendix A cost assumptions
2.3	Clear and Grub	ACRE	$3,968	14	14	14	$55,556	$55,556	$55,556	Means 2008 HC, 31 11 10.10 0020
2.4	Site Survey	EA	$5,945	1	1	1	$5,945	$5,945	$5,945	TtNUS, 2005
2.5	Decontamination Facilities & Services	LS	$350,000	1	1	1	$350,000	$350,000	$350,000	see Appendix A cost assumptions
2.6	Install Erosion and Sedimentation Controls	LF	$8.97	3,500	3,500	3,500	$31,382	$31,382	$31,382	Means 2008 HC, 31 25 13.10 1100, 1250
2.7	Install Fence and signage[2]	LF	$28.31	2,500	2,500	2,500	$70,774	$70,774	$70,774	see cost assumptions (2010) in Appendix G
	Subtotal						**$1,089,022**	**$1,089,022**	**$1,089,022**	
3.0 Interim Construction Monitoring										
3.2	Stormwater	LS	$28,199.21	1	1	1	$28,199	$28,199	$28,199	TtNUS, 1999
3.3	Air	LS	$89,369.80	1	1	1	$89,370	$89,370	$89,370	TtNUS, 1999
	Subtotal						**$117,569**	**$117,569**	**$117,569**	
4.0 Spread/Compact Raymark Waste										
4.1	Excavate Raymark Waste[3]	CY	$2.12	7,668	13,533	8,764	$16,284	$28,738	$18,611	Means 2008 HC, 31 23 16.42 0200
4.2	Load Raymark waste (from other properties)	CY	$6.12	20,000	40,000	100,000				Means 2002 SW&L G1030 140 3400
4.3	Haul Raymark Waste (0.25 miles round trip)[4]	CY	$4.00	33,202	64,240	130,517	$132,822	$256,988	$522,128	Means 2008 HC, 31 23 23.18 0320
4.4	Spread Raymark Waste	CY	$2.40	33,202	64,240	130,517	$79,764	$154,331	$313,557	Means 2008 HC, 31 23 23.17 0400, 31 23 23.23 5000
4.5	Compact Raymark Waste	CY	$0.32	33,202	64,240	130,517	$10,647	$20,600	$41,854	Means 2008 HC, 31 23 23.23 5060
4.6	Watering with 3,000 gallon Tank truck, per Pass	ACRE	$168.43	3,024	5,936	12,096	$509,340	$999,815	$2,037,359	Means 2005 ER, 318 05 0413
4.7	Dust suppressant - tree resin based	ACRE	$11,452	28	42	56	$320,655	$480,983	$641,311	Means 2005 ER, 33 08 0576
4.8	Perimeter Air Sampling	EA	$243.76	108	212	432	$26,326	$51,677	$105,304	Aero-Tech, 2005
4.9	Equipment Decontamination	HR	$54.56	1,383	2,677	5,438	$75,485	$146,050	$296,733	Means 2004 ER, 33 17 0823
	Subtotal						**$1,171,323**	**$2,139,184**	**$3,976,858**	
5.0 Construct Low-Permeability Cap										
5.1	Deliver, Dump, Spread, and Compact Sand Subbase (6")[5]	CY	$27.00	14,453	14,491	14,528	$390,168	$391,183	$392,197	Means 2008 HC (multiple items)
5.2	Install Geosynthetic Clay Liner (bottom layer)	SF	$2.86	709,526	711,371	713,216	$2,030,990	$2,036,271	$2,041,553	Means 2009 FC, 33.46.26.10 0180
5.3	Install 60 mil HDPE liner	SF	$2.84	709,526	711,371	713,216	$2,016,393	$2,021,636	$2,026,879	Means 2005 ER, 33 08 0572
5.4	Install Geosynthetic Drainage Layer	SF	$0.65	709,526	711,371	713,216	$464,023	$465,230	$466,437	Means 2005 ER, 33 08 0513
5.5	Furnish, Spread, and Compact Soil Layer (24")[5]	CY	$11.83	57,813	57,964	58,114	$683,918	$685,697	$687,475	see cost assumptions (2008)
5.6	Install Nonwoven Geotextile Delineation/Warning Layer	SF	$1.29	709,526	711,371	713,216	$915,288	$917,668	$920,048	Means 2010 SW, 31.32.19.16.1550
5.7	Furnish, Place, and Spread Topsoil (6")[5]	CY	$34.65	14,453	14,491	14,528	$500,802	$502,104	$503,406	Means 2005 ER, 18 05 0301
5.8	Hydroseeding with Mulch and Fertilizer	MSF	$43.97	710	711	713	$31,200	$31,281	$31,362	Means 2008 HC, 32 92 19.14 3500
5.9	Site Cleanup	HR	$405.12	64	64	64	$25,928	$25,928	$25,928	Means 2004, 17 04 0101
5.10	Clean Fill, Delivered, Dumped, Spread, and Compacted[5]	CY	$11.83	8,435	14,886	9,640	$99,782	$176,102	$114,044	see cost assumptions (2008)
5.11	Install Geotextile Fabric Layer	SY	$2.21	78,836	79,041	79,246	$174,228	$174,681	$175,134	Means 2010 SW, 31.32.19.16 1500
5.12	As-Built Survey	LS	$30,000.00	1	1	1	$30,000	$30,000	$30,000	see Appendix A cost assumptions
	Subtotal						**$7,362,720**	**$7,457,781**	**$7,414,463**	

TABLE F-2A-2d
CAPITAL COSTS
OU4 CAMU ALTERNATIVES (20,000, 40,000 and 100,000 CY)
CAMU DETAILED ANALYSIS
RAYMARK - OU4- BALLFIELD
STRATFORD, CONNECTICUT

DESCRIPTION		UNIT	UNIT COST	QUANTITY			TOTAL COST			SOURCE
				OU4 - 20,000	OU4 - 40,000	OU4 - 100,000	OU4 - 20,000	OU4 - 40,000	OU4 - 100,000	
6.0 Well Replacement/Installation										
6.1	Well Replacement/Installation (assume 5 wells)	LS	$21,450.22	1	1	1	$21,450	$21,450	$21,450	see Appendix A cost assumptions
	Subtotal						**$21,450**	**$21,450**	**$21,450**	
TOTAL DIRECT COSTS							**$10,513,914**	**$11,576,836**	**$13,371,192**	
7.0 Other Costs										
7.1	Project Management (5% of direct costs)						$525,696	$578,842	$668,560	OSWER 9355.0-75
7.2	Engineering and Design (8% direct costs)						$841,113	$0	$1,069,695	OSWER 9355.0-75
7.3	Construction management (6% of direct costs)						$630,835	$694,610	$802,272	OSWER 9355.0-75
7.4	Location Adjustment (9%)						$946,252	$1,041,915	$1,203,407	Means 2004 ER
7.5	Contingency (15%)						$1,577,087	$1,736,525	$2,005,679	OSWER 9355.0-75
7.6	Health and Safety Monitoring (6% of direct costs)						$630,835	$694,610	$802,272	TtNUS 1999 Report
7.7	Deed Restriction Transactional Fees (assume 1 property)						$0	$22,655	$22,655	
TOTAL OTHER COSTS							**$5,151,818**	**$4,769,157**	**$6,574,539**	
TOTAL CAPITAL COST							**$15,665,732**	**$16,345,993**	**$19,945,731**	

Notes:
[1] For source information regarding unit pricing - refer to cost assumptions provided in Appendix A and G; historical rates asjusted to reflect 2010 price increases.
[2] Assume fencing and signage would be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated.
[4] Volume for hauling RW includes a bulking factor of 1.2.
[5] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement.

RW = Raymark waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet

LF = linear foot
CY = cubic yard
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
There would be no impacts to floodplains or wetlands.

TABLE F-2A-2e
OPERATIONS AND MAINTENANCE COSTS
OU4 CAMU ALTERNATIVES (20,000, 40,000 and 100,000 CY)
CAMU DETAILED ANALYSIS
RAYMARK - OU4- BALLFIELD
STRATFORD, CONNECTICUT

DESCRIPTION		UNIT	UNIT COST[1]	QUANTITY			TOTAL COST		
				OU4 - 20,000	OU4 - 40,000	OU4 - 100,000	OU4 - 20,000	OU4 - 40,000	OU4 - 100,000
OM.1.0	**Groundwater Monitoring (per event)**								
OM.1.1	Sampling Equipment Rental	LS	$1,073	1	1	1	$1,073	$1,073	$1,073
OM.1.2	Sampling Labor - FOL	HR	$110	24	24	24	$2,640	$2,640	$2,640
OM.1.3	Sampling Labor - Sampler	HR	$90	12	12	12	$1,080	$1,080	$1,080
OM.1.4	Analytical Costs	EA	$697	6	6	6	$4,183	$4,183	$4,183
OM.1.5	Data Validation	HR	$110	6	6	6	$660	$660	$660
OM.1.6	Report Preparation	LS	$2,200	1	1	1	$2,200	$2,200	$2,200
	Subtotal						**$11,835**	**$11,835**	**$11,835**
OM.2.0	**Ground Surface Inspections, Maintenance, and Repairs (per year)**								
OM.2.1	Inspections	HR	$110.00	120	120	120	$13,200	$13,200	$13,200
OM.2.2	Mowing (twice per year)	MSF	$7.34	1,419	1,423	1,426	$10,410	$10,437	$10,464
OM.2.3	Revegetation[2]	MSF	$56.31	7	7	7	$400	$401	$402
OM.2.4	Asphalt Repairs	SF	$1.81	0	0	0	$0	$0	$0
OM 2.5	Fence Repair[3]	LF	$27.57	0	0	0	$0	$0	$0
OM 2.6	Sign Replacement[4]	EA	$73.95	0	0	0	$0	$0	$0
OM.2.7	Reporting (annual)	LS	$10,000.00	1	1	1	$10,000	$10,000	$10,000
OM 2.8	Topsoil replacement (1% per year)	CY	$34.65	145	145	145	$5,008	$5,021	$5,034
OM 2.9	Cap/Culvert/Streambank Repairs (2% per year of capital costs)	LS	$1.00	145,259	145,634	146,008	$145,259	$145,634	$146,008
OM 2.10	Contractor mobilizations	LS	$321.75	4	4	4	$1,287	$1,287	$1,287
	Subtotal						**$185,563**	**$185,979**	**$186,395**
OM.3.0	**Deed Restrictions**								
OM.3.1	Inspection (annual)	LS	$1,100.00	1	1	1	$1,100	$1,100	$1,100
OM.3.2	Deed Restriction Reporting (annual)	EA	$5,000.00	1	1	1	$5,000	$5,000	$5,000
	Subtotal						**$6,100**	**$6,100**	**$6,100**
ANNAUL O&M COSTS ALT. OU4-20,000 (YEARS 1-2)[5]							**$239,005**	**--**	--
ANNUAL O&M COSTS ALT. OU4-20,000 (YEARS 3-30)[6]							**$203,499**	**--**	--
ANNAUL O&M COSTS ALT. OU4-40,000 (YEARS 1-2)[5]							--	**$239,421**	--
ANNUAL O&M COSTS ALT. OU4-40,000 (YEARS 3-30)[6]							--	**$203,915**	--
ANNUAL O&M COSTS ALT. OU4-100,000 (YEARS 1-2)[5]							--	**--**	**$239,837**
ANNUAL O&M COSTS ALT. OU4-100,000 (YEARS 3-30)[6]							**--**	**--**	**$204,331**

Notes:

[1] For source information regarding unit pricing - refer to cost assumptions provided in Appendix G.

[2] Assumed that 1% of vegetated surfaces will require repair annually

[3] Assume fencing will not be required following remedial action.

[4] Assume signage will not be required following remedial action.

[5] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities

[6] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

COST ASSUMPTIONS
FOR OU4 CAMU
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		RATIONALE
General Assumptions		
The costs shown in these tables reflect those that would be expected for implementation of remedial actions at one property or property group at a time. Performing actions on more than one property or property group during the same mobilization could potentially result in cost savings.		
Other Costs presented in Section 7.0 of the cost estimate are based on recommended percentages contained in *A Guide to Developing and Documenting Cost Estimates During the Feasibility* (OSWER 9355.0-75), July 2000. Location adjustment based on value published in Means 2008 HC. Contingency line items based on typical values presented in OSWER 9355.0-75		
OU4 CAMU - BALL FIELD		
Generally assumptions provided above are applicable. Cost items specific to OU 4 are detailed below.		
2.0 Site Preparation		
2.2	Demolition and Disposal	Demolition of Ballfield Structures - including bleachers, grandstand, utility building, and former snack vending building. Assume non-hazardous demolition.
		Foundation removal: Brick/Concrete Block Bldg. is 32' x 53' = 1700 SF
		Wood frame for food vending shed is 35' x 17' = 600 SF
		Assume 12"-thick slab foundation w/average reinforcing
		Assume footing 1 FT thick, 2 FT wide w/average reinforcing
		Volume of concrete bleachers = 18" thickness (assumed)
		Volume of concrete foundation = 1700 SF x 1 LF = 1700 CF = 63 CY
		70Length of footing = 2 x (32 LF + 53 LF) = 170 LF; Vol. = 2 LF x 1 LF x 170 LF = 13 CY
		Volume of Concrete Block structure = 600 SF x 10 LF (wall height) = 17,000 CF = 630 CY
		Volume of Wood Frame = 600 SF x 10 LF (wall height) = 6000 CF
		Volume of bleachers: 20000 SF x 1.5 FT thick = 1111 CY; assume similar to
		Weight of bleachers: 20000 SF x 1.5 FT (thick) = 30000 CF x 150 lbs/CF = 4.5 million lbs = 2250 TONS x 1.3 = 2925 TONS (use 30% factor for buidlings and miscellaneous structures associated with bleachers).
		Assume $25000 for miscellaneous removal work (railings, moveable bleachers, wooden seating, press box, etc.)
		Remove chainlink fence 3000 LF, assume posts every 8 ft.
		Disposal. Assume materials consolidated on site. Volume = 63+13+630+1111 CY
2.4	Site Survey	14 acres
		Pre construction. Topographic survey, conventional, average of min. and max. [Means 2008 HC, 02 21 13.09 0020 & 0100]
	Interim-construction topo survey	Post excavation. Topographic survey, conventional, average of min. and max. [Means 2008 HC, 02 21 13.09 0020 & 0100]
	As constructed survey	Post construction. Topographic survey, conventional, average of min. and max. [Means 2008 HC, 02 21 13.09 0020 & 0100]
3.0 Spread/Compact Raymark Waste		
3.2	Haul Raymark Waste	Raymark Waste consolidated to OU4: A = 120000 CY, B = 48000 CY, C = 24000 CY
3.5	Watering with 3,000 gallon Tank truck, per Pass	Assume 4 pass per day for dust suppression for materials to be consolidated.
3.6	Dust suppressant - tree resin based	Use tackfier to minimize fugitive dust generation. Assumes two application.
3.7	Perimeter Air Sampling	Assume 4 samples per 1000 CY of RW deposited and worked.

COST ASSUMPTIONS
FOR OU4 CAMU
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		RATIONALE
General Assumptions		
The costs shown in these tables reflect those that would be expected for implementation of remedial actions at one property or property group at a time. Performing actions on more than one property or property group during the same mobilization could potentially result in cost savings.		
Other Costs presented in Section 7.0 of the cost estimate are based on recommended percentages contained in *A Guide to Developing and Documenting Cost Estimates During the Feasibility* (OSWER 9355.0-75), July 2000. Location adjustment based on value published in Means 2008 HC. Contingency line items based on typical values presented in OSWER 9355.0-75		
OU4 CAMU - BALL FIELD		
Generally assumptions provided above are applicable. Cost items specific to OU 4 are detailed below.		
3.8	Equipment Decontamination	LS for 6 months of operations and multiples. Includes: steam cleaners, pumps, hardware, supplies, labor, shower unit, and wash water disposal.
		Monitor groundwater, storm water, air, and soil during remedial action implementation.
		Assumes 26 samples per month for 6 months @ $600/sample (VOCs - $150, SVOCs - $125, PCBs - $125, Metals - $100, asbestos - $75, misc. - $150); Labor - 3 hours/sample @ $100/sample. ODCs - $10000.
		Analyze 5 storm water samples for 6 months for various parameters (see OU3 details). Assumes 2 hours per sample Labor.
		Monitor air quality for 15, 9, and 7 months at 40 hours per month for Options A, B, and C.
		Analyze excavated sidewall/bottoms for metals, PCBs, and asbestos. ~400 samples (~25 ft on center for botton, 3 samples vertical per 25 Ft interval). 2 hours/sample.
		See OU4 CAMU Cost Estimate Details
4.0 Construct Low-Permeability Cap		
4.11	As-built survey	14 acres. Post construction. Topographic survey, conventional, average of min. and max. [Means 2008 HC, 02 21 13.09 0020 & 0100]
	Interim-construction topo survey	Post excavation. Topographic survey, conventional, average of min. and max. [Means 2008 HC, 02 21 13.09 0020 & 0100]
	As constructed survey	Post construction. Topographic survey, conventional, average of min. and max. [Means 2008 HC, 02 21 13.09 0020 & 0100]
		See OU4 CAMU Cost Estimate Details

APPENDIX F-2 B

STRATFORD LANDFILL AND SHORT BEACH PARK (OU9) STUDY AREA CAMU DETAILED ANALYSIS

Property Description

The OU9 Study Area is located south of the former Raymark Facility near Sikorsky Airport and adjacent to the mouth of Long Island Sound. The physical characteristics are described in Appendix A-3-1.3.

Figure F-2-9 depicts the areas within the OU9 Study Area that contain Raymark Waste. Given that the OU9 Study Area is a former town municipal landfill that accepted waste from other sources, the non-Raymark Waste areas shown on this figure are assumed to contain significant contamination (above CTDEP RSRs) but do not meet the definition of Raymark waste. As discussed in the OU6 RI (TtNUS, 2005), Raymark waste in soil is defined as a single soil sample at the same depth interval containing lead above 400 parts per million (ppm) (milligrams per kilogram (mg/kg)) **and** asbestos (chrysotile only) greater than 1 percent **and either** copper above 288 ppm (mg/kg) **or** polychlorinated biphenyls (PCBs)(Aroclor 1268 only) above 1 ppm (mg/kg). This definition was developed by EPA, in consultation with the CTDEP and the Town-appointed Raymark Advisory Committee (RAC), prior to an evaluation of sampling data from the OU9 Study Area. During field investigations in 2004-2005, samples were taken throughout the two areas primarily for the Raymark waste indicator parameters of asbestos, lead, copper and PCBs. Based on the definition of Raymark waste, the volume of waste at the OU9 Study Area is approximately 1.9 million CY and is found at depths of 0-6 feet below ground surface in the Short Beach Park Area and between 0-38 feet below ground surface at the Stratford Landfill Area.

A screening analysis of the OU9 Study Area as a potential CAMU location was conducted and is presented in Appendix F-1B. Based on an analysis of the effectiveness, implementability, and cost, the CAMU alternative was retained for detailed analysis.

Based on the large volume of wastes present and the prior use of the OU9 Study Area as a known municipal landfill, this CAMU detailed analysis depicts a single capping alternative for the

OU9 Study Area that includes both the Stratford Landfill and the area along Dorne Drive and adjacent soccer fields (See Figure F-2-10). This document provides the basis for the detailed analysis of the OU9 Study Area as a potential CAMU as described in the following sub-sections.

The OU9 Study Area is located in the vicinity of Sikorsky Airport and as such is subject to FAA regulations for site development for adjacent properties. FAA regulations restrict development with respect to the adjacent properties' elevations and distances from the runways. These regulations may significantly affect the OU9 remedial options. Evaluation of the potential impact of these regulations on the OU9 Study Area is ongoing.

Design Parameters

This subsection provides the details on the existing design parameters and assumptions used to convert a portion of the OU9 Study Area into a CAMU. This proposed CAMU location would consolidate Raymark waste at the southern section of the Stratford Landfill and the northern portion of Short Beach Park with Raymark waste from Short Beach Park and Raymark waste from other properties within Stratford.

The proposed area of the CAMU would consolidate approximately 40,000 CY of Raymark Waste from Short Beach Park plus an additional 10,000 CY of Raymark waste other locations within Stratford. The Raymark waste from these other locations would be transported to, and consolidated at, the OU9 Study Area CAMU. The exact cap placement and amount of Raymark Waste that will be brought to the CAMU will be further refined during the remedial design phase.

CAMU Design Standards

The minimum design standards for a new, replacement, or laterally expanded CAMU require a cap, liner, and a leachate collection system. An alternate design, however, is being proposed for this CAMU. Under Section 40 CFR 264.552 (e)(3)(ii) of the CAMU regulations, a CAMU without a liner system may be established if an alternative design will prevent the migration of contamination at least as well as a CAMU with a liner and leachate collection system or if a CAMU is to be established in an area with significant existing contamination and the alternate design would prevent migration that would exceed long-term remedial goals.

Based on the technical information available, the OU9 Study Area meets the requirements of this alternative CAMU design provision, based upon the following:

- As a former municipal landfill, it is assumed that OU9 Study Area contains “significant” levels of existing contamination, both for the Raymark waste and non-Raymark waste areas. The non-Raymark waste areas contain contamination above the State RSRs.

- There will be minimal leaching of any consolidated Raymark Waste because it would be placed above the water table and covered by a low permeable cap.

- Raymark Waste does not appear to present a significant leaching threat, however, there would be even less of a leaching threat since any Raymark Waste brought to the OU9 Study Area which is above the Principal Hazardous Constituents (PHCs) criteria [see Section 3 and 4 of the FS (Nobis, 2010)]) would be taken to an out-of-town licensed facility for treatment and disposal.

- Of the entire area to be covered by a low permeable cap, Raymark Waste underlies about 80 percent of the capped area (including the six disposal cells that are filled with significant quantities of Raymark Waste underlying the existing soccer fields).

- The proposed CAMU is located within a classified GB aquifer. There are no drinking water wells or other private use wells in the area. The only potential exposure is to surface water receptors, and these exposures would not increase if a liner system was not present. In fact, potential future exposures would likely be reduced from current levels because of the placement of a low permeable cap.

Accordingly, installing a liner for the OU9 CAMU would not materially increase protectiveness and would not be the best use of cleanup resources. A CAMU without a liner and leachate collection system will function at least as effectively as a CAMU with a liner. Also, the OU9 CAMU will be created in an area with existing significant contamination and should prevent migration from the CAMU that will exceed long-term remedial goals.

General Design Information and Assumptions

For the design of this CAMU, the following were assumed:

- The final cover over the CAMU would be a cap (low permeable barrier). This cap would cover a portion of the large volume of Raymark Waste already present at the OU9 Study Area.

- The portion of the OU9 Study Area to be capped would encompass 1,500,000 square feet (34.4 acres) out of the total of 94 acres that make up the entire OU9 Study Area (Figure F-2-10).

- Up to 50,000 CY of Raymark waste could be consolidated within the CAMU (40,000 CY already on-site and 10,000 CY from other locations in Stratford) which would result in an overall height of approximately 22.5 feet, with the top of cap at approximately 7 feet above the existing soccer fields.

- Excavated Raymark waste from other properties in Stratford would be subject to analytical testing prior to placement in the CAMU. Waste containing PHCs that exceed the threshold criteria in 40 CFR 264.552(e)(4) would be transported to an out-of-town licensed facility for treatment and disposal.

- Wetlands are present within the OU9 Study Area CAMU; therefore, on-property mitigation for approximately 25,000 square feet of wetlands that would be impacted by cap construction would be required.

- The OU9 Study Area CAMU would occupy approximately 2,000 CY of storage volume (approximately 400,000 gallons) within the 100-year floodplain; therefore, floodplain compensation measures for this volume are needed. The approximate area proposed for compensatory floodplain storage is depicted on Figure F-2-10.

- It is anticipated that the OU9 Study Area CAMU will cause minimal disturbance to existing site functions once the remedial action is completed.

- As part of the design phase, assumptions and justifications will need to be detailed including:

    - calculations supporting the assumptions;
    - evaluation of how ARARs will be met; and
    - a plan for minimizing potential negative effects on the environment and community during the construction and O&M phases.

- The RCRA-compliant cap to be placed over the CAMU will be 3-feet in thickness and would meet the technical requirements contained in the 40 CFR 264.310 and interpreted in the *Revised Alternative Cap Design Guidance Proposed for Unlined, Hazardous Waste Landfills in the EPA Region 1 (Gagne and Choi, 2001).* Final design will require a waiver to exclude the liner system. The basic design parameters, shown on Figure F-2-2 will fulfill the design requirements for a CAMU, based on the cap requirements under 40 CFR 264.552(e)(6)(iv). The cap design includes (listed from top to bottom):

    - Vegetative Cover
    - 6 inch "Topsoil Layer"
    - 24 inch "Protective Soil Layer" (Common Fill)
    - Geotextile fabric, orange, non-woven (“Warning Layer” to prevent future intrusive activity)
    - Lower Protective Soil Layer
    - Geocomposite Drainage Layer ("Drainage Layer")
    - Geomembrane Liner ("Top Low Permeability Layer")
    - Geosynthetic Clay Liner (“Bottom Low Permeability Layer”)
    - 6 inches Liner Sub Base Material ("Base Leveling Layer")

Consolidation and Capping Alternative

The cap design will allow for potential reuse for limited activities (walking trails, etc.) of the affected portion of the OU9 Study Area. Figure F-2-10 is a map that delineates the proposed CAMU area. The cap design assumes the existing ground surface topography will be reworked to facilitate potential reuse; additionally, ground surface elevations will increase with consolidation volume utilized. Figure F-2-11 is a set of cross-sections that depict both the

existing and proposed ground surface topographies. Table F-2B-1 summarizes the detailed analysis of the OU9 Study Area.

Currently there are no monitoring wells installed at the OU9 Study Area. Fifteen wells with various depths ranging from shallow overburden to bedrock would be installed around the cap upon completing the construction to facilitate long-term groundwater monitoring.

Since Raymark Waste would remain on the property, institutional controls would be required. The required operations and maintenance (O&M) efforts would include semi-annual cap inspections; annual repairs and reporting to summarize inspection findings and verify the monthly effectiveness of institutional controls; groundwater sampling (quarterly for two years and annually thereafter); and five-year reviews.

Site Preparation

Site preparation includes the activities necessary to prepare a portion of the OU9 Study Area for consolidation/capping including establishing site support services, preparing and implementing the erosion and sedimentation control plan, establishing air monitoring stations, clearing and grubbing, and constructing access roads and staging areas.

Utilities – Temporary electricity and water would be required during the construction activities.

- Electrical power would be required for at least one office trailer (project engineering office). In addition, electricity may be required to power equipment.

- Temporary power poles would be established and power would be distributed throughout the OU9 Study Area where lighting is required.

- Water would be required to routinely decontaminate vehicles, equipment, and personnel, and for dust control. Decontamination would occur on a daily basis. Dust suppression will be required. A temporary water service could be installed to provide water for OU9 Study Area use. Consumption volumes are uncertain.

Property Boundary Survey – A property boundary survey by a licensed surveyor would be required. The property survey would need to include obtaining and reviewing previous surveys, researching the tax assessor's maps, researching of deeds for the OU9 Study Area and for all adjoining properties, researching deed changes, and establishing monuments at the OU9 Study Area to identify the property lines. Monuments will consist of iron rods and granite, depending on regulatory requirements.

Environmental Protection Plan (EPP) – A specification would be prepared requiring the General Contractor to prepare a site-specific Environmental Protection Plan. The specification would dictate minimum requirements and would need to be reviewed and approved by the oversight engineer. At a minimum, the plan would consist of an erosion and sediment control plan, traffic control plan, a work area plan, a spill control plan, a storm water pollution prevention plan, a non-hazardous solid waste disposal plan, a recycling and solid waste minimization plan, an air monitoring plan, and a waste water management plan.

Grubbing and Clearing – Clearing and grubbing includes removing trees, stumps, roots, and brush. Grubbing shall consist of completely removing roots, stumps, trash, and other debris from all areas to be graded. Any brush and small trees may be chipped and stored temporarily for future onsite use. However, in the event that on-site storage area is unavailable, the cleared brush, vegetation, and trees would be sent off-site to a composting facility.

Decontamination Stations – For the purpose of the design, it is assumed that one decontamination station would be constructed during the site preparation phase.

Excavation and Temporary Storage

Some of the Raymark waste at the OU9 Study Area designated for consolidation within the CAMU area will be excavated from Short Beach Park. This excavated material as well as Raymark waste from other locations within Stratford would be consolidated within a portion of the OU9 Study Area to provide a final grade for the cap, and/or to allow for potential reuse of the area.

Excavation Approach – It is expected that common construction equipment (i.e., front-end loaders, excavators, etc.) would be used to excavate and deposit the Raymark waste from the

OU9 Study Area into dump trucks, which would transport the soils to temporary stockpile areas or directly into the CAMU.

Excavation Delineation – Figure F-2-10 shows the approximate areas of Raymark waste at the OU9 Study Area that are proposed to be consolidated under this CAMU alternative. Stakes will be used to delineate the areas of Raymark waste during field activities. Sampling during the design phase would be conducted to confirm the Raymark waste areas.

Backfilling, Grading, and Compaction

During the design phase of this project, the exact grades of the final OU9 Study Area CAMU would be determined. One goal in backfilling is to create a finished surface that would be suitable for the potential future land reuse. The final grades would be designed to allow for sheet flow of stormwater runoff. The cap design may include storm water retention and/or discharge to local storm sewers. A pre-design study would need to be conducted to ascertain pipe sizes and design parameters for the retention area and storm sewers.

The final grade of the cap has been conceptualized to rise approximately 7 feet above existing ground surface (including the thickness of capping materials) and will be contoured such that a relatively flat area exists at the top surface for potential future re-use. The final elevation of the CAMU would reach approximately 23 feet msl.

RCRA-Compliant Cap

As discussed previously, a 3-foot, RCRA-compliant, low-permeability cap will be constructed on top of the consolidated Raymark waste material. The cap would be constructed to provide long-term minimization of migration of liquids through the closed CAMU, promote drainage, and minimize erosion.

Final Survey and Markers

Upon completion of final grading, the topography of the OU9 Study Area CAMU will be surveyed to determine the finish grade contours. A benchmark shall be established and set at an accessible location adjacent to the cap for future settlement measurements. This benchmark shall be adequately protected and marked for ease in future location and reference.

Post-Closure Maintenance

Some settlement of the cap system is assumed within 2 years after the cap construction. Visual observations and maintenance of the cap system would be performed on a quarterly basis for the first 2 years after completion. Visual observations and maintenance of the cap system would be performed on a quarterly basis for the first two years after completion. After two years, it is assumed that maintenance would be performed annually in the spring. Additional topsoil may be required to fill low areas resulting from settlement and maintain drainage slopes. Areas of the cover affected by localized erosion would be repaired by the addition of topsoil and re-grading. Deep rooted plant species (trees and shrubs) growth over the cap system would be avoided to minimize root extension into the cap. The final cap system would be maintained so that the cap remains free of areas of excessive ponding, distressed vegetation (grasses), and tree growth.

Analysis of the Alternative

This section presents the analysis of the CAMU alternative proposed and the consolidation and cap design at the OU9 Study Area using seven of the nine criteria promulgated for use by the NCP and as described in the preface for Appendix F-2. This analysis is summarized in tabular form on Table F-2B-1.

Overall Protection of Human Health and the Environment

The CAMU alternative would protect human health and the environment through consolidation, engineering controls (low-permeability cap), and institutional controls. Once the low-permeability cap is in place, any stormwater and leachate that would have been potentially generated by precipitation would be minimized. This alternative would be protective based on the comprehensive cap design.

Institutional controls, such as deed restrictions and local ordinances, would be used to restrict groundwater use and future activities within the OU9 CAMU area that could damage or intrude into the cap system.

The long-term groundwater monitoring program would alert the responsible agency of changes in groundwater contamination, which may indicate changes in soil contaminant status or the capping system's effectiveness.

Compliance with ARARs

The Applicable or Relevant and Appropriate Requirements (ARARs) are presented in Appendix C. The CAMU alternative complies with all chemical-specific and action-specific ARARs. However, it will not comply with federal and state location-specific ARARs unless several issues are addressed.

As for the federal location-specific ARARs, EPA's policy that implements Executive Order 11998 (Floodplain Management) states that any action affecting floodplains and wetlands should be avoided if a practicable alternative exists. If there is no practicable alternative to taking an action that affects floodplains and wetlands, then EPA must act to minimize potential harm or avoid adverse effects. This includes restoring and preserving the natural and beneficial values of the floodplains and wetlands. The state ARARs regarding floodplains have requirements similar to the federal ARARs discussed above. Such state ARARs are described in Appendix C.

The actions and costs required to meet the ARARs discussed above are described in the Implementability and Cost section of this Analysis of the Alternative.

In addition to the Floodplain ARARs noted above, EPA has determined that the RCRA-modified low-permeability cap would fulfill the alternative CAMU design standards and would effectively result in preventing direct exposures; thereby, achieving the Remedial Action Objective (i.e.; to prevent direct contact with Raymark waste) for the OU9 Study Area CAMU.

For consistency with the To Be Considered (TBCs) requirements, the cap design and construction would be consistent with the technical specifications contained in the *Revised Alternative Cap Design Guidance Proposed for Unlined, Hazardous Waste Landfills in EPA Region 1* (Gagne and Choi, 2001).

Long-Term Effectiveness and Permanence

Under this CAMU alternative, the potential for direct exposures would be eliminated in the long term, if the cap and institutional controls are maintained. Any potential leaching of contaminants would also essentially be eliminated/minimized in the long term, if the cap is maintained. While no ecological risks were identified for the OU9 Study Area, risks to ecological receptors would be further reduced over the long term by capping contaminated soils and maintaining the cap system.

Some minor residual human health risks would remain because some Raymark waste will be left in-place above the water table; however, there would be no direct human exposures. This CAMU alternative would be protective based on the comprehensive area of the cap design.

The CAMU alternative would be effective in the long term and is considered permanent. However, regular maintenance of the cap system would be required to avoid any potential problems into the future and extend the life of the cap.

Five-year reviews would be required (40 CFR 300.430(f)(4)(ii)) to assess the cap system's effectiveness in preventing exposures to contaminated materials. Review of the effectiveness of institutional controls, including deed restrictions and ordinances, in preventing damage to the cap system would be required as well.

To ensure long-term effectiveness, the CAMU alternative would require O&M efforts consisting of cap inspections and repairs (as necessary), long-term groundwater monitoring, and inspections/reporting for compliance with institutional controls.

Reduction of Toxicity, Mobility, and Volume through Treatment

A CAMU does not provide inherent reductions in toxicity, mobility or volume of waste as no treatment processes are utilized and existing Raymark waste within the Study Area will be contained in-place under the constructed cap. However, a reduction in toxicity, mobility and volume through treatment may be realized during the consolidation process prior to cap construction as transported waste from other properties in Stratford will be subject analytical testing to determine compliance with the Principal Hazardous Constituents (PHCs). Any waste found to exceed the PHC standards would be subject to transportation off-site for treatment

and/or disposal. Based upon historical sampling within OU6, approximately 10% of excavated waste may be in excess of the PHC standards.

The CAMU alternative would not fully satisfy the statutory preference for treatment to reduce risks posed by contaminated soils as only Raymark waste from other properties in Stratford that is transported to the CAMU for disposition under the cap would be subject to analytical testing and potential off-site treatment and disposal.

Short-Term Effectiveness

Short-term impacts to the community, workers, and environment from the implementation of this CAMU alternative could be mitigated using engineering controls. The implementation of this alternative is not expected to pose any significant risks to the local community, but residents could be impacted due to noise and the inherent construction-type work.

Increased truck and heavy equipment traffic through portions of Stratford would occur as the result of mobilization, site preparation, excavation, consolidation, and the import and placement of Raymark Waste from OU6 properties and as well as clean materials for capping. Coordination with the town, residents, and businesses to schedule truck and heavy equipment traffic on public roads would be required. Dust mitigation and air monitoring would be ongoing during all construction activities.

Implementability

Implementation is considered technically feasible, however, compliance with the federal floodplain Executive Order would be required. There is sufficient on-site area (see Figure F-12-10) that is suitable for floodplain compensation purposes. The area proposed for floodplain compensation is sufficiently close to the OU9 Study Area CAMU to reduce the potential for increased flooding of adjacent properties. The costs for this action are shown as part of the detailed cost estimate (Attachment F-2B).

Based upon the assumptions included in Appendix F-1B, the OU9 Study Area CAMU would occupy approximately 2,000 CY of storage volume (approximately 400,000 gallons) within the 100-year floodplain. The cross-sections on Figure F-2-10 depict the volume of soil designated for excavation to recreate the required volume of compensatory floodplain storage.

Cost

Detailed costs developed for this detailed analysis are presented in Attachment F-2B-2a through F-2B-2c.

TABLE F-2B-1
SUMMARY OF ANALYSIS FOR RAYMARK OU9 STUDY AREA
CAMU DETAILED ANALYSIS
RAYMARK – OU6 – ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

Criterion	Proposed Alternative
Overall Protection of Human Health and the Environment	• Would protect human health through waste removal and construction of an engineered barrier over consolidated waste footprint to prevent direct contact. • RI did not identify ecological risks for this property group.
Compliance with ARARs	• Would comply with all chemical-specific and action-specific ARARs. • Would not comply with location-specific ARARs without additional compensatory measures.
Long-Term Effectiveness and Permanence	• Residual risk within acceptable limits. • Risk reduction would be dependent upon proper execution of O&M program. • 5-year reviews required. • O&M of cap, deed restrictions (no excavation or use of groundwater), and groundwater monitoring would be required. • Controls would be adequate to ensure long-term effectiveness. • Capping technology reliable.
Reduction of Toxicity, Mobility, or Volume Through Treatment	• Treatment of waste from other properties assumed to occur prior to its arrival on-site to comply with disposal regulations (see assumptions). • Minimal on-site consolidation; majority of on-site soil waste not disturbed from present environs.
Short-Term Effectiveness	• No adverse impacts to community or workers anticipated during implementation, assuming adequate implementation of controls. • No adverse impacts to environment anticipated during implementation. • Monitoring would be conducted during remedial action to verify effectiveness of controls. • Total imported volume of RW = 50,000 CY (40,000 CY from OU9, plus 10,000 CY from OU6 properties). • Approximately 11 months to complete remedial action.
Implementability	• Considered technically feasible; wetlands and floodplain mitigation required. • All potential exposure pathways could be monitored adequately. • Would require coordination with state/town officials and property owner to perform long-term O&M and inspections/reporting for compliance with deed restrictions. • Required equipment and specialists readily available. • Technology generally available and in full-scale use.
Cost	Capital: ***$37,166,400*** O&M (Years 1-2): ***$512,700*** O&M (Years 3-30): ***$430,000*** Five-Year Reviews: ***$20,000 each*** PV of O&M: ***$5,529,300*** PV of Alternative: ***$42,695,700***

TABLE F-2B-2a
PRESENT VALUE ANALYSIS
OU9 CAMU ALTERNATIVE - DETAILED ANALYSIS
RAYMARK - OU6- ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$37,166,384	$0	$0	$37,166,384	7.0%	$37,166,384
1	$0	$512,674	$0	$512,674	7.0%	$479,135
2	$0	$512,674	$0	$512,674	7.0%	$447,790
3	$0	$430,073	$0	$430,073	7.0%	$351,068
4	$0	$430,073	$0	$430,073	7.0%	$328,101
5	$0	$430,073	$20,000	$450,073	7.0%	$320,896
6	$0	$430,073	$0	$430,073	7.0%	$286,576
7	$0	$430,073	$0	$430,073	7.0%	$267,828
8	$0	$430,073	$0	$430,073	7.0%	$250,307
9	$0	$430,073	$0	$430,073	7.0%	$233,931
10	$0	$430,073	$20,000	$450,073	7.0%	$228,794
11	$0	$430,073	$0	$430,073	7.0%	$204,325
12	$0	$430,073	$0	$430,073	7.0%	$190,958
13	$0	$430,073	$0	$430,073	7.0%	$178,465
14	$0	$430,073	$0	$430,073	7.0%	$166,790
15	$0	$430,073	$20,000	$450,073	7.0%	$163,127
16	$0	$430,073	$0	$430,073	7.0%	$145,681
17	$0	$430,073	$0	$430,073	7.0%	$136,150
18	$0	$430,073	$0	$430,073	7.0%	$127,243
19	$0	$430,073	$0	$430,073	7.0%	$118,919
20	$0	$430,073	$20,000	$450,073	7.0%	$116,307
21	$0	$430,073	$0	$430,073	7.0%	$103,868
22	$0	$430,073	$0	$430,073	7.0%	$97,073
23	$0	$430,073	$0	$430,073	7.0%	$90,723
24	$0	$430,073	$0	$430,073	7.0%	$84,787
25	$0	$430,073	$20,000	$450,073	7.0%	$82,926
26	$0	$430,073	$0	$430,073	7.0%	$74,057
27	$0	$430,073	$0	$430,073	7.0%	$69,212
28	$0	$430,073	$0	$430,073	7.0%	$64,684
29	$0	$430,073	$0	$430,073	7.0%	$60,452
30	$0	$430,073	$20,000	$450,073	7.0%	$59,125
TOTAL	**$37,166,384**					**$42,695,681**
					PV O&M	**$5,529,297**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE F-2B-2b
CAPITAL COSTS
OU9 CAMU ALTERNATIVE - DETAILED ANALYSIS
RAYMARK - OU6- ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

DESCRIPTION		UNIT	UNIT COST[1]	QUANTITY OU9 - CAMU	TOTAL COST OU9 - CAMU	SOURCE
1.0 Mobilization/Demobilization						
1.1	Personnel/Equipment Mobilization	LS	$96,526	1	$96,526	see Appendix A cost assumptions
1.2	Field Support Facilities	LS	$37,538	3	$112,614	see Appendix A cost assumptions
1.3	Monthly Costs associated with Field Support	MONTH	$51,481	11	$566,286	see Appendix A cost assumptions
	Subtotal				**$775,426**	
2.0 Site Preparation						
	Stratford LF & Short Beach Park					
2.1	Site Access Road Construction	SY	$23.06	1,900	$43,812	Means 2008 HC, 32 11 23.23 0300
2.2	Demolition and Disposal	LS	$30,000	1	$30,000	see Appendix A cost assumptions
2.3	Clear and Grub	ACRE	$3,968	18	$71,429	Means 2008 HC, 31 11 10.10 0020
2.4	Site Survey	EA	$5,945	1	$5,945	TtNUS, 2005
2.5	Decontamination Facilities & Services	LS	$350,000	1	$350,000	see Appendix A cost assumptions
2.6	Install Erosion and Sedimentation Controls	LF	$8.97	5,000	$44,831	Means 2008 HC, 31 25 13.10 1100, 1250
2.7	Install Fence and signage[2]	LF	$28.31	5,000	$141,548	see cost assumptions (2010) in Appendix G
	Airport Property N. of Marine Basin					
2.8	Site Access Road Construction	SY	$23.06	900	$20,753	Means 2008 HC, 32 11 23.23 0300
2.9	Clear and Grub	ACRE	$3,968	2	$7,937	Means 2008 HC, 31 11 10.10 0020
2.10	Decontamination Facilities & Services	LS	$50,000	1	$50,000	see Appendix A cost assumptions (2010)
2.11	Install Erosion and Sedimentation Controls	LF	$8.97	1,200	$10,759	Means 2008 HC, 31 25 13.10 1100, 1250
2.12	Install Fence and signage[2]	LF	$28.31	1,200	$33,971	see cost assumptions (2010) in Appendix G
	Subtotal				**$810,986**	
3.0 Interim Construction Monitoring						
3.1	Stormwater	LS	$5,784.45	1	$5,784	TtNUS, 1999
3.2	Air	LS	$26,030.04	1	$26,030	TtNUS, 1999
3.3	Soil Confirmatory	LS	$182,326.90	1	$182,327	see Appendix A cost assumptions
	Subtotal				**$214,141**	
4.0 Spread/Compact Raymark Waste						
	Stratford LF & Short Beach Park					
4.1	Excavate Raymark Waste[3]	CY	$2.12	194,900	$413,884	Means 2008 HC, 31 23 16.42 0200
4.2	Load Raymark waste (from other properties)	CY	$6.12	9,400	$57,515	
4.3	Haul Raymark Waste (0.25 miles round trip)[4]	CY	$4.00	233,880	$935,629	Means 2008 HC, 31 23 23.18 0320
4.4	Spread Raymark Waste	CY	$2.40	233,880	$561,879	Means 2008 HC, 31 23 23.17 0400, 31 23 23.23 5000
4.5	Compact Raymark Waste	CY	$0.32	233,880	$75,001	Means 2008 HC, 31 23 23.23 5060
4.6	Watering with 3,000 gallon Tank truck, per Pass	ACRE	$168	13,824	$2,328,410	Means 2005 ER, 318 05 0413
4.7	Dust suppressant - tree resin	ACRE	$11,452	74	$847,447	Means 2005 ER, 33 08 0576
4.8	Perimeter Air Sampling	EA	$243.76	817	$199,201	Aero-Tech, 2005
4.9	Equipment Decontamination	HR	$54.56	9,745	$531,732	Means 2004 ER, 33 17 0823

TABLE F-2B-2b
CAPITAL COSTS
OU9 CAMU ALTERNATIVE - DETAILED ANALYSIS
RAYMARK - OU6- ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

	DESCRIPTION	UNIT	UNIT COST[1]	QUANTITY	TOTAL COST	SOURCE
				OU9 - CAMU	OU9 - CAMU	
	Airport Property N. of Marine Basin					
4.9	Excavate Raymark Waste[3]	CY	$2.12	7,000	$14,865	Means 2008 HC, 31 23 16.42 0200
4.10	Haul Raymark Waste (1 mile round trip)[4]	CY	$16.00	8,400	$134,416	Means 2008 HC, 31 23 23.18 0320
4.11	Spread Raymark Waste	CY	$2.40	8,400	$20,180	Means 2008 HC, 31 23 23.17 0400, 31 23 23.23 5000
4.12	Compact Raymark Waste	CY	$0.32	8,400	$2,694	Means 2008 HC, 31 23 23.23 5060
4.13	Watering with 3,000 gallon Tank truck, per Pass	ACRE	$168	112	$18,864	Means 2005 ER, 318 05 0413
4.14	Dust suppressant - tree resin	ACRE	$11,452	4	$45,808	Means 2005 ER, 33 08 0576
4.15	Perimeter Air Sampling	EA	$243.76	28	$6,825	Aero-Tech, 2005
4.16	Equipment Decontamination	HR	$54.56	350	$19,098	Means 2004 ER, 33 17 0823
	Subtotal				**$6,213,448**	
5.0	**Construct Low-Permeability Cap**					
5.1	Deliver, Dump, Spread, and Compact Sand Subbase (6")[5]	CY	$27.00	30,974	$836,140	Means 2008 HC (multiple items)
5.2	Install Geosynthetic Clay Liner (bottom layer)	SF	$2.86	1,520,530	$4,352,460	Means 2009 FC, 33.46.26.10 0180
5.3	Install 60 mil HDPE liner	SF	$2.84	1,520,530	$4,321,178	Means 2005 ER, 33 08 0572
5.4	Install Geosynthetic Drainage Layer	SF	$0.65	1,520,530	$994,413	Means 2005 ER, 33 08 0513
5.5	Furnish, Spread, and Compact Soil Layer (24")[5]	CY	$11.83	123,895	$1,465,653	see cost assumptions (2008)
5.6	Install Nonwoven Geotextile Delineation/Warning Layer	SF	$1.29	1,520,530	$1,961,484	Means 2010 SW, 31.32.19.16.1550
5.7	Furnish, Place, and Spread Topsoil (6")[5]	CY	$34.65	30,974	$1,073,230	Means 2005 ER, 18 05 0301
5.8	Hydroseeding with Mulch and Fertilizer	MSF	$43.97	1,521	$66,862	Means 2008 HC, 32 92 19.14 3500
5.9	Site Cleanup	HR	$405.12	64	$25,928	Means 2004, 17 04 0101
5.10	Clean Fill, Delivered, Dumped, Spread, and Compacted[6]	CY	$11.83	52,250	$618,107	see cost assumptions (2008)
5.11	Install Geotextile Fabric Layer	SY	$2.21	168,948	$373,375	Means 2010 SW, 31.32.19.16 1500
5.12	As-Built Survey	LS	$50,000	1	$50,000	see Appendix A cost assumptions
5.13	Build Replacement Dorne Drive	LS	$280,000	1	$280,000	see Appendix A cost assumptions
	Subtotal				**$16,418,829**	
6.0	**Well Replacement/Installation**					
6.1	Well Replacement/Installation (assume 15 wells)	LS	$80,438.34	1	$80,438	see Appendix A cost assumptions
	Subtotal				**$80,438**	
7.0	**Wetlands & Floodplains Mitigation[6]**					
7.1	Purchase land for Flood Storage Mitigation	ACRE	$200,000.00	0	$0	see Appendix A cost assumptions
7.2	Flood storage mitigation	LS	$225,000.00	1	$225,000	see Appendix A cost assumptions
7.3	Purchase land for Wetlands Mitigation	ACRE	$200,000.00	0	$0	see Appendix A cost assumptions
7.4	Construct compensatory wetlands	LS	$160,000.00	1	$160,000	see Appendix A cost assumptions
	Subtotal				**$385,000**	

TABLE F-2B-2b
CAPITAL COSTS
OU9 CAMU ALTERNATIVE - DETAILED ANALYSIS
RAYMARK - OU6- ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

DESCRIPTION		UNIT	UNIT COST[1]	QUANTITY OU9 - CAMU	TOTAL COST OU9 - CAMU	SOURCE
TOTAL DIRECT COSTS					**$24,898,269**	
7.0 Other Costs						
7.1	Project Management (5% of direct costs)				$1,244,913	OSWER 9355.0-75
7.2	Engineering and Design (8% direct costs)				$1,991,861	OSWER 9355.0-75
7.3	Construction management (6% of direct costs)				$1,493,896	OSWER 9355.0-75
7.4	Location Adjustment (9%)				$2,240,844	Means 2004 ER
7.5	Contingency (15%)				$3,734,740	OSWER 9355.0-75
7.6	Health and Safety Monitoring (6% of direct costs)				$1,493,896	TtNUS 1999 Report
7.7	Deed Restriction Transactional Fees				$67,964	
TOTAL OTHER COSTS					**$12,268,115**	
TOTAL CAPITAL COST					**$37,166,384**	

Notes:

[1] For source information regarding unit pricing - refer to cost assumptions provided in Appendix A and G; rates asjusted to reflect 2010 price increases.

[2] Assume fencing and signage would be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to be excavated.

[4] Volume for hauling RW includes a bulking factor of 1.2.

[5] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.

[6] Impacts to floodplains will evaluated during Remedial Design and will require onsite compensation to ensure no loss of flood storage capacity will be incurred; impacted wetlands would be restored to pre-existing conditions to the extent practical

RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation

TABLE F-2B-2c
OPERATIONS AND MAINTENANCE COSTS
OU9 CAMU ALTERNATIVE - DETAILED ANALYSIS
RAYMARK - OU6- ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

DESCRIPTION		UNIT	UNIT COST[1]	QUANTITY	TOTAL COST
				OU9 - CAMU	OU9 - CAMU
OM.1.0 Groundwater Monitoring (per events)					
OM.1.1	Sampling Equipment Rental	LS	$1,073	1	$1,073
OM.1.2	Sampling Labor - FOL	HR	$110	68	$7,480
OM.1.3	Sampling Labor - Sampler	HR	$90	34	$3,060
OM.1.4	Analytical Costs	EA	$697	17	$11,851
OM.1.5	Data Validation	HR	$110	17	$1,870
OM.1.6	Report Preparation	LS	$2,200	1	$2,200
	Subtotal				**$27,534**
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)					
OM.2.1	Inspections	HR	$110.00	120	$13,200
OM.2.2	Mowing (twice per year)	MSF	$7.34	3,041	$22,309
OM.2.3	Revegetation[2]	MSF	$56.31	15	$856
OM.2.4	Asphalt Repairs	SF	$1.81	0	$0
OM 2.5	Fence Repair[3]	LF	$27.57	0	$0
OM 2.6	Sign Replacement[4]	EA	$73.95	0	$0
OM.2.7	Reporting (annual)	LS	$10,000.00	1	$10,000
OM 2.8	Topsoil replacement (1% per year)	CY	$34.65	310	$10,732
OM 2.9	Cap/Culvert/Streambank Repairs (0.5% per year of capital costs)	LS	$328,376.59	1	$328,377
OM 2.10	Contractor mobilizations	LS	$321.75	3	$965
	Subtotal				**$386,439**
OM.3.0 Deed Restrictions					
OM.3.1	Inspection (annual)	LS	$1,100.00	1	$1,100
OM.3.2	Deed Restriction Reporting (annual)	EA	$5,000.00	3	$15,000
	Subtotal				**$16,100**
ANNUAL O&M COSTS ALT. OU9-3A AND OU9-3B (YEARS 1-2)[5]					**$512,674**
ANNUAL O&M COSTS ALT. OU9-3A AND OU9-3B (YEARS 3-30)[6]					**$430,073**

Notes:

[1] For source information regarding unit pricing - refer to cost assumptions provided in Appendix G.

[2] Assumed that 1% of vegetated surfaces will require repair annually

[3] Assume fencing will not be required following remedial action.

[4] Assume signage will not be required following remedial action.

[5] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[6] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

COST ASSUMPTIONS
FOR OU9 CAMU
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		RATIONALE
General Assumptions		
The costs shown in these tables reflect those that would be expected for implementation of remedial actions at one property or property group at a time. Performing actions on more than one property or property group during the same mobilization could potentially result in cost savings.		
Other Costs presented in Section 7.0 of the cost estimate are based on recommended percentages contained in *A Guide to Developing and Documenting Cost Estimates During the Feasibility* (OSWER 9355.0-75), July 2000. Location adjustment based on value published in Means 2008 HC. Contingency line items based on typical values presented in OSWER 9355.0-75		
OU9 CAMU - STRATFORD LANDFILL & SHORE BEACH PARK		
Generally assumptions provided above are applicable. Cost items specific to OU 9 are detailed below.		
2.0 Site Preparation		
2.2	Demolition and Disposal	Remove existing roadway - 1200 LF x 20 FT wide, 4-inch thick asphalt
		Remove two onsite structures - each 100 FT x 50 FT x 12 FT high; 8 inch thick walls
		Dispose of rubble in area to be capped.
2.3	Site Survey - Short Beach Park & Stratford LF *Pre-construction topographic and boundary survey*	37 acres.
		Topo. Survey - conventional, use average of min. and max. [Means 2008 HC, 02 21 13.09 0020 & 0100]. Boundary survey - lot location and lines, maximum. Site/property boundaries, areas of Raymark Waste [Means 2008 HC, 02 21 13.13 0320]
		See OU9 CAMU Cost Estimate Details
2.10	Site Survey - Airport Property	Topgraphic survey, conventional, min. [Means 2008 HC 02 21 13.09 0010]
2.11	Airport Property N.- Decontamination Facilities & Services	Equipment decontamination pads assumed assumed 20' x 40' in size with 6" gravel base, 60-mil high density polyethylene liner, and 4" crushed stone, graded to divert decontamination fluids into a water collection sump.
		See OU9 CAMU Cost Estimate Details
3.0 Interim Construction Monitoring		Monitor groundwater, storm water, air, and soil during remedial action
		Assumes 26 samples per month for 6 months @ $600/sample (VOCs - $150, SVOCs - $125, PCBs - $125, Metals - $100, asbestos - $75, misc. - $150); Labor - 3 hours/sample @ $100/sample. ODCs - $10000. (2008)
		Analyze 5 storm water samples for 6 months for various parameters (see OU3 details). (2008)
		Monitor air quality for 6 months.
		Analyze excavated sidewall/bottoms for metals, PCBs, and asbestos. ~300 samples (~25 ft on center for botton, 3 samples vertical per 25 Ft interval).
		See OU9 CAMU Cost Estimate Details
4.0 Spread/Compact Raymark Waste		
4.5	Watering with 3,000 gallon Tank truck, per Pass	Assumes 4 passes per day, 2 trucks, 37 acres (SL/SBP) and 2 acres (Airport Property).
4.6	Dust suppressant - tree resin	Assumes 1 application pre-construction, 1 application post-backfilling/compaction/grading.

COST ASSUMPTIONS
FOR OU9 CAMU
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

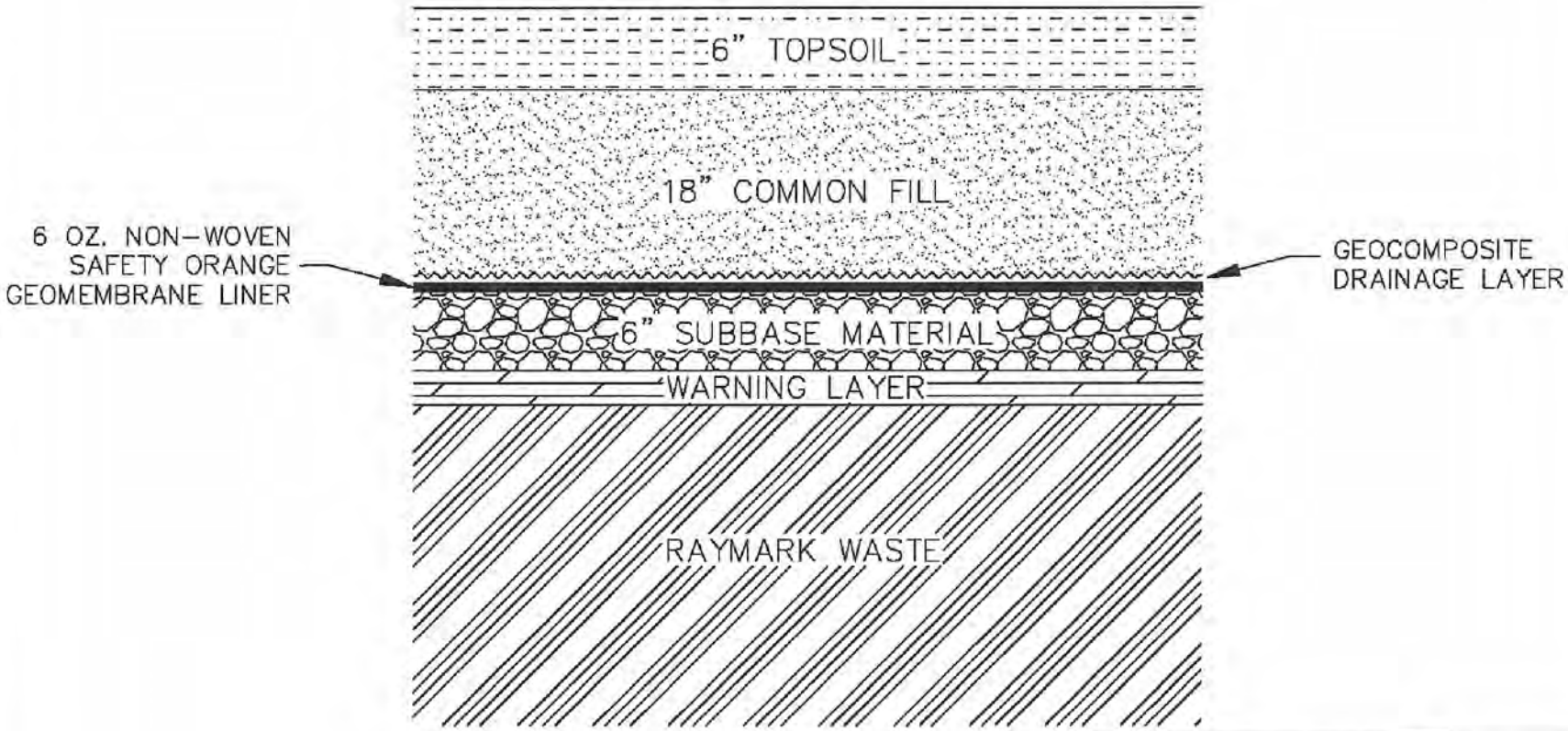
DESCRIPTION		RATIONALE
General Assumptions		
The costs shown in these tables reflect those that would be expected for implementation of remedial actions at one property or property group at a time. Performing actions on more than one property or property group during the same mobilization could potentially result in cost savings.		
Other Costs presented in Section 7.0 of the cost estimate are based on recommended percentages contained in *A Guide to Developing and Documenting Cost Estimates During the Feasibility* (OSWER 9355.0-75), July 2000. Location adjustment based on value published in Means 2008 HC. Contingency line items based on typical values presented in OSWER 9355.0-75		
OU9 CAMU - STRATFORD LANDFILL & SHORE BEACH PARK		
Generally assumptions provided above are applicable. Cost items specific to OU 9 are detailed below.		
4.8	Equipment/personnel decontaminantion - Short Beach Park	Equipment decontaminantion using 6HP steam cleaner, 3 HP water pump.
		Assume 2 hours per day operations & 1 maintenance/repair per month.
		Provision of personnel decontamination trailer with showers.
		Use 2 frac tanks to store clean and used water.
		1500 gallons per day water usage.
		See OU9 CAMU Cost Estimate Details
4.16	Equipment/personnel decontaminantion - Airport Property N.	Assumes 10 days operation.
5.0 Construct Low-Permeability Cap		
5.11	As-built survey	Post construction. Topographic survey, conventional, average of min. and max. [Means 2008 HC, 02 21 13.09 0020 & 0100]
	Interim-construction topo survey	Post excavation. Topographic survey, conventional, average of min. and max. [Means 2008 HC, 02 21 13.09 0020 & 0100]
	As constructed survey	Post construction. Topographic survey, conventional, average of min. and max. [Means 2008 HC, 02 21 13.09 0020 & 0100]
		See OU9 CAMU Cost Estimate Details
5.12	Build Replacement Dorne Drive	Fine grading, compaction, import and placement of 4 inches gravel, 3 inch binding course, and 3 inches wearing course.
6.0 Well Replacement/Installation		
		Assume 15 wells, at $5000 each. Installed on finished landfill, and downgradient locations in Short Beach Park. (2008)

NOTES:
1) PLAN NOT TO BE USED FOR DESIGN
2) ALL LOCATIONS TO BE CONSIDERED APPROXIMATE
3) PROPERTY BOUNDARIES ARE APPROXIMATE BASED ON TOWN OF STRATFORD ENGINEERING DEPARTMENT PLANS
4) PUBHx WETLAND DESIGNATION WAS OBTAINED FROM THE NATIONAL WETLAND INVENTORY MAP.

Nobis
Nobis Engineering, Inc.

OU4 STUDY AREA CAMU
RAYMARK - OU6 - ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

FILE	SCALE
CFS Project\dwg\FIGURES\FIGURES 4-4-.dwg	AS NOTED
FIGURE NUMBER F-2-1	REV 0 / DATE 07/09/10



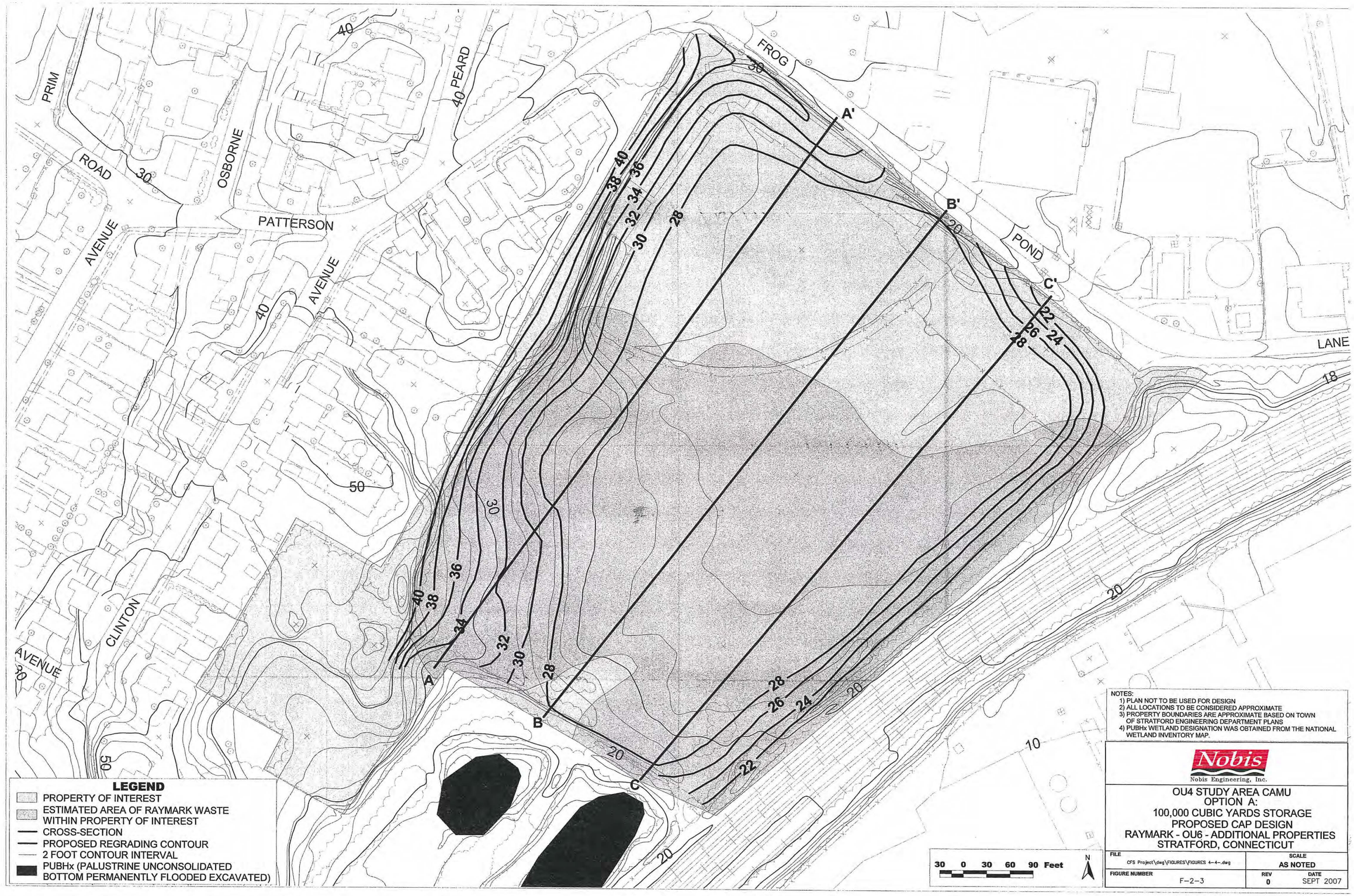
NOT TO SCALE

Nobis
Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
Tel (978) 683-0891
Fax (978) 683-0966
www.nobisengineering.com

FIGURE F-2-2

BASIC CAP DESIGN PARAMETERS
CAMU DESIGN
OU6 ADDITIONAL PROPERTIES
RAYMARK SUPERFUND SITE
STRATFORD, CONNECTICUT

SCALE:	NTS	DATE:	07/09/10



NOTES:
1) PLAN NOT TO BE USED FOR DESIGN
2) ALL LOCATIONS TO BE CONSIDERED APPROXIMATE
3) PROPERTY BOUNDARIES ARE APPROXIMATE BASED ON TOWN OF STRATFORD ENGINEERING DEPARTMENT PLANS
4) PUBHx WETLAND DESIGNATION WAS OBTAINED FROM THE NATIONAL WETLAND INVENTORY MAP.

Nobis
Nobis Engineering, Inc.

OU4 STUDY AREA CAMU
OPTION A:
100,000 CUBIC YARDS STORAGE
PROPOSED CAP DESIGN
RAYMARK - OU6 - ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

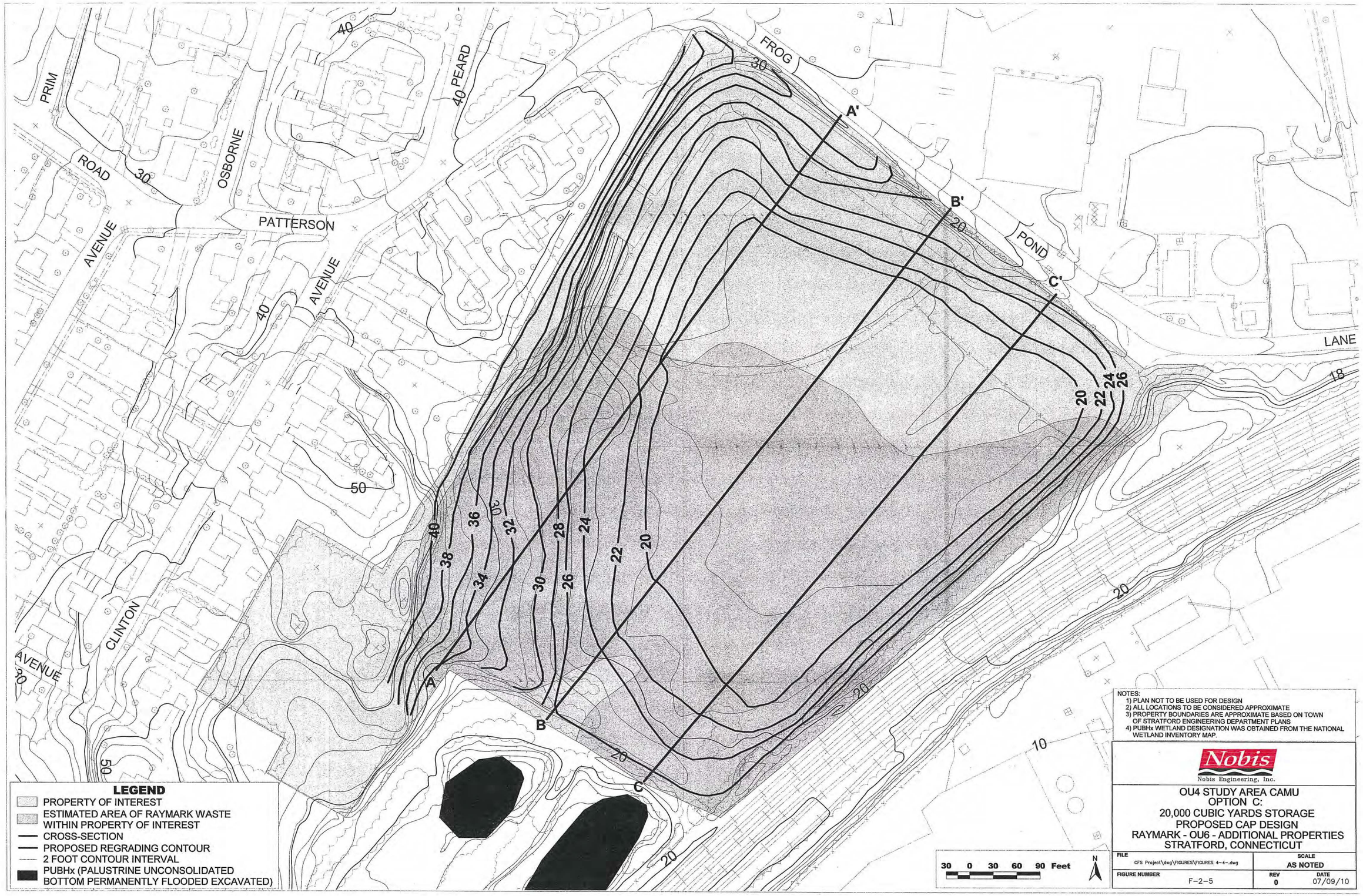
FILE	SCALE
CFS Project\dwg\FIGURES\FIGURES 4-4-.dwg	AS NOTED
FIGURE NUMBER F-2-3	REV 0 / DATE SEPT 2007

NOTES:
1) PLAN NOT TO BE USED FOR DESIGN
2) ALL LOCATIONS TO BE CONSIDERED APPROXIMATE
3) PROPERTY BOUNDARIES ARE APPROXIMATE BASED ON TOWN OF STRATFORD ENGINEERING DEPARTMENT PLANS
4) PUBHx WETLAND DESIGNATION WAS OBTAINED FROM THE NATIONAL WETLAND INVENTORY MAP.

Nobis
Nobis Engineering, Inc.

OU4 STUDY AREA CAMU
OPTION B:
40,000 CUBIC YARDS STORAGE
PROPOSED CAP DESIGN
RAYMARK - OU6 - ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

FILE	SCALE
CFS Project\dwg\FIGURES\FIGURES 4-4-.dwg	AS NOTED
FIGURE NUMBER F-2-4	REV 0 / DATE 07/09/10



LEGEND

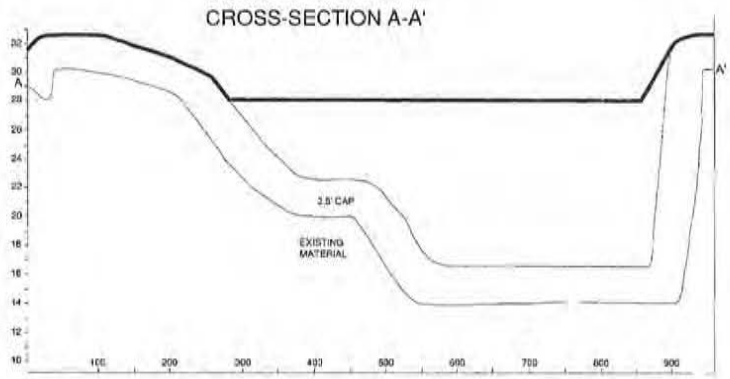
- PROPERTY OF INTEREST
- ESTIMATED AREA OF RAYMARK WASTE WITHIN PROPERTY OF INTEREST
- CROSS-SECTION
- PROPOSED REGRADING CONTOUR
- 2 FOOT CONTOUR INTERVAL
- PUBHx (PALUSTRINE UNCONSOLIDATED BOTTOM PERMANENTLY FLOODED EXCAVATED)

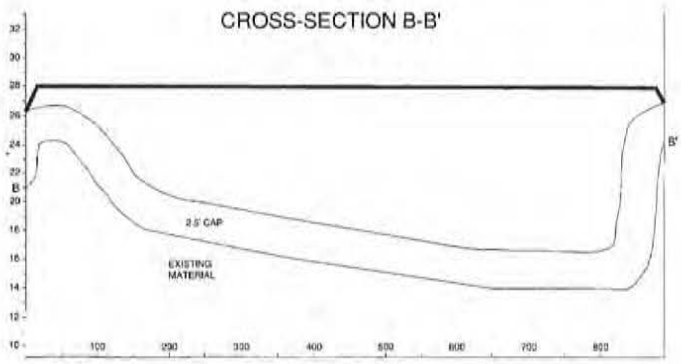
NOTES:
1) PLAN NOT TO BE USED FOR DESIGN
2) ALL LOCATIONS TO BE CONSIDERED APPROXIMATE
3) PROPERTY BOUNDARIES ARE APPROXIMATE BASED ON TOWN OF STRATFORD ENGINEERING DEPARTMENT PLANS
4) PUBHx WETLAND DESIGNATION WAS OBTAINED FROM THE NATIONAL WETLAND INVENTORY MAP.

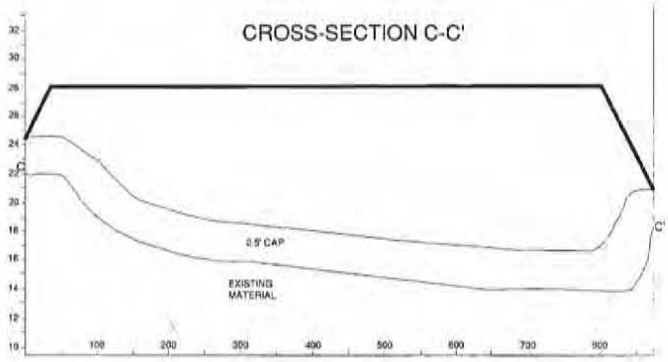
Nobis
Nobis Engineering, Inc.

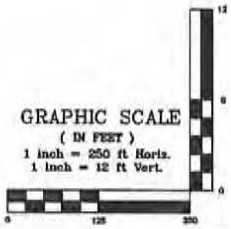
OU4 STUDY AREA CAMU
OPTION C:
20,000 CUBIC YARDS STORAGE
PROPOSED CAP DESIGN
RAYMARK - OU6 - ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

FILE	SCALE	
CFS Project\dwg\FIGURES\FIGURES 4-4-.dwg	AS NOTED	
FIGURE NUMBER	REV	DATE
F-2-5	0	07/09/10







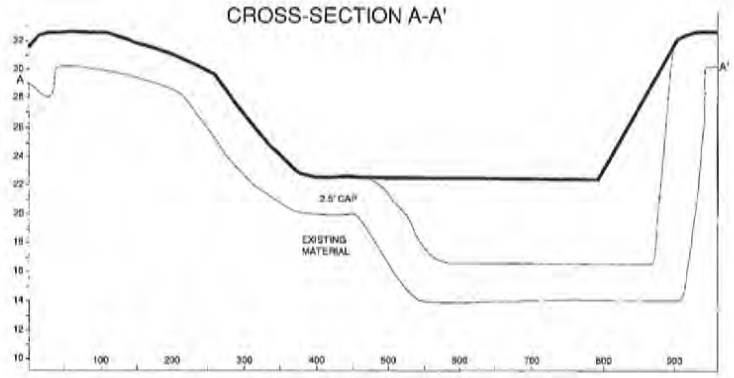


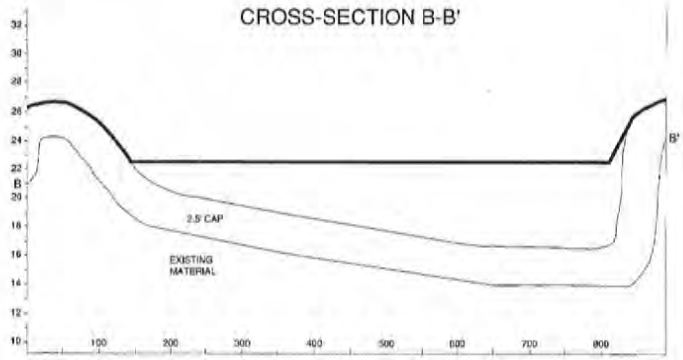
Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
Tel (978) 683-0891
Fax (978) 683-0966
www.nobisengineering.com

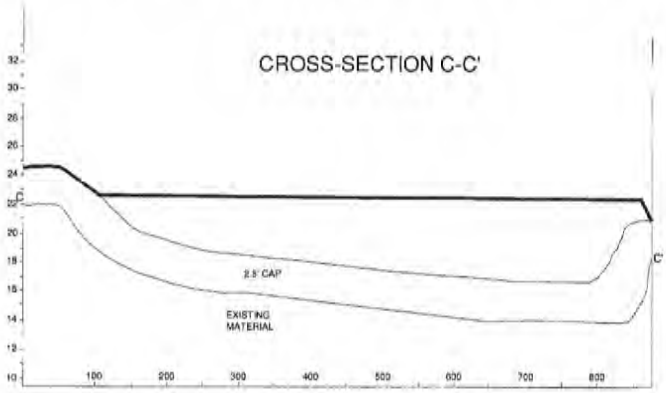
FIGURE F-2-6

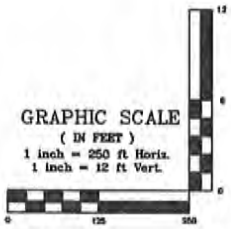
OU4 STUDY AREA CAMU
OPTION A CROSS-SECTIONS
100,000 CUBIC YARDS STORAGE
RAYMARK SUPERFUND SITE
STRATFORD, CONNECTICUT

SCALE:	AS NOTED	DATE:	07/09/10







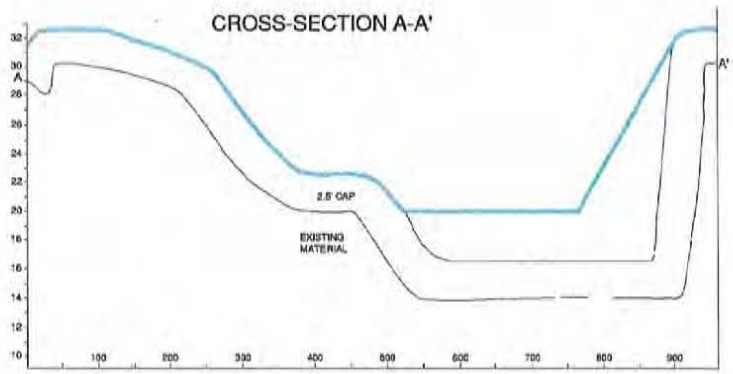


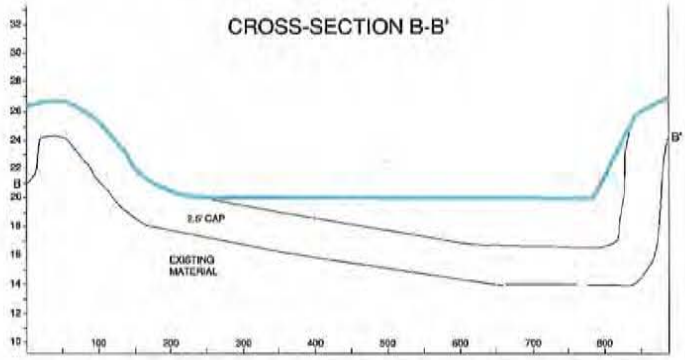
Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
Tel (978) 683-0891
Fax (978) 683-0966
www.nobisengineering.com

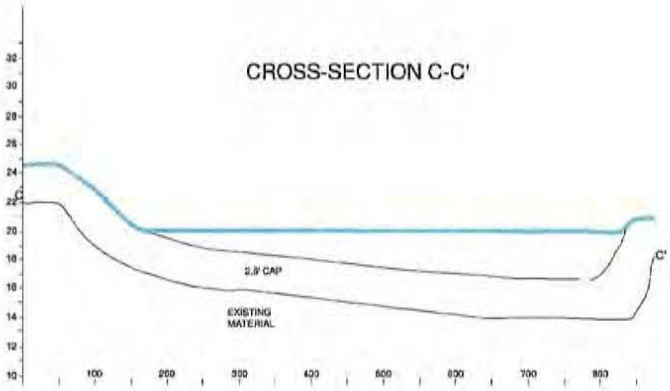
FIGURE F-2-7

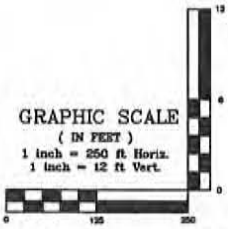
OU4 STUDY AREA CAMU
OPTION B CROSS-SECTIONS
40,000 CUBIC YARDS STORAGE
RAYMARK SUPERFUND SITE
STRATFORD, CONNECTICUT

SCALE: AS NOTED | DATE: 07/09/10







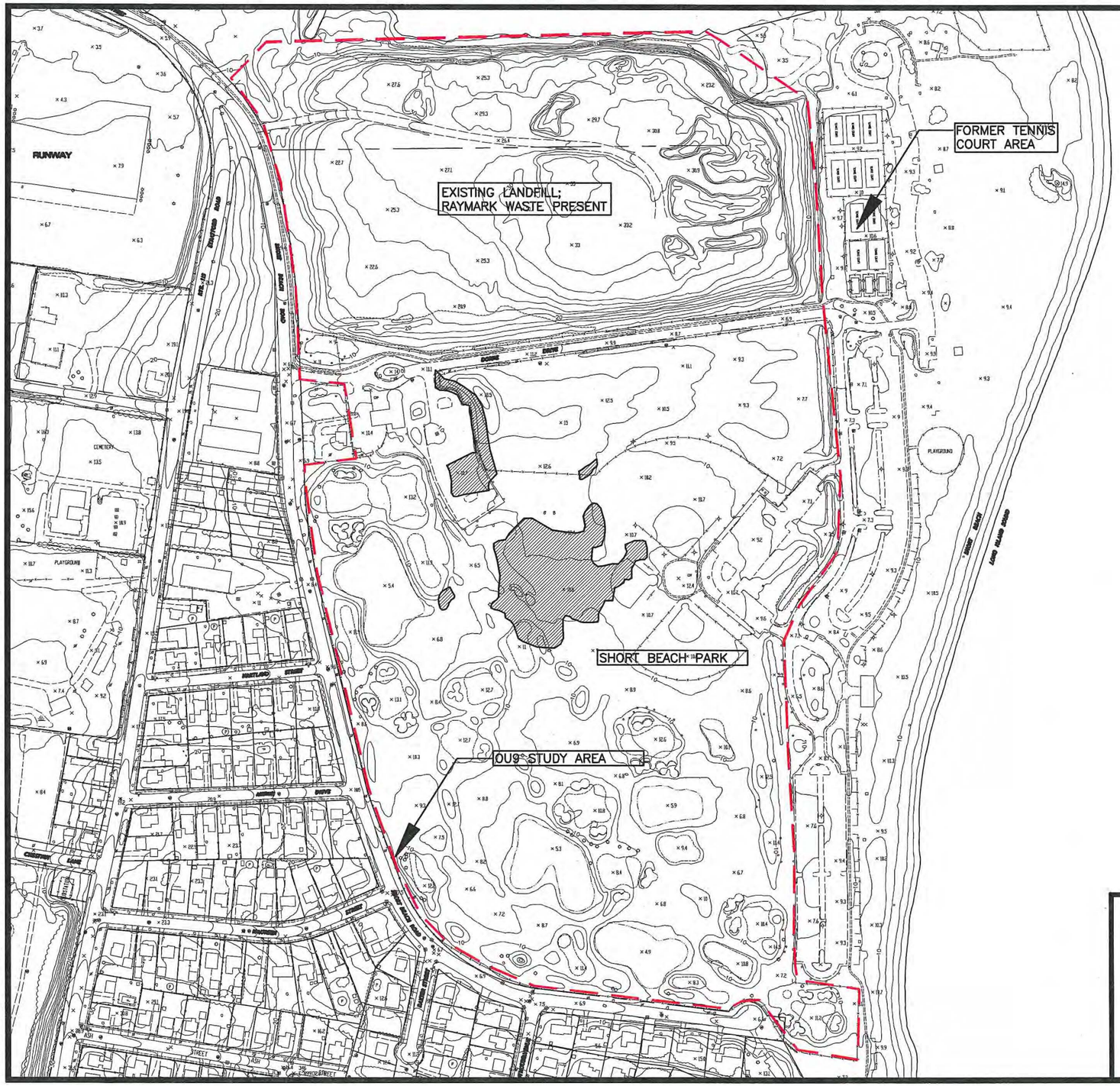


Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
Tel (978) 683-0891
Fax (978) 683-0966
www.nobisengineering.com

FIGURE F-2-8

OU4 STUDY AREA CAMU
OPTION C CROSS-SECTIONS
20,000 CUBIC YARDS STORAGE
RAYMARK SUPERFUND SITE
STRATFORD, CONNECTICUT

SCALE: AS NOTED | DATE: 07/09/10



GENERAL LEGEND

EXISTING	PROPOSED	DESCRIPTION
10		CONTOUR
		EXISTING RAYMARK WASTE

GRAPHIC SCALE

0 150' 300' 600'

Nobis

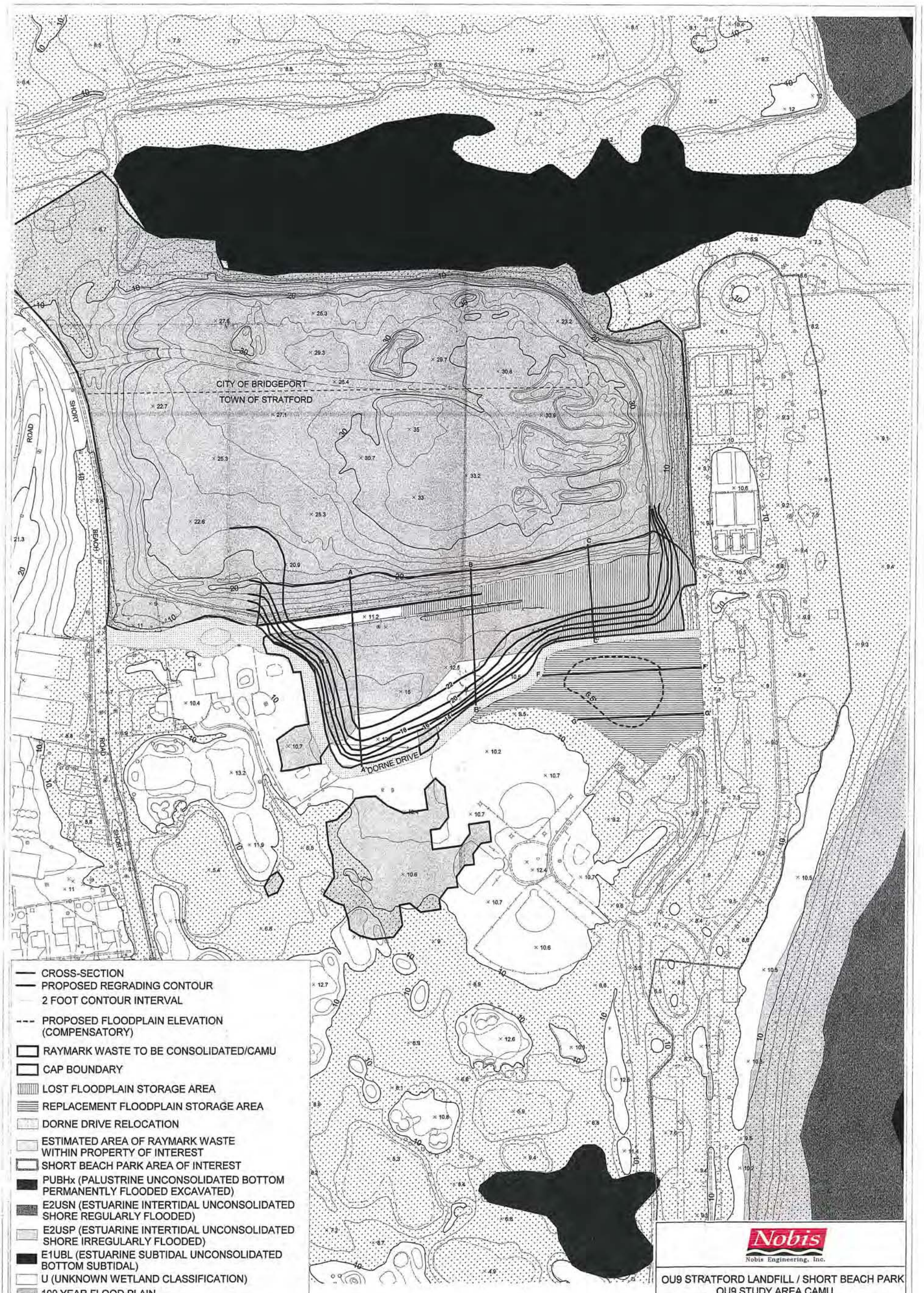
Nobis Engineering, Inc.
Concord, NH
Lawrence, MA
www.nobisengineering.com

FIGURE F-2-9

OU9 STUDY AREA
FOCUSED FEASIBILITY STUDY
STRATFORD, CONNECTICUT

DRAWN BY:	CEL	APPROVED BY:	LC
PROJECT:	80006	July 2010	

H:\0000 Job Orders\00006 Raymark\Raymark CAD\FS Figures\Figure F-2-9.dwg

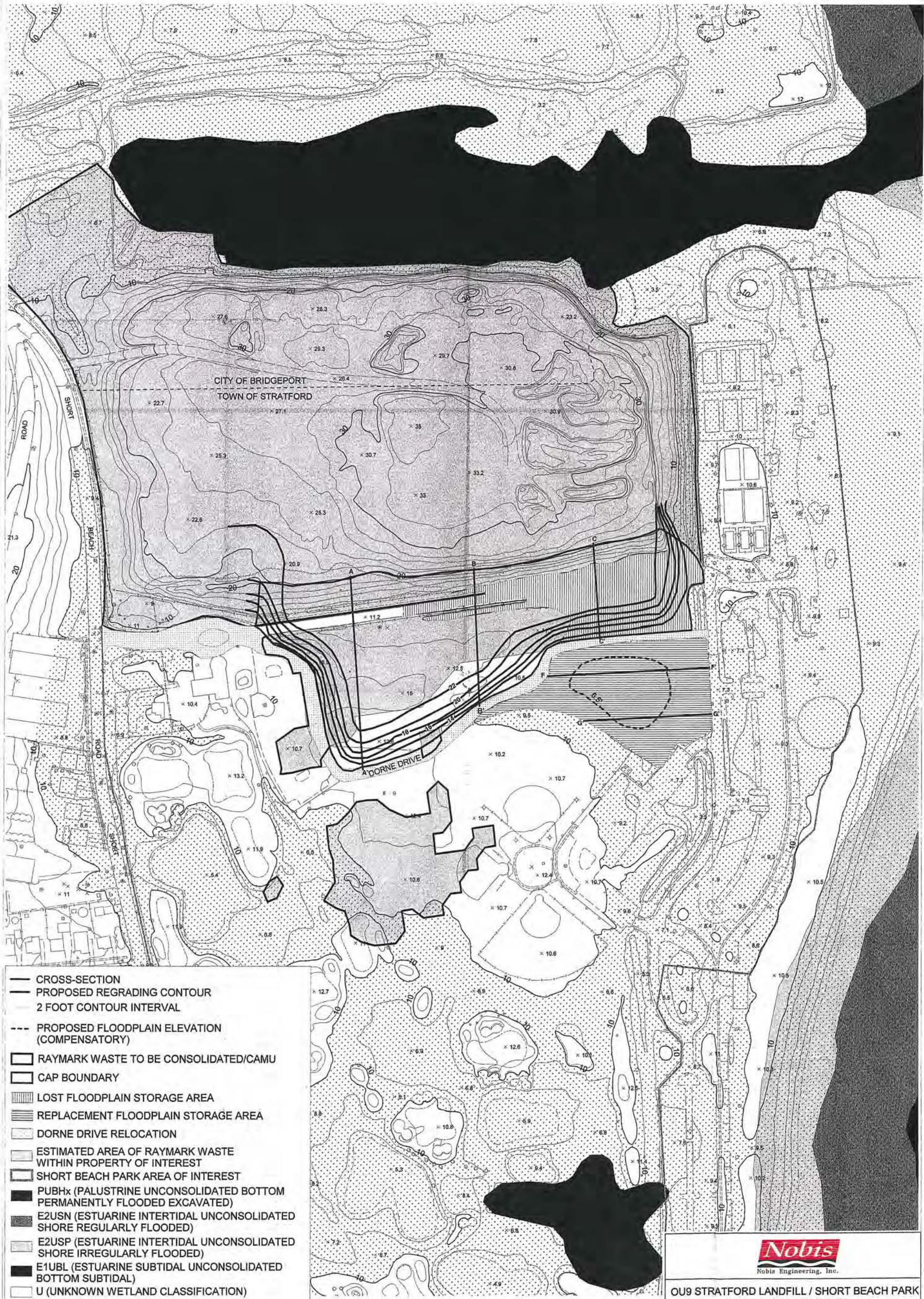


NOTES:
1) PLAN NOT TO BE USED FOR DESIGN
2) ALL LOCATIONS TO BE CONSIDERED APPROXIMATE
3) PROPERTY BOUNDARIES ARE APPROXIMATE BASED ON TOWN OF STRATFORD ENGINEERING DEPARTMENT PLANS
4) FLOOD PLAIN EXTENT BASED ON FEDERAL EMERGENCY MANAGEMENT AGENCY, Q3 FLOOD DATA, COMMUNITY-PANEL NUMBERS 090016 0001-0004, REVISED JUNE 16, 1992, FEMA, WASHINGTON, D.C. AND MODIFIED TO TOWN OF STRATFORD ENGINEERING PLAN 10-FOOT CONTOUR.
5) WETLAND DELINEATIONS WERE OBTAINED FROM THE NATIONAL INVENTORY MAP.

Nobis
Nobis Engineering, Inc.

OU9 STRATFORD LANDFILL / SHORT BEACH PARK
OU9 STUDY AREA CAMU
PROPOSED CAP DESIGN
RAYMARK - OU6 - ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

FILE	SCALE
CFS Project\dwg\FIGURES\FIGURES 4-4-.dwg	AS NOTED
FIGURE NUMBER F-2-10	REV 0 / DATE 07/09/10

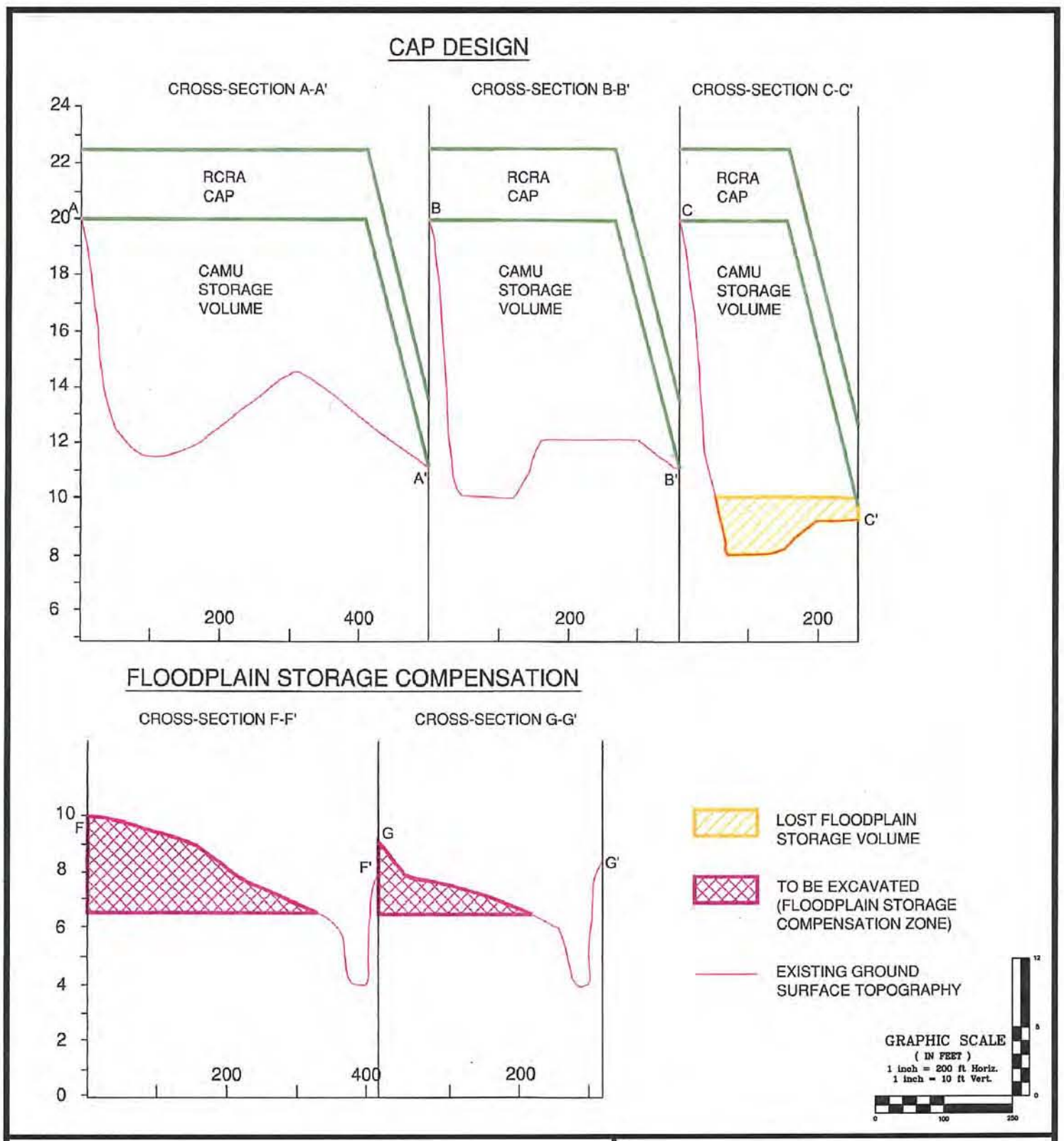


NOTES:
1) PLAN NOT TO BE USED FOR DESIGN
2) ALL LOCATIONS TO BE CONSIDERED APPROXIMATE
3) PROPERTY BOUNDARIES ARE APPROXIMATE BASED ON TOWN OF STRATFORD ENGINEERING DEPARTMENT PLANS
4) FLOOD PLAIN EXTENT BASED ON FEDERAL EMERGENCY MANAGEMENT AGENCY, Q3 FLOOD DATA, COMMUNITY-PANEL NUMBERS 090016 0001-0004, REVISED JUNE 16, 1992, FEMA, WASHINGTON, D.C. AND MODIFIED TO TOWN OF STRATFORD ENGINEERING PLAN 10-FOOT CONTOUR.
5) WETLAND DELINEATIONS WERE OBTAINED FROM THE NATIONAL INVENTORY MAP.

Nobis
Nobis Engineering, Inc.

OU9 STRATFORD LANDFILL / SHORT BEACH PARK
OU9 STUDY AREA CAMU
PROPOSED CAP DESIGN
RAYMARK - OU6 - ADDITIONAL PROPERTIES
STRATFORD, CONNECTICUT

FILE	SCALE
CFS Project\dwg\FIGURES\FIGURES 4-4-.dwg	AS NOTED
FIGURE NUMBER F-2- 10	REV 0 / DATE 07/09/10



Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
Tel (978) 683-0891
Fax (978) 683-0966
www.nobisengineering.com

FIGURE F-2-11

OU9 STUDY AREA CAMU
PROPOSED CAP DESIGN
CROSS-SECTIONS
RAYMARK SUPERFUND SITE
STRATFORD, CONNECTICUT

SCALE: AS NOTED | DATE: 07/09/10

APPENDIX F-3

COMPARATIVE ANALYSIS OF ALTERNATIVES

FOR

CONSOLIDATION AND CAMU AREAS

APPENDIX F-3 – COMPARATIVE ANALYSIS

PURPOSE

The primary objective of Appendix F-3 is to conduct a comparative analysis of viable CAMU options that were evaluated in the detailed analysis presented in Appendix F-2. In accordance with the interim *Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (EPA. October 1988), the results of the detailed analysis for implementing CAMU options at the former Raybestos Memorial Ballfield (OU4) and the Stratford Landfill and Short Beach Park (OU9) are evaluated relative to one another for the comparative analysis to identify the potential CAMU location and option that best meets the required criteria (described in Appendix F-2). To supplement this analysis, a summary table that qualitatively ranks each option's ability to meet the required criteria is provided as Table F-3-1.

Overall Protection of Human Health and the Environment

A potential CAMU at either OU4 or OU9 will be protective of human health and the environment via containment of Raymark waste beneath a RCRA-compliant, low-permeability cap. The RCRA cap will prevent direct exposures as well as limit the potential for infiltration to ground water from precipitation events. The greatest degree of protection will be found at OU4 as that location provides the greatest consolidation capacity (up to 100,000 CY) for Raymark waste excavated from other locations within Stratford. In addition to the reduction of risks realized from its consolidation capacity, a potential CAMU at OU4 will provide additional protection from an estimated 190,000 CY of Raymark waste that is already present at OU4. This could result in up to 290,000 CY of Raymark waste placed beneath a RCRA compliant low-permeability cap. Potential reuse of the area would further ensure long term protection. The two other volume alternatives (40,000 CY and 20,000 CY) for consolidation of Raymark waste at a CAMU at OU4 will also be protective of human health and the environment; however, the protection provided will be from lower quantities of Raymark waste as the volumes consolidated are reduced accordingly.

At OU9, approximately 50,000 CY of Raymark waste could be consolidated along Dorne Drive and the soccer fields. It is estimated that 40,000 CY of Raymark waste will be excavated from Short Beach Park and placed in the CAMU area, leaving consolidation capacity for an additional

10,000 CY of Raymark waste from other locations in Stratford. This option offers significantly less protection than a CAMU at OU4 because, as less consolidation capacity is available at OU9, fewer locations in Stratford with Raymark waste will be able to be excavated. The CAMU at OU9 will be placed above cells that contain an unknown quantity of Raymark waste, which will provide additional protection. Finally, in order to construct a CAMU at OU9, the municipal landfill will also require capping at the same time, which will provide additional protectiveness from the wastes within the landfill.

At both OU4 and OU9, protection of human health and the environment will be ensured by establishing institutional controls, which combined with the RCRA-compliant, low-permeability cap, will render the consolidated Raymark waste inaccessible. Long-term monitoring of the cap and groundwater will be required to observe changes in conditions over time and evaluate the effectiveness of the remedy. Five year reviews and reporting will also be required.

A CAMU at either OU4 or OU9 will be equally protective of human health and the environment. Based upon the detailed analysis, it is determined that a CAMU at OU4 could provide a greater degree of protectiveness than a CAMU at OU9 by providing significantly greater capacity for the consolidation of Raymark waste, and providing protection from 190,000 CY of Raymark waste already present at OU4.

Compliance with ARARs

Applicable or Relevant and Appropriate Requirements (ARARs) are presented in Appendix C. The CAMUs at OU4 and OU9 will comply with all chemical-specific, location-specific and action-specific ARARs. The CAMUs will use an alternative design allowed under the CAMU regulations that will include a low-permeability layered system of containment (that is a cap) without an impermeable bottom liner. This issue is the same for both OU4 and OU9 and is discussed in the detailed evaluations in Appendix F-2.

EPA's policy that implements Executive Order 11990 (Protection of Wetlands) and Executive Order 11998 (Floodplain Management) states that any action that impacts wetlands or floodplains should be avoided if a practicable alternative exists. If there is no practicable alternative, then EPA must act to minimize potential harm or avoid adverse effects. This includes restoring and preserving the natural and beneficial values of the wetland and

floodplains. OU4 does not have any wetlands or floodplains, however, at OU9 over 25,000 SF of wetlands would be impacted and floodplain compensation would be required for up to 400,000 gallons.

The OU9 Study Area is also located in the vicinity of Sikorsky Airport and, as such, is subject to FAA regulations for site development of adjacent properties. FAA regulations restrict development with respect to the adjacent properties' elevations and distances from the runways. Although evaluation of the potential impact of these regulations on the OU9 Study Area is ongoing, these regulations may significantly affect the OU9 remedial options. There are no FAA issues associated with a CAMU at OU4.

Given the detailed analysis presented for a potential CAMU at OU4 and OU9, OU4 best meets the identified ARARs that will govern the consolidation activities required. Compliance with ARARs at OU4 is independent of the volume of Raymark waste consolidated (100,000 CY, 40,000 CY, or 20,000 CY) at that location.

Long-Term Effectiveness and Permanence

As the permanent cap design for each of the CAMU options at OU4 and OU9 are the same, the potential for direct exposure will be eliminated, providing the cap and institutional controls are properly maintained. In addition, the cap will also address any potential for contaminant leaching. Although ecological risks have not been identified in either OU4 or OU9, any potential exposures to ecological receptors will also be reduced as a result of capping contaminated soil and maintenance of the cap system.

Regarding future maintenance of the cap, more effort will be required to ensure effectiveness within OU9 (34 acres) following cap construction, as compared to OU4 (13.5 acres). This is because, in addition to the overall size (acreage) difference, OU9 will have steeper slopes and will likely have higher maintenance costs because of the need to repair washouts and erosion from storm events. This is simply due to the nature of the steep side slopes of the landfill, especially on the northern side near the Marine Basin. Erosion is not a major concern at OU4 as the topography will allow for gentle slopes, and erosion issues should be significantly less than OU9. Beyond sloping and the associated erosion issues, each consolidation option evaluated at either OU4 or OU9 will require similar maintenance tasks in the future, consisting of monthly

inspections with annual repairs and reporting, and long-term monitoring of groundwater to ensure effectiveness and permanence.

All of the potential CAMU options will require enforcement and maintenance of institutional controls in the future to ensure effectiveness. OU4 provides the greatest degree of long term effectiveness and permanence for the largest amount of potential Raymark waste consolidated (up to 100,000 CY) at a single location which significantly reduces future efforts for enforcement of institutional controls. OU9 will require institutional controls for a larger area than OU4 (approximately 34 versus 13.5 acres). Both potential CAMU locations would be subject to 5-year reviews.

Reuse at both OU4 and OU9 will be possible. Because of the overall height of the landfill and associated FAA regulations, however, reuse at OU9 would likely be limited to low impact recreational activities, such as walking trails. Reuse at OU4 would likely not be limited and could be incorporated into the final remedy design.

Reduction of Toxicity, Mobility, and Volume through Treatment

None of the potential CAMU options evaluated will result in the reduction of toxicity, mobility, and volume through treatment of Raymark waste that is already in place at OU4 or OU9. However, Raymark waste that is consolidated at a CAMU location from other locations within Stratford will undergo analytical testing to determine compliance with the Principal Hazardous Constituents standard established by the CAMU regulations. Based upon historical sampling within OU6 it is assumed that approximately 10% of excavated Raymark waste may require out-of-Town treatment and disposal. Because of this, the greatest volume of Raymark waste excavated for consolidation is assumed to result in greatest amount of out-of-Town treatment and disposal.

Using the assumed 10% requirement for out-of-Town treatment and disposal, OU4 will result in the greatest reduction of toxicity, mobility, and volume through treatment. As OU4 has the potential to consolidate up to 100,000 CY of Raymark waste, approximately 10,000 CY is assumed to require out-of-Town treatment. The two other CAMU volume alternatives for OU4 (40,000 CY and 20,000 CY) will result in reductions of 4,000 and 2,000 CY, respectively. OU9,

which has a consolidation capacity from other locations in Stratford of up to 10,000 CY will result in a reduction of toxicity, mobility, and volume through treatment of up to 1,000 CY.

Short-Term Effectiveness

Short-term impacts to the community and workers from the implementation of any of the CAMU options at either OU4 or OU9 will be similar and can be mitigated using engineering controls. Impacts to the environment will be minimal at OU4 and readily addressed by engineering controls. However, the construction of a CAMU at OU9 will result in a loss of existing floodplains and wetlands which will require mitigation.

Based upon the consolidation capacities evaluated, implementing a CAMU option within OU4 could result in transporting the greatest amount of Raymark waste (100,000, 40,000, or 20,000 CY) from other locations in Stratford. This would have a short term impact of increased of truck traffic but could provide consolidation capacity for more cleanups at the other locations in Town with Raymark waste. A CAMU at OU9 could result in transporting the least amount of Raymark waste (approximately 10,000 CY) from other locations within Town but would not provide consolidation capacity for other locations in Town. Material hauling for cap construction at OU9 (> 200,000 CY), however, would be at least twice the volume as that for OU4 (approximately 100,000 CY) because of the overall cap size (34 acres versus 13.5 acres). Transportation activities for any of the CAMU options will require coordination with the Town, residents, and businesses to schedule truck and heavy equipment traffic on public roads.

The conceptual design for a CAMU at OU4 assumes that approximately 3 to 4 years would be required for consolidation and capping (up to 100,000 CY) while 2 to 3 years would be required to implement this option at OU9 (includes Remedial Design, project planning and construction activities).

Implementability

All of the CAMU options at OU4 and OU9 are technically feasible and would require implementation by personnel of similar qualifications using similar types of equipment and techniques during both the construction period and long-term operations and maintenance.

Additional remedial actions in the future, if required, will be equally difficult to implement at either potential CAMU location, regardless of the consolidation volume, due to the presence of a RCRA-compliant, low-permeability cap. Similar agency coordination will be required for any of the potential CAMU options.

The overall differentiating factor between CAMU options concerning implementability is compliance with federal regulations for alteration of a floodplain and impacts to wetlands. OU9 will require mitigation to compensate for lost flood storage capacity and wetlands impacted by the construction of a CAMU. The conceptual design identified adequate space within OU9 in close proximity to the work area for construction of a new floodplain area and for wetland mitigation. This effort, therefore, would be feasible to undertake without land acquisition from abutting properties. No such difficulties are anticipated with the construction of a CAMU at OU4.

Cost

Costs include the construction of a CAMU and 30 years of operations and maintenance of the RCRA-compliant, low permeability cap. Costs for the excavation of Raymark waste from other locations within Stratford and transportation to a CAMU location are part of each individual property group's costs and are not included here. See individual property groups (Volume 1 of this FS) for cost breakdown for excavation and transportation.

In general, costs associated with OU9 are difficult to compare to those of OU4. This is because a large portion of OU9 is a municipal landfill (29.8 acres) that is already filled to capacity. During the evaluation a CAMU design, it was determined that capping of the Stratford landfill would have to be done at the same time as a CAMU was constructed. The primary reason is that capping of the Stratford Landfill will likely result in the generation of additional material to be capped as a result of grading and slope development. This material could easily be placed within the footprint of a CAMU and both the landfill and CAMU capped at the same time. If, however, a CAMU was constructed before the landfill was capped, any extra material from grading and slope development of the landfill would have to be either shipped off-site, placed further within Short Beach Park and then capped, or placed above the already capped CAMU and then capped again. While it is possible to construct just a CAMU, it is much more effective to develop an overall comprehensive design for both the landfill and CAMU. As the landfill and potential CAMU location are two separate, abutting areas, this will ensure that the final design

for both the landfill and CAMU are integrated and will minimize the overall costs for both remedial design and mobilizations for construction. Because of these limitations, the evaluation of a CAMU at OU9 also includes capping of the Stratford Landfill.

In addition, the consolidation capacity at OU9 for Raymark waste from other locations within Stratford is somewhat limited (10,000 CY). All other Raymark waste (up to 40,000 CY) will be consolidated from within OU9 (Short Beach Park) itself. Total present value capital costs for capping the landfill and CAMU is in excess of $37 million. Thirty year present value O&M costs are in excess of $5 million.

Present value capital costs for consolidation at OU4 for 20,000, 40,000, and 100,000 CY of Raymark waste from other locations within Stratford are $15.7, $16.3, and $19.9 million, respectively. As can be seen, the additional capping costs for increased consolidation volumes are minimal. In addition, these increased costs represent significant additional consolidation volumes, as compared to the capacity at OU9 (10,000 CY). Thirty year present value O&M costs would be similar for all three consolidation options, regardless of volume, and are approximately $2.6 million.

TABLE F-3-1
SUMMARY OF COMPARATIVE ANALYSIS FOR POTENTIAL CAMU OPTIONS
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATTFORD, CONNECTICUT

	POTENTIAL CAMU OPTION			
	Former Raybestos Memorial Ballfield (OU4)			Stratford Landfill and Short Beach Park (OU9)
	OU4 - A 100,000 CY	OU4 - B 40,000 CY	OU4 - C 20,000 CY	OU9 10,000 CY
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT				
Protection of Human Health	■	◘	◘	◘
Protection of the Environment	■	◘	◘	◘
COMPLIANCE WITH ARARs				
Chemical-Specific ARARs	■	■	■	■
Location-Specific ARARs	■	■	■	◘
Action-Specific ARARs	■	■	■	■
Other Criteria, Advisories, Guidance	■	■	■	■
LONG-TERM EFFECTIVENESS AND PERMANENCE				
Magnitude of Residual Risk	■	◘	◘	◘
Adequacy and Reliability of Controls	■	■	■	■
REDUCTION OF TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT				
Treatment/Recycling Processes Utilized	◘	◘	◘	◘
Amount of Hazardous Materials Destroyed or Treated	■	◘	◘	◘
Degree of Expected Reductions in Tox, Mob, or Vol	■	◘	◘	◘
Irreversibility	■	■	■	■
Type and Quantity of [Process] Residuals	■	◘	◘	◘
SHORT-TERM EFFECTIVENESS				
Protection of Community During Remedial Actions	◘	■	■	◘
Protection of Workers During Remedial Actions	◘	■	■	◘
Environmental Impacts	■	■	■	◘
Time Until Remedial Action Objectives are Achieved	◘	◘	■	■
IMPLEMENTABILITY				
Ability to Construct and Operate the Technology	■	■	■	◘
Reliability of the Technology	■	■	■	■
Ease of Undertaking Additional Remedial Actions, if Necessary	◘	◘	◘	◘
Ability to Monitor Effectiveness of the Remedy	■	■	■	■
Ability to Obtain Approvals from Other Agencies	■	■	■	◘
Coordination with Other Agencies	■	■	■	◘
Availability of Off-Site Treatment, Storage, and Disposal Services and Capacity	**NA**	**NA**	**NA**	**NA**
Availability of Necessary Equipment and Specialists	■	■	■	■
Availability of Prospective Technologies	■	■	■	■
COST				
Capital	$19,945,700	$16,346,000	$15,665,700	$37,166,400
Present Value of O&M (First 30 Years)	$2,621,300	$2,616,200	$2,611,000	$5,529,300
Present Value of the Alternative	$22,567,100	$18,962,200	$18,276,700	$42,695,700

Notes:

■ = Highest rating (most protective, most effective, most implementable)

◘ = Meets criterion, but another alternative(s) more protective/effective/implementable

□ = Does not meet criterion

NA = not applicable

APPENDIX G

COST ESTIMATES

G-1

LOCKWOOD AVENUE PROPERTY

COST ESTIMATE BACKUP SHEETS

PRESENT VALUE ANALYSIS
ALTERNATIVE 1 - NO ACTION
LOCKWOOD AVENUE
RAYMARK INDUSTRIES SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$10,000	$10,000	7.0%	$7,130
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$10,000	$10,000	7.0%	$5,083
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$10,000	$10,000	7.0%	$3,624
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$10,000	$10,000	7.0%	$2,584
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$10,000	$10,000	7.0%	$1,842
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$10,000	$10,000	7.0%	$1,314
TOTAL	**$0**	**$0**	**$60,000**	**$60,000**		**$21,578**
					PV O&M	**$21,578**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review [1]	Total	Discount Rate[2]	Present Value
0	$56,463	$0	$0	$56,463	7.0%	$56,463
1	$0	$61,330	$0	$61,330	7.0%	$57,318
2	$0	$61,330	$0	$61,330	7.0%	$53,568
3	$0	$34,387	$0	$34,387	7.0%	$28,070
4	$0	$34,387	$0	$34,387	7.0%	$26,234
5	$0	$34,387	$10,000	$44,387	7.0%	$31,647
6	$0	$34,387	$0	$34,387	7.0%	$22,914
7	$0	$34,387	$0	$34,387	7.0%	$21,415
8	$0	$34,387	$0	$34,387	7.0%	$20,014
9	$0	$34,387	$0	$34,387	7.0%	$18,704
10	$0	$34,387	$10,000	$44,387	7.0%	$22,564
11	$0	$34,387	$0	$34,387	7.0%	$16,337
12	$0	$34,387	$0	$34,387	7.0%	$15,268
13	$0	$34,387	$0	$34,387	7.0%	$14,269
14	$0	$34,387	$0	$34,387	7.0%	$13,336
15	$0	$34,387	$10,000	$44,387	7.0%	$16,088
16	$0	$34,387	$0	$34,387	7.0%	$11,648
17	$0	$34,387	$0	$34,387	7.0%	$10,886
18	$0	$34,387	$0	$34,387	7.0%	$10,174
19	$0	$34,387	$0	$34,387	7.0%	$9,508
20	$0	$34,387	$10,000	$44,387	7.0%	$11,470
21	$0	$34,387	$0	$34,387	7.0%	$8,305
22	$0	$34,387	$0	$34,387	7.0%	$7,762
23	$0	$34,387	$0	$34,387	7.0%	$7,254
24	$0	$34,387	$0	$34,387	7.0%	$6,779
25	$0	$34,387	$10,000	$44,387	7.0%	$8,178
26	$0	$34,387	$0	$34,387	7.0%	$5,921
27	$0	$34,387	$0	$34,387	7.0%	$5,534
28	$0	$34,387	$0	$34,387	7.0%	$5,172
29	$0	$34,387	$0	$34,387	7.0%	$4,834
30	$0	$34,387	$10,000	$44,387	7.0%	$5,831
TOTAL	**$56,463**	**$1,085,500**	**$60,000**	**$1,201,963**		**$553,466**
					PV O&M	**$497,003**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 15 LF avg depth per well)	30	LF	$35.79	$1,074
2.3	Install PVC Well Screens (2" diameter)	20	LF	$19.69	$394
2.4	Install PVC Well Casing (2" diameter)	10	LF	$14.79	$148
2.5	Install Filter Pack	24	LF	$15.52	$372
2.6	Install Bentonite Seal	2	EA	$57.23	$114
2.7	Install Annular Seal	4	LF	$69.04	$276
2.8	PVC Well Plugs	2	EA	$27.86	$56
2.9	Flush-Mount Protective Cover with Locking Cap	2	EA	$451.55	$903
2.10	Surface Pad, Concrete 2' x 2'	2	EA	$154.79	$310
2.11	Well Development (2 HR/WELL)	4	EA	$228.23	$913
2.12	IDW Transportation/Disposal (drums)	2	EA	$508.52	$1,017
	Subtotal				**$8,330**
3.0 Fencing and Signage					
3.1	Chain Link Fence	900	LF	$27.57	$24,813
3.2	Signage	9	EA	$73.95	$666
	Subtotal				**$25,479**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization[4]	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of RW	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Place, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405.12	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$188,862	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$56,463**
TOTAL CAPITAL COST FOR ALTERNATIVE 2					**$56,463**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Lockwood Avenue Property.

RW = Raymark Waste
PVC = polyvinyl chloride
IDW = investigation derived waste
LS = lump sum
EA = each
SF = square feet
LF = linear foot
MSL = thousand square feet
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.80	MSF	$56.31	$45	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	30	LF	$27.57	$827	see cost assumptions
OM 2.6	Sign Replacement[5]	36	EA	$73.95	$2,662	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	1	EA	$321.75	$322	see cost assumptions
	Subtotal				**$19,306**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$61,330**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$34,387**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Lockwood Avenue Property.

[2] Estimated that 1% of vegetated surfaces would require repair annually (need for repair to be established during 5-Year Reviews).

[3] Assume that there is no Raymark waste located below paved surfaces at this property group.

[4] Estimated that 100% of fencing would require replacement over the period of O&M (need for repair to be established during 5-Year Reviews).

[5] Estimated that signage would require replacement 4 times over the period of O&M (need for repair to be established during 5-Year Reviews).

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear feet
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review	Total	Discount Rate	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.1 of the FS.

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 15 LF avg depth per well)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.10	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0	**Fencing and Signage**				
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.95	$0
	Subtotal				**$0**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction**				
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of RW	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Place, Spread, and Compact Soil Layer (24")[8]	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[8]	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$188,862	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 3					**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.1 of the FS.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	0	LS	$1,073	$0	see cost assumptions
OM.1.2	Sampling Labor - FOL	0	HR	$110	$0	see cost assumptions
OM.1.3	Sampling Labor - Sampler	0	HR	$90	$0	see cost assumptions
OM.1.4	Analytical Costs	0	EA	$697	$0	see cost assumptions
OM.1.5	Data Validation	0	HR	$110	$0	see cost assumptions
OM.1.6	Report Preparation (annual)	0	LS	$2,200	$0	see cost assumptions
	Subtotal				**$0**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	0	HR	$110.00	$0	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation (1% per year)	0	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs (5% per year)	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement	0	EA	$73.95	$0	see cost assumptions
OM.2.5	Reporting (annual)	0	LS	$2,250.00	$0	see cost assumptions
OM.2.6	Contractor mobilizations	0	EA	$321.75	$0	see cost assumptions
	Subtotal				**$0**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	0	LS	$1,100.00	$0	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	0	EA	$5,000.00	$0	see cost assumptions
	Subtotal				**$0**	
ANNUAL O&M COST (YEARS 1-2)					**$0**	
ANNUAL O&M COST (YEARS 3-30)					**$0**	

Note:
These Alternatives are not applicable to this property group - see Section 4.1 of the FS.

PRESENT VALUE ANALYSIS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review	Total	Discount Rate	Present Value
0	$0	$0	0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.1 of the FS.

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 15 LF avg depth per well)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.10	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0 Fencing and Signage					
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.95	$0
	Subtotal				**$0**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of RW	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Place, Spread, and Compact Soil Layer (24")[8]	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[8]	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$188,862	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 4					**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.1 of the FS.

PRESENT VALUE ANALYSIS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review	Total	Discount Rate	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.1 of the FS.

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 15 LF avg depth per well)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.10	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0	**Fencing and Signage**				
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.95	$0
	Subtotal				**$0**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
6.1	Excavate and Load RW[2]	0	CY	$2.12	$0
6.2	Haul RW to Stockpile Area[3]	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization[4]	0	EA	$1,535.00	$0
	Subtotal	0			**$0**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks[5]	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidation[6]	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of RW[6, 7]	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[6, 7]	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Place, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[9]	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$188,862	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 5					**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.1 of the FS.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST	SOURCE
OM.1.0	**Groundwater Monitoring (per event)**					
OM.1.1	Sampling Equipment Rental	0	LS	$1,073	$0	see cost assumptions
OM.1.2	Sampling Labor - FOL	0	HR	$110	$0	see cost assumptions
OM.1.3	Sampling Labor - Sampler	0	HR	$90	$0	see cost assumptions
OM.1.4	Analytical Costs	0	EA	$697	$0	see cost assumptions
OM.1.5	Data Validation	0	HR	$110	$0	see cost assumptions
OM.1.6	Report Preparation (annual)	0	LS	$2,200	$0	see cost assumptions
	Subtotal				**$0**	
OM.2.0	**Ground Surface Inspections, Maintenance, and Repairs (per year)**					
OM.2.1	Inspection	0	HR	$110.00	$0	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation (1% per year)	0	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs (5% per year)	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement	0	EA	$73.95	$0	see cost assumptions
OM.2.5	Reporting (annual)	0	LS	$2,250.00	$0	see cost assumptions
OM.2.6	Contractor mobilizations	0	EA	$321.75	$0	see cost assumptions
	Subtotal				**$0**	
OM.3.0	**Deed Restrictions**					
OM.3.1	Inspection (annual)	0	LS	$1,100.00	$0	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	0	EA	$5,000.00	$0	see cost assumptions
	Subtotal				**$0**	
ANNUAL O&M COST (YEARS 1-2)					**$0**	
ANNUAL O&M COST (YEARS 3-30)					**$0**	

Note:
These Alternatives are not applicable to this property group - see Section 4.1 of the FS.

PRESENT VALUE ANALYSIS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review	Total	Discount Rate	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Note:

This Alternative is not applicable to this property group - see Section 4.1 of the FS.

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 15 LF avg depth per well)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.10	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0 Fencing and Signage					
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.95	$0
	Subtotal				**$0**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[2]	0	CY	$2.12	$0
6.2	Haul RW to Stockpile Area[3]	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[4]	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of RW[5]	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of RW (no treatment)[5, 6]	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[5, 6]	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Place, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[7]	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[8]	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$188,862	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 6					**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.1 of the FS.

PRESENT VALUE ANALYSIS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review	Total	Discount Rate	Present Value
0	$0	$0	0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Note:

This Alternative is not applicable to this property group - see Section 4.1 of the FS.

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 15 LF avg depth per well)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.10	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0	**Fencing and Signage**				
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.95	$0
	Subtotal				**$0**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
6.1	Excavate and Load RW[2]	0	CY	$2.12	$0
6.2	Haul RW to Stockpile Area[3]	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization[4]	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks[5]	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidation[6]	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of RW[6, 7]	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[6, 7]	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Place, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[9]	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$188,862	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 7					**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.1 of the FS.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation (annual)	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	160	MSF	$7.34	$1,174	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.80	MSF	$56.31	$45	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	3	EA	$321.75	$965	see cost assumptions
	Subtotal				**$17,634**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$59,658**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$32,715**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Lockwood Avenue Property.

[2] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[3] Assume that there is no Raymark waste located below paved surfaces at this property group.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear feet
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review	Total	Discount Rate	Present Value
0	$0	$0	0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.1 of the FS.

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 15 LF avg depth per well)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.10	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0	**Fencing and Signage**				
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.95	$0
	Subtotal				**$0**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
6.1	Excavate and Load RW[2]	0	CY	$2.12	$0
6.2	Haul RW to Stockpile Area[3]	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks[4]	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of RW[5]	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of RW (no treatment)[5, 6]	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[5, 6]	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Place, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[7]	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[8]	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$188,862	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 8					**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.1 of the FS.

PRESENT VALUE ANALYSIS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$2,788,337	$0	0	$2,788,337	7.0%	$2,788,337
1	$0	$59,658	$0	$59,658	7.0%	$55,755
2	$0	$59,658	$0	$59,658	7.0%	$52,108
3	$0	$32,715	$0	$32,715	7.0%	$26,705
4	$0	$32,715	$0	$32,715	7.0%	$24,958
5	$0	$32,715	$10,000	$42,715	7.0%	$30,455
6	$0	$32,715	$0	$32,715	7.0%	$21,799
7	$0	$32,715	$0	$32,715	7.0%	$20,373
8	$0	$32,715	$0	$32,715	7.0%	$19,040
9	$0	$32,715	$0	$32,715	7.0%	$17,795
10	$0	$32,715	$10,000	$42,715	7.0%	$21,714
11	$0	$32,715	$0	$32,715	7.0%	$15,543
12	$0	$32,715	$0	$32,715	7.0%	$14,526
13	$0	$32,715	$0	$32,715	7.0%	$13,576
14	$0	$32,715	$0	$32,715	7.0%	$12,687
15	$0	$32,715	$10,000	$42,715	7.0%	$15,482
16	$0	$32,715	$0	$32,715	7.0%	$11,082
17	$0	$32,715	$0	$32,715	7.0%	$10,357
18	$0	$32,715	$0	$32,715	7.0%	$9,679
19	$0	$32,715	$0	$32,715	7.0%	$9,046
20	$0	$32,715	$10,000	$42,715	7.0%	$11,038
21	$0	$32,715	$0	$32,715	7.0%	$7,901
22	$0	$32,715	$0	$32,715	7.0%	$7,384
23	$0	$32,715	$0	$32,715	7.0%	$6,901
24	$0	$32,715	$0	$32,715	7.0%	$6,450
25	$0	$32,715	$10,000	$42,715	7.0%	$7,870
26	$0	$32,715	$0	$32,715	7.0%	$5,633
27	$0	$32,715	$0	$32,715	7.0%	$5,265
28	$0	$32,715	$0	$32,715	7.0%	$4,920
29	$0	$32,715	$0	$32,715	7.0%	$4,599
30	$0	$32,715	$10,000	$42,715	7.0%	$5,611
TOTAL	**$2,788,337**	**$1,035,339**	**$60,000**	**$3,883,676**		**$3,264,592**
					PV O&M	**$476,255**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 15 LF avg depth per well)	30	LF	$35.79	$1,074
2.3	Install PVC Well Screens (2" diameter)	20	LF	$19.69	$394
2.4	Install PVC Well Casing (2" diameter)	10	LF	$14.79	$148
2.5	Install Filter Pack	24	LF	$15.52	$372
2.6	Install Bentonite Seal	2	EA	$57.23	$114
2.7	Install Annular Seal	4	LF	$69.04	$276
2.8	PVC Well Plugs	2	EA	$27.86	$56
2.9	Flush-Mount Protective Cover with Locking Cap	2	EA	$451.55	$903
2.10	Surface Pad, Concrete 2' x 2'	2	EA	$154.79	$310
2.11	Well Development (2 HR/WELL)	4	EA	$228.23	$913
2.12	IDW Transportation/Disposal (drums)	2	EA	$508.52	$1,017
	Subtotal				**$8,330**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	900	LF	$27.57	$24,813
3.2	Signage	9	EA	$73.95	$666
	Subtotal				**$25,479**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	8	MONTH	$4,531	$36,247
	Subtotal				**$65,698**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	5	ACRE	$3,968.29	$21,032
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	900	LF	$8.97	$8,070
	Subtotal				**$49,772**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	11,852	CY	$2.12	$25,168
6.2	Haul RW/Soil to Stockpile Area[4]	14,222	CY	$4.00	$56,896
6.3	Perimeter Air Sampling	267	EA	$243.76	$65,007
6.4	Equipment Decontamination	593	HR	$54.56	$32,335
6.5	Stockpile Management	14,222	CY	$1.44	$20,440
6.6	Stockpile Characterization[5]	29	EA	$1,535.00	$44,515
	Subtotal				**$244,360**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	14,222	CY	$2.44	$34,732
7.2	Transport RW to in-town consolidation[7]	12,800	CY	$5.52	$70,700
7.3	Equipment Decontamination	593	HR	$54.56	$32,335
7.4	Out-of-Town Transportation of Waste[7, 8]	2,133	TON	$170.00	$362,667
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)[7, 8]	2,133	TON	$192.00	$409,600
	Subtotal				**$910,033**

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Place, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[9]	80,000	SF	$1.29	$103,200
8.8	Furnish, Place, and Spread Topsoil (6")[10]	1,630	CY	$34.65	$56,466
8.9	Hydroseeding with Mulch and Fertilizer	80	MSF	$43.97	$3,518
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	11,407	CY	$11.83	$134,947
8.14	Install Nonwoven Geotextile Fabric	8,889	SY	$2.21	$19,644
	Subtotal				**$343,703**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	1	LS	$188,862	$188,862
	Subtotal				**$188,862**
TOTAL DIRECT COSTS					**$1,858,891**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$111,533
10.2	Engineering and Design (12%)				$223,067
10.3	Construction management (8%)				$148,711
10.4	Location Adjustment (9%)				$167,300
10.5	Contingency (15%)				$278,834
TOTAL OTHER COSTS					**$929,446**
TOTAL CAPITAL COST FOR ALTERNATIVE 9					**$2,788,337**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Lockwood Avenue Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor).
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; impacted wetlands will be restored to pre-existing conditions to the extent practical.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$10,595,995	$0	0	$10,595,995	7.0%	$10,595,995
1	$0	$59,658	$0	$59,658	7.0%	$55,755
2	$0	$59,658	$0	$59,658	7.0%	$52,108
3	$0	$32,715	$0	$32,715	7.0%	$26,705
4	$0	$32,715	$0	$32,715	7.0%	$24,958
5	$0	$32,715	$10,000	$42,715	7.0%	$30,455
6	$0	$32,715	$0	$32,715	7.0%	$21,799
7	$0	$32,715	$0	$32,715	7.0%	$20,373
8	$0	$32,715	$0	$32,715	7.0%	$19,040
9	$0	$32,715	$0	$32,715	7.0%	$17,795
10	$0	$32,715	$10,000	$42,715	7.0%	$21,714
11	$0	$32,715	$0	$32,715	7.0%	$15,543
12	$0	$32,715	$0	$32,715	7.0%	$14,526
13	$0	$32,715	$0	$32,715	7.0%	$13,576
14	$0	$32,715	$0	$32,715	7.0%	$12,687
15	$0	$32,715	$10,000	$42,715	7.0%	$15,482
16	$0	$32,715	$0	$32,715	7.0%	$11,082
17	$0	$32,715	$0	$32,715	7.0%	$10,357
18	$0	$32,715	$0	$32,715	7.0%	$9,679
19	$0	$32,715	$0	$32,715	7.0%	$9,046
20	$0	$32,715	$10,000	$42,715	7.0%	$11,038
21	$0	$32,715	$0	$32,715	7.0%	$7,901
22	$0	$32,715	$0	$32,715	7.0%	$7,384
23	$0	$32,715	$0	$32,715	7.0%	$6,901
24	$0	$32,715	$0	$32,715	7.0%	$6,450
25	$0	$32,715	$10,000	$42,715	7.0%	$7,870
26	$0	$32,715	$0	$32,715	7.0%	$5,633
27	$0	$32,715	$0	$32,715	7.0%	$5,265
28	$0	$32,715	$0	$32,715	7.0%	$4,920
29	$0	$32,715	$0	$32,715	7.0%	$4,599
30	$0	$32,715	$10,000	$42,715	7.0%	$5,611
TOTAL	**$10,595,995**	**$1,035,339**	**$60,000**	**$11,691,334**		**$11,072,250**
					PV O&M	**$476,255**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 15 LF avg depth per well)	30	LF	$35.79	$1,074
2.3	Install PVC Well Screens (2" diameter)	20	LF	$19.69	$394
2.4	Install PVC Well Casing (2" diameter)	10	LF	$14.79	$148
2.5	Install Filter Pack	24	LF	$15.52	$372
2.6	Install Bentonite Seal	2	EA	$57.23	$114
2.7	Install Annular Seal	4	LF	$69.04	$276
2.8	PVC Well Plugs	2	EA	$27.86	$56
2.9	Flush-Mount Protective Cover with Locking Cap	2	EA	$451.55	$903
2.10	Surface Pad, Concrete 2' x 2'	2	EA	$154.79	$310
2.11	Well Development (2 HR/WELL)	4	EA	$228.23	$913
2.12	IDW Transportation/Disposal (drums)	2	EA	$508.52	$1,017
	Subtotal				**$8,330**
3.0	**Fencing and Signage[2]**				
3.1	Chain Link Fence	900	LF	$27.57	$24,813
3.2	Signage	9	EA	$73.95	$666
	Subtotal				**$25,479**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	8	MONTH	$4,531	$36,247
	Subtotal				**$65,698**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	5	ACRE	$3,968.29	$21,032
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	900	LF	$8.97	$8,070
	Subtotal				**$49,772**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
6.1	Excavate and Load RW[3]	11,852	CY	$2.12	$25,168
6.2	Haul RW/Soil to Stockpile Area[4]	14,222	CY	$4.00	$56,896
6.3	Perimeter Air Sampling	267	EA	$243.76	$65,007
6.4	Equipment Decontamination	593	HR	$54.56	$32,335
6.5	Stockpile Management	14,222	CY	$1.44	$20,440
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$199,845**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks[5]	14,222	CY	$2.44	$34,732
7.2	Transport RW to In-Town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	593	HR	$54.56	$32,335
7.4	Out-of-Town Transportation of Waste[6]	21,333	TON	$170.00	$3,626,667
7.5	Out-of-Town Disposal of Waste (no treatment)[6, 7]	19,200	TON	$107.10	$2,056,320
7.6	Out-of-Town Disposal of Waste (treatment)[6, 7]	2,133	TON	$192.00	$409,600
	Subtotal				**$6,159,653**

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	80,000	SF	$1.29	$103,200
8.8	Furnish, Place, and Spread Topsoil (6")[9]	1,630	CY	$34.65	$56,466
8.9	Hydroseeding with Mulch and Fertilizer	80	MSF	$43.97	$3,518
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	11,407	CY	$11.83	$134,947
8.14	Install Nonwoven Geotextile Fabric	8,889	SY	$2.21	$19,644
	Subtotal				**$343,703**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	1	LS	$188,862	$188,862
	Subtotal				**$188,862**
TOTAL DIRECT COSTS					**$7,063,996**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$423,840
10.2	Engineering and Design (12%)				$847,680
10.3	Construction management (8%)				$565,120
10.4	Location Adjustment (9%)				$635,760
10.5	Contingency (15%)				$1,059,599
TOTAL OTHER COSTS					**$3,531,998**
TOTAL CAPITAL COST FOR ALTERNATIVE 10					**$10,595,995**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Lockwood Avenue Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2 .
[5] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor).
[6] A conversion factor of 1.5 was used to convert CY to TON.
[7] Volume of RW for Out-of-Town disposal excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[10] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; impacted wetlands will be restored to pre-existing conditions to the extent practical.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

G-2

200 FERRY BOULEVARD

COST ESTIMATE BACKUP SHEETS

PRESENT VALUE ANALYSIS
ALTERNATIVE 1 - NO ACTION
200 FERRY BLVD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$10,000	$10,000	7.0%	$7,130
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$10,000	$10,000	7.0%	$5,083
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$10,000	$10,000	7.0%	$3,624
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$10,000	$10,000	7.0%	$2,584
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$10,000	$10,000	7.0%	$1,842
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$10,000	$10,000	7.0%	$1,314
TOTAL	**$0**	**$0**	**$60,000**	**$60,000**		**$21,578**
					PV O&M	**$21,578**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
200 FERRY BLVD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review [1]	Total	Discount Rate[2]	Present Value
0	$40,543	$0	$0	$40,543	7.0%	$40,543
1	$0	$59,429	$0	$59,429	7.0%	$55,541
2	$0	$59,429	$0	$59,429	7.0%	$51,907
3	$0	$32,486	$0	$32,486	7.0%	$26,518
4	$0	$32,486	$0	$32,486	7.0%	$24,783
5	$0	$32,486	$10,000	$42,486	7.0%	$30,292
6	$0	$32,486	$0	$32,486	7.0%	$21,646
7	$0	$32,486	$0	$32,486	7.0%	$20,230
8	$0	$32,486	$0	$32,486	7.0%	$18,907
9	$0	$32,486	$0	$32,486	7.0%	$17,670
10	$0	$32,486	$10,000	$42,486	7.0%	$21,597
11	$0	$32,486	$0	$32,486	7.0%	$15,434
12	$0	$32,486	$0	$32,486	7.0%	$14,424
13	$0	$32,486	$0	$32,486	7.0%	$13,480
14	$0	$32,486	$0	$32,486	7.0%	$12,598
15	$0	$32,486	$10,000	$42,486	7.0%	$15,399
16	$0	$32,486	$0	$32,486	7.0%	$11,004
17	$0	$32,486	$0	$32,486	7.0%	$10,284
18	$0	$32,486	$0	$32,486	7.0%	$9,611
19	$0	$32,486	$0	$32,486	7.0%	$8,983
20	$0	$32,486	$10,000	$42,486	7.0%	$10,979
21	$0	$32,486	$0	$32,486	7.0%	$7,846
22	$0	$32,486	$0	$32,486	7.0%	$7,332
23	$0	$32,486	$0	$32,486	7.0%	$6,853
24	$0	$32,486	$0	$32,486	7.0%	$6,404
25	$0	$32,486	$10,000	$42,486	7.0%	$7,828
26	$0	$32,486	$0	$32,486	7.0%	$5,594
27	$0	$32,486	$0	$32,486	7.0%	$5,228
28	$0	$32,486	$0	$32,486	7.0%	$4,886
29	$0	$32,486	$0	$32,486	7.0%	$4,566
30	$0	$32,486	$10,000	$42,486	7.0%	$5,581
TOTAL	**$40,543**	**$1,028,451**	**$60,000**	**$1,128,995**		**$513,949**
					PV O&M	**$473,406**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
200 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 15 LF avg depth per well)	30	LF	$35.79	$1,074
2.3	Install PVC Well Screens (2" diameter)	20	LF	$19.69	$394
2.4	Install PVC Well Casing (2" diameter)	10	LF	$14.79	$148
2.5	Install Filter Pack	24	LF	$15.52	$372
2.6	Install Bentonite Seal	2	EA	$57.23	$114
2.7	Install Annular Seal	4	LF	$69.04	$276
2.8	PVC Well Plugs	2	EA	$27.86	$56
2.9	Flush-Mount Protective Cover with Locking Cap	2	EA	$451.55	$903
2.10	Surface Pad, Concrete 2' x 2'	2	EA	$154.79	$310
2.11	Well Development (2 HR/WELL)	4	EA	$228.23	$913
2.12	IDW Transportation/Disposal (drums)	2	EA	$508.52	$1,017
	Subtotal				**$8,330**
3.0 Fencing and Signage					
3.1	Chain Link Fence	336	LF	$27.57	$9,264
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$9,559**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization[4]	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of RW	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
200 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
8.0	**Construction of Low-Permeability Cap**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405.12	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management**				
9.1	Flood Storage Mitigation	0	LS	$9,559	$0
9.2	Wetland Mitigation	0	LS	$8,330	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$40,543**
TOTAL CAPITAL COST FOR ALTERNATIVE 2					**$40,543**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 200 Ferry Boulevard Property.

RW = Raymark Waste
PVC = polyvinyl chloride
IDW = investigation derived waste
LS = lump sum
EA = each
SF = square feet
LF = linear foot
MSL = thousand square feet
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
200 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation (annual)	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.00	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	78	SF	$1.81	$140	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	11	LF	$27.57	$309	see cost assumptions
OM 2.6	Sign Replacement[5]	16	EA	$73.95	$1,183	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	1	EA	$321.75	$322	see cost assumptions
	Subtotal				**$17,404**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$59,429**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$32,486**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 200 Ferry Boulevard Property.

[2] Estimated that 1% of vegetated surfaces would require repair annually (estimated cost is negligible based upon small portion of Raymark waste delineated below vegetated surfaces) (need for repair to be established during 5-Year Reviews).

[3] Estimated 5% of asphalt surfaces will require repair annually - actual need for repair to be established during 5-Year Reviews.

[4] Estimated that 100% of fencing would require replacement over the period of O&M (need for repair to be established during 5-Year Reviews).

[5] Estimated that signage would require replacement 4 times over the period of O&M (need for repair to be established during 5-Year Reviews).

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear feet
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
200 FERRY BLVD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$286,211	$0	$0	$286,211	7.0%	$286,211
1	$0	$59,041	$0	$59,041	7.0%	$55,178
2	$0	$59,041	$0	$59,041	7.0%	$51,568
3	$0	$32,098	$0	$32,098	7.0%	$26,201
4	$0	$32,098	$0	$32,098	7.0%	$24,487
5	$0	$32,098	$10,000	$42,098	7.0%	$30,015
6	$0	$32,098	$0	$32,098	7.0%	$21,388
7	$0	$32,098	$0	$32,098	7.0%	$19,989
8	$0	$32,098	$0	$32,098	7.0%	$18,681
9	$0	$32,098	$0	$32,098	7.0%	$17,459
10	$0	$32,098	$10,000	$42,098	7.0%	$21,400
11	$0	$32,098	$0	$32,098	7.0%	$15,249
12	$0	$32,098	$0	$32,098	7.0%	$14,252
13	$0	$32,098	$0	$32,098	7.0%	$13,319
14	$0	$32,098	$0	$32,098	7.0%	$12,448
15	$0	$32,098	$10,000	$42,098	7.0%	$15,258
16	$0	$32,098	$0	$32,098	7.0%	$10,873
17	$0	$32,098	$0	$32,098	7.0%	$10,161
18	$0	$32,098	$0	$32,098	7.0%	$9,497
19	$0	$32,098	$0	$32,098	7.0%	$8,875
20	$0	$32,098	$10,000	$42,098	7.0%	$10,879
21	$0	$32,098	$0	$32,098	7.0%	$7,752
22	$0	$32,098	$0	$32,098	7.0%	$7,245
23	$0	$32,098	$0	$32,098	7.0%	$6,771
24	$0	$32,098	$0	$32,098	7.0%	$6,328
25	$0	$32,098	$10,000	$42,098	7.0%	$7,756
26	$0	$32,098	$0	$32,098	7.0%	$5,527
27	$0	$32,098	$0	$32,098	7.0%	$5,165
28	$0	$32,098	$0	$32,098	7.0%	$4,828
29	$0	$32,098	$0	$32,098	7.0%	$4,512
30	$0	$32,098	$10,000	$42,098	7.0%	$5,530
TOTAL	**$286,211**	**$1,016,815**	**$60,000**	**$1,363,026**		**$754,804**
					PV O&M	**$468,593**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
200 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	30	LF	$35.79	$1,074
2.3	Install PVC Well Screens (2" diameter)	20	LF	$19.69	$394
2.4	Install PVC Well Casing (2" diameter)	10	LF	$14.79	$148
2.5	Install Filter Pack	24	LF	$15.52	$372
2.6	Install Bentonite Seal	2	EA	$57.23	$114
2.7	Install Annular Seal	4	LF	$69.04	$276
2.8	PVC Well Plugs	2	EA	$27.86	$56
2.9	Flush-Mount Protective Cover with Locking Cap	2	EA	$451.55	$903
2.10	Surface Pad, Concrete 2' x 2'	2	EA	$154.79	$310
2.11	Well Development (2 HR/WELL)	4	EA	$228.23	$913
2.12	IDW Transportation/Disposal (drums)	2	EA	$508.52	$1,017
	Subtotal				**$8,330**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	336	LF	$27.57	$9,264
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$9,559**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	1	MONTH	$4,531	$4,531
	Subtotal				**$33,982**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	336	LF	$8.97	$3,013
	Subtotal				**$23,683**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW[3]	416	CY	$2.12	$883
6.2	Haul RW to Stockpile Area[4]	499	CY	$4.00	$1,996
6.3	Perimeter Air Sampling	9	EA	$243.76	$2,280
6.4	Equipment Decontamination	21	HR	$54.56	$1,134
6.5	Stockpile Management	499	CY	$1.44	$717
6.6	Stockpile Characterization[5]	1	EA	$1,535.00	$1,535
	Subtotal				**$8,545**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	232	CY	$2.44	$567
7.2	Transport RW to in-town consolidation[7]	209	CY	$5.52	$1,154
7.3	Equipment Decontamination	21	HR	$54.56	$1,134
7.4	Out-of-Town Transportation of Waste[7, 8]	35	TON	$170.00	$5,922
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)[7, 8]	35	TON	$192.00	$6,688
	Subtotal				**$15,465**

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
200 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap**				
8.1	Spread and Compact RW/Soil Excavated Material[9, 10]	197	CY	$2.40	$473
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[9]	81	CY	$27.00	$2,200
8.3	Install Geosynthetic Clay Liner (bottom layer)	4,000	SF	$2.86	$11,450
8.4	Install 60 mil HDPE liner	4,000	SF	$2.84	$11,368
8.5	Install Geosynthetic Drainage Layer	4,000	SF	$0.65	$2,616
8.6	Furnish, Spread, and Compact Soil Layer (24")[10]	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	4,000	SF	$1.29	$5,160
8.8	Furnish, Place, and Spread Topsoil (6")[9]	22	CY	$34.65	$776
8.9	Hydroseeding with Mulch and Fertilizer	1	MSF	$43.97	$48
8.10	Place, Spread, and Compact Asphalt Base Course (12")	107	ECY	$9.35	$1,004
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2,900	SF	$2.27	$6,583
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	444	SY	$2.21	$982
	Subtotal				**$68,588**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$190,807**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$11,448
10.2	Engineering and Design (12%)				$22,897
10.3	Construction management (8%)				$15,265
10.4	Location Adjustment (9%)				$17,173
10.5	Contingency (15%)				$28,621
TOTAL OTHER COSTS					**$95,404**
TOTAL CAPITAL COST FOR ALTERNATIVE 3					**$286,211**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 200 Ferry Boulevard Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 2.5- or 3-ft below ground surface and additional non-RW soil required to faciliate cap construction.
[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor).
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement.
[10] Pending analytical evaluation of PHCs, non-RW soil excavated to prepare for cap construction was estimated to provide enough volume to construct the 24-inch protective barrier in vegetated portions of the cap area with approximately 32 CY of excess material.
[11] No floodplains or wetlands would be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
200 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation (annual)	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	2	MSF	$7.34	$16	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.01	MSF	$56.31	$1	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	145	SF	$1.81	$263	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	4	EA	$321.75	$1,287	see cost assumptions
	Subtotal				**$17,017**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$59,041**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$32,098**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 200 Ferry Boulevard Property

[2] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future

[3] Assumed 5% of asphalt surfaces will require repair annually

[4] Assume fencing will not be required following remedial action

[5] Assume signage will not be required following remedial action

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear feet
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
200 FERRY BLVD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$414,786	$0	0	$414,786	7.0%	$414,786
1	$0	$59,041	$0	$59,041	7.0%	$55,178
2	$0	$59,041	$0	$59,041	7.0%	$51,568
3	$0	$32,098	$0	$32,098	7.0%	$26,201
4	$0	$32,098	$0	$32,098	7.0%	$24,487
5	$0	$32,098	$10,000	$42,098	7.0%	$30,015
6	$0	$32,098	$0	$32,098	7.0%	$21,388
7	$0	$32,098	$0	$32,098	7.0%	$19,989
8	$0	$32,098	$0	$32,098	7.0%	$18,681
9	$0	$32,098	$0	$32,098	7.0%	$17,459
10	$0	$32,098	$10,000	$42,098	7.0%	$21,400
11	$0	$32,098	$0	$32,098	7.0%	$15,249
12	$0	$32,098	$0	$32,098	7.0%	$14,252
13	$0	$32,098	$0	$32,098	7.0%	$13,319
14	$0	$32,098	$0	$32,098	7.0%	$12,448
15	$0	$32,098	$10,000	$42,098	7.0%	$15,258
16	$0	$32,098	$0	$32,098	7.0%	$10,873
17	$0	$32,098	$0	$32,098	7.0%	$10,161
18	$0	$32,098	$0	$32,098	7.0%	$9,497
19	$0	$32,098	$0	$32,098	7.0%	$8,875
20	$0	$32,098	$10,000	$42,098	7.0%	$10,879
21	$0	$32,098	$0	$32,098	7.0%	$7,752
22	$0	$32,098	$0	$32,098	7.0%	$7,245
23	$0	$32,098	$0	$32,098	7.0%	$6,771
24	$0	$32,098	$0	$32,098	7.0%	$6,328
25	$0	$32,098	$10,000	$42,098	7.0%	$7,756
26	$0	$32,098	$0	$32,098	7.0%	$5,527
27	$0	$32,098	$0	$32,098	7.0%	$5,165
28	$0	$32,098	$0	$32,098	7.0%	$4,828
29	$0	$32,098	$0	$32,098	7.0%	$4,512
30	$0	$32,098	$10,000	$42,098	7.0%	$5,530
TOTAL	**$414,786**	**$1,016,815**	**$60,000**	**$1,491,601**		**$883,379**
					PV O&M	**$468,593**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT -OF-TOWN DISPOSAL
200 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	30	LF	$35.79	$1,074
2.3	Install PVC Well Screens (2" diameter)	20	LF	$19.69	$394
2.4	Install PVC Well Casing (2" diameter)	10	LF	$14.79	$148
2.5	Install Filter Pack	24	LF	$15.52	$372
2.6	Install Bentonite Seal	2	EA	$57.23	$114
2.7	Install Annular Seal	4	LF	$69.04	$276
2.8	PVC Well Plugs	2	EA	$27.86	$56
2.9	Flush-Mount Protective Cover with Locking Cap	2	EA	$451.55	$903
2.10	Surface Pad, Concrete 2' x 2'	2	EA	$154.79	$310
2.11	Well Development (2 HR/WELL)	4	EA	$228.23	$913
2.12	IDW Transportation/Disposal (drums)	2	EA	$508.52	$1,017
	Subtotal				**$8,330**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	336	LF	$27.57	$9,264
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$9,559**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	1	MONTH	$4,531	$4,531
	Subtotal				**$33,982**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	336	LF	$8.97	$3,013
	Subtotal				**$23,683**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW[3]	416	CY	$2.12	$883
6.2	Haul RW to Stockpile Area[4]	499	CY	$4.00	$1,996
6.3	Perimeter Air Sampling	9	EA	$243.76	$2,280
6.4	Equipment Decontamination	21	HR	$54.56	$1,134
6.5	Stockpile Management	499	CY	$1.44	$717
6.6	Stockpile Characterization[5]	1	EA	$1,535.00	$1,535
	Subtotal				**$8,545**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks [6]	232	CY	$2.44	$567
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	21	HR	$54.56	$1,134
7.4	Out-of-Town Transportation of RW[7]	348	TON	$170.00	$59,217
7.5	Out-of-Town Disposal of RW (no treatment)[7, 8]	314	TON	$107.10	$33,576
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	35	TON	$192.00	$6,688
	Subtotal				**$101,182**

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT -OF-TOWN DISPOSAL
200 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap**				
8.1	Spread and Compact RW/Soil Excavated Material[9, 10]	197	CY	$2.40	$473
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[9]	81	CY	$27.00	$2,200
8.3	Install Geosynthetic Clay Liner (bottom layer)	4,000	SF	$2.86	$11,450
8.4	Install 60 mil HDPE liner	4,000	SF	$2.84	$11,368
8.5	Install Geosynthetic Drainage Layer	4,000	SF	$0.65	$2,616
8.6	Furnish, Spread, and Compact Soil Layer (24")[10]	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	4,000	SF	$1.29	$5,160
8.8	Furnish, Place, and Spread Topsoil (6")[9]	22	CY	$34.65	$776
8.9	Hydroseeding with Mulch and Fertilizer	1	MSF	$43.97	$48
8.10	Place, Spread, and Compact Asphalt Base Course (12")	107	ECY	$9.35	$1,004
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2,900	SF	$2.27	$6,583
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	444	SY	$2.21	$982
	Subtotal				**$68,588**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$276,524**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$16,591
10.2	Engineering and Design (12%)				$33,183
10.3	Construction management (8%)				$22,122
10.4	Location Adjustment (9%)				$24,887
10.5	Contingency (15%)				$41,479
TOTAL OTHER COSTS					**$138,262**
TOTAL CAPITAL COST FOR ALTERNATIVE 4					**$414,786**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 200 Ferry Boulevard Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 2.5- or 3-ft below ground surface and additional non-RW soil required to faciliate cap construction.
[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor).
[7] A conversion factor of 1.5 was used to convert CY to TON.
[8] Volume of RW for disposal assumes that 10% would be hazardous requiring treatment prior to disposal.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement.
[10] Pending analytical evaluation of PHCs, non-RW soil excavated to prepare for cap construction was estimated to provide enough volume to construct the 24-inch protective barrier in vegetated portions of the cap area with approximately 32 CY of excess material.
[11] No floodplains or wetlands would be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
200 FERRY BLVD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$233,803	$0	$0	$233,803	7.0%	$233,803
1	$0	$35,924	$0	$35,924	7.0%	$33,574
2	$0	$35,924	$0	$35,924	7.0%	$31,378
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$233,803**	**$71,848**	**$0**	**$305,651**		**$298,754**
					PV O&M	**$64,952**

Notes:

[1] Five-year reviews are not included as all Raymark will be removed

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
200 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	30	LF	$35.79	$1,074
2.3	Install PVC Well Screens (2" diameter)	20	LF	$19.69	$394
2.4	Install PVC Well Casing (2" diameter)	10	LF	$14.79	$148
2.5	Install Filter Pack	24	LF	$15.52	$372
2.6	Install Bentonite Seal	2	EA	$57.23	$114
2.7	Install Annular Seal	4	LF	$69.04	$276
2.8	PVC Well Plugs	2	EA	$27.86	$56
2.9	Flush-Mount Protective Cover with Locking Cap	2	EA	$451.55	$903
2.10	Surface Pad, Concrete 2' x 2'	2	EA	$154.79	$310
2.11	Well Development (2 HR/WELL)	4	EA	$228.23	$913
2.12	IDW Transportation/Disposal (drums)	2	EA	$508.52	$1,017
	Subtotal				**$8,330**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	336	LF	$27.57	$9,264
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$9,559**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	1	MONTH	$4,531	$4,531
	Subtotal				**$33,982**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	336	LF	$8.97	$3,013
	Subtotal				**$23,683**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[4]	546	CY	$2.12	$1,160
6.2	Haul RW/Soil to Stockpile Area[5]	656	CY	$4.00	$2,623
6.3	Perimeter Air Sampling	12	EA	$243.76	$2,996
6.4	Equipment Decontamination	27	HR	$54.56	$1,490
6.5	Stockpile Management	656	CY	$1.44	$942
6.6	Stockpile Characterization[6]	2	EA	$1,535.00	$3,070
	Subtotal				**$12,282**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	489	CY	$2.44	$1,194
7.2	Transport RW to in-town consolidation[8]	440	CY	$5.52	$2,430
7.3	Equipment Decontamination	27	HR	$54.56	$1,490
7.4	Out-of-Town Transportation of RW[9]	73	TON	$170.00	$12,467
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[8, 9]	73	TON	$192.00	$14,080
	Subtotal				**$31,661**

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
200 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	150	CY	$2.40	$360
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	60	CY	$34.65	$2,082
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$20
8.10	Place, Spread, and Compact Asphalt Base Course (12")	57	ECY	$9.35	$537
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	1,550	SF	$2.27	$3,519
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	290	CY	$11.83	$3,435
8.14	Install Nonwoven Geotextile Fabric	222	SY	$2.21	$491
	Subtotal				**$36,371**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$155,869**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$9,352
10.2	Engineering and Design (12%)				$18,704
10.3	Construction management (8%)				$12,469
10.4	Location Adjustment (9%)				$14,028
10.5	Contingency (15%)				$23,380
TOTAL OTHER COSTS					**$77,934**
TOTAL CAPITAL COST FOR ALTERNATIVE 5					**$233,803**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 200 Ferry Boulevard Property.
[2] Transactional fees for deed establishment is not required for complete excavation of Raymark waste.
[3] Assume fencing and signage to be temporary and required during construction activities for site security only.
[4] Represents in situ estimate of RW to be excavated to a depth of 5.5-ft below ground surface and additional non-RW soil required to faciliate safety benching/sloping for excavations greater than 4-ft.
[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.
[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).
[7] Volume includes all RW intended for disposal.
[8] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[9] A conversion factor of 1.5 was used to convert CY to TON.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; additionally excavated soil is intended for re-use on-site pending analytical results for PHCs and was deducted from backfill estimates.
[11] No floodplains or wetlands would be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
200 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0	**Groundwater Monitoring (per event)**					
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation (annual)	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0	**Ground Surface Inspections, Maintenance, and Repairs (per year)[2]**					
OM.2.1	Inspection	0	HR	$110.00	$0	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation	0	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	0	LS	$2,250.00	$0	see cost assumptions
OM.2.8	Contractor mobilizations	0	EA	$321.75	$0	see cost assumptions
	Subtotal				**$0**	
OM.3.0	**Deed Restrictions[2]**					
OM.3.1	Inspection (annual)	0	LS	$1,100.00	$0	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	0	EA	$5,000.00	$0	see cost assumptions
	Subtotal				**$0**	
ANNUAL O&M COST (YEARS 1-2)[3]					**$35,924**	
ANNUAL O&M COST (YEARS 3-30)[4]					**$0**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 200 Ferry Boulevard Property

[2] Assume that O&M for ground surfaces and deed is not required following complete excavation of Raymark waste

[3] O&M for Years 1 and 2 include quarterly groundwater monitoring with annual reporting

[4] O&M for Years 3 - 30 will not be required pending analytical data and concurrence from the State following the first 2 years of groundwater data collection

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear feet
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
200 FERRY BLVD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review	Total	Discount Rate[2]	Present Value
0	$501,737	$0	$0	$501,737	7.0%	$501,737
1	$0	$35,924	$0	$35,924	7.0%	$33,574
2	$0	$35,924	$0	$35,924	7.0%	$31,378
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$501,737**	**$71,848**	**$0**	**$573,585**		**$566,688**
					PV O&M	**$64,952**

Notes:

[1] Five-year reviews are not included as all Raymark will be removed

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
200 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	30	LF	$35.79	$1,074
2.3	Install PVC Well Screens (2" diameter)	20	LF	$19.69	$394
2.4	Install PVC Well Casing (2" diameter)	10	LF	$14.79	$148
2.5	Install Filter Pack	24	LF	$15.52	$372
2.6	Install Bentonite Seal	2	EA	$57.23	$114
2.7	Install Annular Seal	4	LF	$69.04	$276
2.8	PVC Well Plugs	2	EA	$27.86	$56
2.9	Flush-Mount Protective Cover with Locking Cap	2	EA	$451.55	$903
2.10	Surface Pad, Concrete 2' x 2'	2	EA	$154.79	$310
2.11	Well Development (2 HR/WELL)	4	EA	$228.23	$913
2.12	IDW Transportation/Disposal (drums)	2	EA	$508.52	$1,017
	Subtotal				**$8,330**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	336	LF	$27.57	$9,264
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$9,559**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	1	MONTH	$4,531	$4,531
	Subtotal				**$33,982**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	336	LF	$8.97	$3,013
	Subtotal				**$23,683**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[4]	546	CY	$2.12	$1,160
6.2	Haul RW/Soil to Stockpile Area[5]	656	CY	$4.00	$2,623
6.3	Perimeter Air Sampling	12	EA	$243.76	$2,996
6.4	Equipment Decontamination	25	HR	$54.56	$1,341
6.5	Stockpile Management	656	CY	$1.44	$942
6.6	Stockpile Characterization[6]	1	EA	$1,535.00	$1,535
	Subtotal				**$10,598**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	489	CY	$2.44	$1,194
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	25	HR	$54.56	$1,341
7.4	Out-of-Town Transportation of RW[8]	733	TON	$170.00	$124,667
7.5	Out-of-Town Disposal of RW (no treatment)[8, 9]	660	TON	$107.10	$70,686
7.6	Out-of-Town Disposal of RW (treatment)[8, 9]	73	TON	$192.00	$14,080
	Subtotal				**$211,968**

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
200 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	150	CY	$2.40	$360
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$11.83	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	60	CY	$34.65	$2,082
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$20
8.10	Place, Spread, and Compact Asphalt Base Course (12")	57	ECY	$9.35	$537
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	1550	SF	$2.27	$3,519
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	290	CY	$11.83	$3,435
8.14	Install Nonwoven Geotextile Fabric	222	SY	$2.21	$491
	Subtotal				**$36,371**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$334,491**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$20,069
10.2	Engineering and Design (12%)				$40,139
10.3	Construction management (8%)				$26,759
10.4	Location Adjustment (9%)				$30,104
10.5	Contingency (15%)				$50,174
TOTAL OTHER COSTS					**$167,246**
TOTAL CAPITAL COST FOR ALTERNATIVE 6					**$501,737**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 200 Ferry Boulevard Property.
[2] Transactional fees for deed establishment is not required for complete excavation of Raymark waste.
[3] Assume fencing and signage to be temporary and required during construction activities for site security only.
[4] Represents in situ estimate of RW to be excavated to a depth of 5.5-ft below ground surface and additional non-RW soil required to faciliate safety benching/sloping for excavations greater than 4-ft.
[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.
[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).
[7] Volume includes all RW intended for disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Volume of RW for disposal assumes that 10% would be hazardous requiring treatment prior to disposal.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; additionally excavated soil is intended for re-use on-site pending analytical results for PHCs and was deducted from backfill estimates.
[11] No floodplains or wetlands would be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
200 FERRY BLVD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$226,056	$0	0	$226,056	7.0%	$226,056
1	$0	$58,909	$0	$58,909	7.0%	$55,055
2	$0	$58,909	$0	$58,909	7.0%	$51,453
3	$0	$31,966	$0	$31,966	7.0%	$26,093
4	$0	$31,966	$0	$31,966	7.0%	$24,386
5	$0	$31,966	$10,000	$41,966	7.0%	$29,921
6	$0	$31,966	$0	$31,966	7.0%	$21,300
7	$0	$31,966	$0	$31,966	7.0%	$19,907
8	$0	$31,966	$0	$31,966	7.0%	$18,604
9	$0	$31,966	$0	$31,966	7.0%	$17,387
10	$0	$31,966	$10,000	$41,966	7.0%	$21,333
11	$0	$31,966	$0	$31,966	7.0%	$15,187
12	$0	$31,966	$0	$31,966	7.0%	$14,193
13	$0	$31,966	$0	$31,966	7.0%	$13,265
14	$0	$31,966	$0	$31,966	7.0%	$12,397
15	$0	$31,966	$10,000	$41,966	7.0%	$15,210
16	$0	$31,966	$0	$31,966	7.0%	$10,828
17	$0	$31,966	$0	$31,966	7.0%	$10,120
18	$0	$31,966	$0	$31,966	7.0%	$9,457
19	$0	$31,966	$0	$31,966	7.0%	$8,839
20	$0	$31,966	$10,000	$41,966	7.0%	$10,845
21	$0	$31,966	$0	$31,966	7.0%	$7,720
22	$0	$31,966	$0	$31,966	7.0%	$7,215
23	$0	$31,966	$0	$31,966	7.0%	$6,743
24	$0	$31,966	$0	$31,966	7.0%	$6,302
25	$0	$31,966	$10,000	$41,966	7.0%	$7,732
26	$0	$31,966	$0	$31,966	7.0%	$5,504
27	$0	$31,966	$0	$31,966	7.0%	$5,144
28	$0	$31,966	$0	$31,966	7.0%	$4,808
29	$0	$31,966	$0	$31,966	7.0%	$4,493
30	$0	$31,966	$10,000	$41,966	7.0%	$5,513
TOTAL	**$226,056**	**$1,012,855**	**$60,000**	**$1,298,911**		**$693,010**
					PV O&M	**$466,955**

Notes:

[1] Five-year reviews are not included as all Raymark will be removed

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
200 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	30	LF	$35.79	$1,074
2.3	Install PVC Well Screens (2" diameter)	20	LF	$19.69	$394
2.4	Install PVC Well Casing (2" diameter)	10	LF	$14.79	$148
2.5	Install Filter Pack	24	LF	$15.52	$372
2.6	Install Bentonite Seal	2	EA	$57.23	$114
2.7	Install Annular Seal	4	LF	$69.04	$276
2.8	PVC Well Plugs	2	EA	$27.86	$56
2.9	Flush-Mount Protective Cover with Locking Cap	2	EA	$451.55	$903
2.10	Surface Pad, Concrete 2' x 2'	2	EA	$154.79	$310
2.11	Well Development (2 HR/WELL)	4	EA	$228.23	$913
2.12	IDW Transportation/Disposal (drums)	2	EA	$508.52	$1,017
	Subtotal				**$8,330**
3.0	**Fencing and Signage[2]**				
3.1	Chain Link Fence	336	LF	$27.57	$9,264
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$9,559**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	1	MONTH	$4,531	$4,531
	Subtotal				**$33,982**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	336	LF	$8.97	$3,013
	Subtotal				**$23,683**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
6.1	Excavate and Load RW[3]	181	CY	$2.12	$385
6.2	Haul RW/Soil to Stockpile Area[4]	218	CY	$4.00	$871
6.3	Perimeter Air Sampling	4	EA	$243.76	$995
6.4	Equipment Decontamination	9	HR	$54.56	$495
6.5	Stockpile Management	218	CY	$1.44	$313
6.6	Stockpile Characterization[5]	1	EA	$1,535.00	$1,535
	Subtotal				**$4,595**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks[6]	218	CY	$2.44	$532
7.2	Transport RW to in-town consolidation[7]	196	CY	$5.52	$1,083
7.3	Equipment Decontamination	9	HR	$54.56	$495
7.4	Out-of-Town Transportation of Waste[7, 8]	33	TON	$170.00	$5,553
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)[7, 8]	33	TON	$192.00	$6,272
	Subtotal				**$13,935**

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
200 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Place, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[9]	2,000	SF	$1.29	$2,580
8.8	Furnish, Place, and Spread Topsoil (6")[10]	9	CY	$34.65	$318
8.9	Hydroseeding with Mulch and Fertilizer	0.45	MSF	$43.97	$20
8.10	Place, Spread, and Compact Asphalt Base Course (12")	57	ECY	$9.35	$537
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	1,550	SF	$2.27	$3,519
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	90	CY	$11.83	$1,065
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$33,965**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$150,704**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$9,042
10.2	Engineering and Design (12%)				$18,084
10.3	Construction management (8%)				$12,056
10.4	Location Adjustment (9%)				$13,563
10.5	Contingency (15%)				$22,606
TOTAL OTHER COSTS					**$75,352**
TOTAL CAPITAL COST FOR ALTERNATIVE 7					**$226,056**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 200 Ferry Boulevard Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 2 or 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal (assume 1 sample per 500 CY)
[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor).
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement.
[11] No floodplains or wetlands would be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
200 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation (annual)	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	0.90	MSF	$7.34	$7	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.01	MSF	$56.31	$1	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	78	SF	$1.81	$140	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	4	EA	$321.75	$1,287	see cost assumptions
	Subtotal				**$16,885**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$58,909**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$31,966**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 200 Ferry Boulevard Property

[2] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[3] Assumed 5% of asphalt surfaces will require repair annually

[4] Assume fencing will not be required following remedial action

[5] Assume signage will not be required following remedial action

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear feet
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
200 FERRY BLVD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$344,330	$0	0	$344,330	7.0%	$344,330
1	$0	$58,909	$0	$58,909	7.0%	$55,055
2	$0	$58,909	$0	$58,909	7.0%	$51,453
3	$0	$31,966	$0	$31,966	7.0%	$26,093
4	$0	$31,966	$0	$31,966	7.0%	$24,386
5	$0	$31,966	$10,000	$41,966	7.0%	$29,921
6	$0	$31,966	$0	$31,966	7.0%	$21,300
7	$0	$31,966	$0	$31,966	7.0%	$19,907
8	$0	$31,966	$0	$31,966	7.0%	$18,604
9	$0	$31,966	$0	$31,966	7.0%	$17,387
10	$0	$31,966	$10,000	$41,966	7.0%	$21,333
11	$0	$31,966	$0	$31,966	7.0%	$15,187
12	$0	$31,966	$0	$31,966	7.0%	$14,193
13	$0	$31,966	$0	$31,966	7.0%	$13,265
14	$0	$31,966	$0	$31,966	7.0%	$12,397
15	$0	$31,966	$10,000	$41,966	7.0%	$15,210
16	$0	$31,966	$0	$31,966	7.0%	$10,828
17	$0	$31,966	$0	$31,966	7.0%	$10,120
18	$0	$31,966	$0	$31,966	7.0%	$9,457
19	$0	$31,966	$0	$31,966	7.0%	$8,839
20	$0	$31,966	$10,000	$41,966	7.0%	$10,845
21	$0	$31,966	$0	$31,966	7.0%	$7,720
22	$0	$31,966	$0	$31,966	7.0%	$7,215
23	$0	$31,966	$0	$31,966	7.0%	$6,743
24	$0	$31,966	$0	$31,966	7.0%	$6,302
25	$0	$31,966	$10,000	$41,966	7.0%	$7,732
26	$0	$31,966	$0	$31,966	7.0%	$5,504
27	$0	$31,966	$0	$31,966	7.0%	$5,144
28	$0	$31,966	$0	$31,966	7.0%	$4,808
29	$0	$31,966	$0	$31,966	7.0%	$4,493
30	$0	$31,966	$10,000	$41,966	7.0%	$5,513
TOTAL	**$344,330**	**$1,012,855**	**$60,000**	**$1,417,186**		**$811,285**
					PV O&M	**$466,955**

Notes:

[1] Five-year reviews are not included as all Raymark will be removed

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
200 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	30	LF	$35.79	$1,074
2.3	Install PVC Well Screens (2" diameter)	20	LF	$19.69	$394
2.4	Install PVC Well Casing (2" diameter)	10	LF	$14.79	$148
2.5	Install Filter Pack	24	LF	$15.52	$372
2.6	Install Bentonite Seal	2	EA	$57.23	$114
2.7	Install Annular Seal	4	LF	$69.04	$276
2.8	PVC Well Plugs	2	EA	$27.86	$56
2.9	Flush-Mount Protective Cover with Locking Cap	2	EA	$451.55	$903
2.10	Surface Pad, Concrete 2' x 2'	2	EA	$154.79	$310
2.11	Well Development (2 HR/WELL)	4	EA	$228.23	$913
2.12	IDW Transportation/Disposal (drums)	2	EA	$508.52	$1,017
	Subtotal				**$8,330**
3.0	**Fencing and Signage[2]**				
3.1	Chain Link Fence	336	LF	$27.57	$9,264
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$9,559**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	1	MONTH	$4,531	$4,531
	Subtotal				**$33,982**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	336	LF	$8.97	$3,013
	Subtotal				**$23,683**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
6.1	Excavate and Load RW[3]	181	CY	$2.12	$385
6.2	Haul RW/Soil to Stockpile Area[4]	218	CY	$4.00	$871
6.3	Perimeter Air Sampling	4	EA	$243.76	$995
6.4	Equipment Decontamination	9	HR	$54.56	$495
6.5	Stockpile Management	218	CY	$1.44	$313
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$3,060**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks[5]	218	CY	$2.44	$532
7.2	Transport RW to In-Town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	9	HR	$54.56	$495
7.4	Out-of-Town Transportation of Waste[6]	327	TON	$170.00	$55,533
7.5	Out-of-Town Disposal of Waste (no treatment)[6, 7]	294	TON	$107.10	$31,487
7.6	Out-of-Town Disposal of Waste (treatment)[6, 7]	33	TON	$192.00	$6,272
	Subtotal				**$94,320**

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
200 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	2,000	SF	$1.29	$2,580
8.8	Furnish, Place, and Spread Topsoil (6")[9]	9	CY	$34.65	$318
8.9	Hydroseeding with Mulch and Fertilizer	0.45	MSF	$43.97	$20
8.10	Place, Spread, and Compact Asphalt Base Course (12")	57	ECY	$9.35	$537
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	1,550	SF	$2.27	$3,519
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	90	CY	$11.83	$1,065
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$33,965**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$229,554**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$13,773
10.2	Engineering and Design (12%)				$27,546
10.3	Construction management (8%)				$18,364
10.4	Location Adjustment (9%)				$20,660
10.5	Contingency (15%)				$34,433
TOTAL OTHER COSTS					**$114,777**
TOTAL CAPITAL COST FOR ALTERNATIVE 8					**$344,330**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 200 Ferry Boulevard Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 2 or 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Volume includes all RW intended for disposal
[6] A conversion factor of 1.5 was used to convert CY to TON.
[7] Volume of RW for Out-of-Town disposal excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement.
[10] No floodplains or wetlands would be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
200 FERRY BLVD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$250,392	$0	0	$250,392	7.0%	$250,392
1	$0	$58,909	$0	$58,909	7.0%	$55,055
2	$0	$58,909	$0	$58,909	7.0%	$51,453
3	$0	$31,966	$0	$31,966	7.0%	$26,093
4	$0	$31,966	$0	$31,966	7.0%	$24,386
5	$0	$31,966	$10,000	$41,966	7.0%	$29,921
6	$0	$31,966	$0	$31,966	7.0%	$21,300
7	$0	$31,966	$0	$31,966	7.0%	$19,907
8	$0	$31,966	$0	$31,966	7.0%	$18,604
9	$0	$31,966	$0	$31,966	7.0%	$17,387
10	$0	$31,966	$10,000	$41,966	7.0%	$21,333
11	$0	$31,966	$0	$31,966	7.0%	$15,187
12	$0	$31,966	$0	$31,966	7.0%	$14,193
13	$0	$31,966	$0	$31,966	7.0%	$13,265
14	$0	$31,966	$0	$31,966	7.0%	$12,397
15	$0	$31,966	$10,000	$41,966	7.0%	$15,210
16	$0	$31,966	$0	$31,966	7.0%	$10,828
17	$0	$31,966	$0	$31,966	7.0%	$10,120
18	$0	$31,966	$0	$31,966	7.0%	$9,457
19	$0	$31,966	$0	$31,966	7.0%	$8,839
20	$0	$31,966	$10,000	$41,966	7.0%	$10,845
21	$0	$31,966	$0	$31,966	7.0%	$7,720
22	$0	$31,966	$0	$31,966	7.0%	$7,215
23	$0	$31,966	$0	$31,966	7.0%	$6,743
24	$0	$31,966	$0	$31,966	7.0%	$6,302
25	$0	$31,966	$10,000	$41,966	7.0%	$7,732
26	$0	$31,966	$0	$31,966	7.0%	$5,504
27	$0	$31,966	$0	$31,966	7.0%	$5,144
28	$0	$31,966	$0	$31,966	7.0%	$4,808
29	$0	$31,966	$0	$31,966	7.0%	$4,493
30	$0	$31,966	$10,000	$41,966	7.0%	$5,513
TOTAL	**$250,392**	**$1,012,855**	**$60,000**	**$1,323,247**		**$717,347**
					PV O&M	**$466,955**

Notes:

[1] Five-year reviews are not included as all Raymark will be removed

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
200 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	
1.0 Deed Restrictions						
1.1	Transactional Fees	1	LS	$22,655	$22,655	
	Subtotal					**$22,655**
2.0 Monitoring Well Construction						
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753	
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	30	LF	$35.79	$1,074	
2.3	Install PVC Well Screens (2" diameter)	20	LF	$19.69	$394	
2.4	Install PVC Well Casing (2" diameter)	10	LF	$14.79	$148	
2.5	Install Filter Pack	24	LF	$15.52	$372	
2.6	Install Bentonite Seal	2	EA	$57.23	$114	
2.7	Install Annular Seal	4	LF	$69.04	$276	
2.8	PVC Well Plugs	2	EA	$27.86	$56	
2.9	Flush-Mount Protective Cover with Locking Cap	2	EA	$451.55	$903	
2.10	Surface Pad, Concrete 2' x 2'	2	EA	$154.79	$310	
2.11	Well Development (2 HR/WELL)	4	EA	$228.23	$913	
2.12	IDW Transportation/Disposal (drums)	2	EA	$508.52	$1,017	
	Subtotal					**$8,330**
3.0 Fencing and Signage[2]						
3.1	Chain Link Fence	336	LF	$27.57	$9,264	
3.2	Signage	4	EA	$73.95	$296	
	Subtotal					**$9,559**
4.0 Mobilization/Demobilization						
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655	
4.2	Field Support Facilities	1	LS	$6,796	$6,796	
4.3	Monthly Costs associated with Field Support	2	MONTH	$4,531	$9,062	
	Subtotal					**$38,513**
5.0 Site Preparation						
5.1	Site Access Road Construction	0	SY	$23.06	$0	
5.2	Clear and Grub	0	ACRE	$3,968.29	$0	
5.3	Site Survey	1	EA	$5,945.37	$5,945	
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495	
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230	
5.6	Install Erosion and Sedimentation Controls	336	LF	$8.97	$3,013	
	Subtotal					**$23,683**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill						
6.1	Excavate and Load RW[3]	296	CY	$2.12	$629	
6.2	Haul RW/Soil to Stockpile Area[4]	356	CY	$4.00	$1,422	
6.3	Perimeter Air Sampling	7	EA	$243.76	$1,625	
6.4	Equipment Decontamination	15	HR	$54.56	$808	
6.5	Stockpile Management	356	CY	$1.44	$511	
6.6	Stockpile Characterization[5]	1	EA	$1,535.00	$982	
	Subtotal					**$5,979**
7.0 Transportation and Treatment/Disposal of Raymark Waste						
7.1	Load RW into Trucks[6]	356	CY	$2.44	$868	
7.2	Transport RW to in-town consolidation[7]	320	CY	$5.52	$1,767	
7.3	Equipment Decontamination	15	HR	$54.56	$808	
7.4	Out-of-Town Transportation of Waste[7, 8]	53	TON	$170.00	$9,067	
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0	
7.6	Out-of-Town Disposal of Waste (treatment)[7, 8]	53	TON	$192.00	$10,240	
	Subtotal					**$22,751**

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
200 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**					
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0	
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0	
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0	
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0	
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0	
8.6	Place, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0	
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[9]	2,000	SF	$1.29	$2,580	
8.8	Furnish, Place, and Spread Topsoil (6")[10]	9	CY	$34.65	$318	
8.9	Hydroseeding with Mulch and Fertilizer	0.45	MSF	$43.97	$20	
8.10	Place, Spread, and Compact Asphalt Base Course (12")	57	CY	$9.35	$537	
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	1550	SF	$2.27	$3,519	
8.12	Site Cleanup	64	HR	$405.12	$25,928	
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	216	CY	$11.83	$2,559	
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0	
	Subtotal					**$35,459**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**					
9.1	Flood Storage Mitigation	0	LS	$0	$0	
9.2	Wetland Mitigation	0	LS	$0	$0	
	Subtotal					**$0**
TOTAL DIRECT COSTS						**$166,928**
10.0	**OTHER COSTS**					
10.1	Project Management (6%)					$10,016
10.2	Engineering and Design (12%)					$20,031
10.3	Construction management (8%)					$13,354
10.4	Location Adjustment (9%)					$15,024
10.5	Contingency (15%)					$25,039
TOTAL OTHER COSTS						**$83,464**
TOTAL CAPITAL COST FOR ALTERNATIVE 9						**$250,392**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 200 Ferry Boulevard Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
4 Volume for hauling RW to the stockpile area includes a bulking factor of 1.2 .
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal (assume 1 sample per 500 CY)
[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor) .
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement.
[11] No floodplains or wetlands would be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
200 FERRY BLVD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$444,839	$0	0	$444,839	7.0%	$444,839
1	$0	$58,909	$0	$58,909	7.0%	$55,055
2	$0	$58,909	$0	$58,909	7.0%	$51,453
3	$0	$31,966	$0	$31,966	7.0%	$26,093
4	$0	$31,966	$0	$31,966	7.0%	$24,386
5	$0	$31,966	$10,000	$41,966	7.0%	$29,921
6	$0	$31,966	$0	$31,966	7.0%	$21,300
7	$0	$31,966	$0	$31,966	7.0%	$19,907
8	$0	$31,966	$0	$31,966	7.0%	$18,604
9	$0	$31,966	$0	$31,966	7.0%	$17,387
10	$0	$31,966	$10,000	$41,966	7.0%	$21,333
11	$0	$31,966	$0	$31,966	7.0%	$15,187
12	$0	$31,966	$0	$31,966	7.0%	$14,193
13	$0	$31,966	$0	$31,966	7.0%	$13,265
14	$0	$31,966	$0	$31,966	7.0%	$12,397
15	$0	$31,966	$10,000	$41,966	7.0%	$15,210
16	$0	$31,966	$0	$31,966	7.0%	$10,828
17	$0	$31,966	$0	$31,966	7.0%	$10,120
18	$0	$31,966	$0	$31,966	7.0%	$9,457
19	$0	$31,966	$0	$31,966	7.0%	$8,839
20	$0	$31,966	$10,000	$41,966	7.0%	$10,845
21	$0	$31,966	$0	$31,966	7.0%	$7,720
22	$0	$31,966	$0	$31,966	7.0%	$7,215
23	$0	$31,966	$0	$31,966	7.0%	$6,743
24	$0	$31,966	$0	$31,966	7.0%	$6,302
25	$0	$31,966	$10,000	$41,966	7.0%	$7,732
26	$0	$31,966	$0	$31,966	7.0%	$5,504
27	$0	$31,966	$0	$31,966	7.0%	$5,144
28	$0	$31,966	$0	$31,966	7.0%	$4,808
29	$0	$31,966	$0	$31,966	7.0%	$4,493
30	$0	$31,966	$10,000	$41,966	7.0%	$5,513
TOTAL	**$444,839**	**$1,012,855**	**$60,000**	**$1,517,695**		**$911,794**
					PV O&M	**$466,955**

Notes:

[1] Five-year reviews are not included as all Raymark will be removed

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
200 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	30	LF	$35.79	$1,074
2.3	Install PVC Well Screens (2" diameter)	20	LF	$19.69	$394
2.4	Install PVC Well Casing (2" diameter)	10	LF	$14.79	$148
2.5	Install Filter Pack	24	LF	$15.52	$372
2.6	Install Bentonite Seal	2	EA	$57.23	$114
2.7	Install Annular Seal	4	LF	$69.04	$276
2.8	PVC Well Plugs	2	EA	$27.86	$56
2.9	Flush-Mount Protective Cover with Locking Cap	2	EA	$451.55	$903
2.10	Surface Pad, Concrete 2' x 2'	2	EA	$154.79	$310
2.11	Well Development (2 HR/WELL)	4	EA	$228.23	$913
2.12	IDW Transportation/Disposal (drums)	2	EA	$508.52	$1,017
	Subtotal				**$8,330**
3.0	**Fencing and Signage[2]**				
3.1	Chain Link Fence	336	LF	$27.57	$9,264
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$9,559**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	2	MONTH	$4,531	$9,062
	Subtotal				**$38,513**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	336	LF	$8.97	$3,013
	Subtotal				**$23,683**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
6.1	Excavate and Load RW[3]	296	CY	$2.12	$629
6.2	Haul RW/Soil to Stockpile Area[4]	356	CY	$4.00	$1,422
6.3	Perimeter Air Sampling	7	EA	$243.76	$1,625
6.4	Equipment Decontamination	9	HR	$54.56	$495
6.5	Stockpile Management	356	CY	$1.44	$511
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$4,683**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks[5]	356	CY	$2.44	$868
7.2	Transport RW to In-Town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	9	HR	$54.56	$495
7.4	Out-of-Town Transportation of Waste[6]	533	TON	$170.00	$90,667
7.5	Out-of-Town Disposal of Waste (no treatment)[6, 7]	480	TON	$107.10	$51,408
7.6	Out-of-Town Disposal of Waste (treatment)[6, 7]	53	TON	$192.00	$10,240
	Subtotal				**$153,678**

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
200 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	2,000	SF	$1.29	$2,580
8.8	Furnish, Place, and Spread Topsoil (6")[9]	9	CY	$34.65	$318
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$20
8.10	Place, Spread, and Compact Asphalt Base Course (12")	57	ECY	$9.35	$537
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	1,550	SF	$2.27	$3,519
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	216	CY	$11.83	$2,559
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$35,459**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$296,560**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$17,794
10.2	Engineering and Design (12%)				$35,587
10.3	Construction management (8%)				$23,725
10.4	Location Adjustment (9%)				$26,690
10.5	Contingency (15%)				$44,484
TOTAL OTHER COSTS					**$148,280**
TOTAL CAPITAL COST FOR ALTERNATIVE 10					**$444,839**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 200 Ferry Boulevard Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2 .
[5] Volume includes all RW intended for disposal.
[6] A conversion factor of 1.5 was used to convert CY to TON.
[7] Volume of RW for Out-of-Town disposal excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement.
[10] No floodplains or wetlands would be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

G-3

FERRY BOULEVARD PROPERTIES

COST ESTIMATE BACKUP SHEETS

PRESENT VALUE ANALYSIS
ALTERNATIVE 1 - NO ACTION
FERRY BLVD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$25,000	$25,000	7.0%	$17,825
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$25,000	$25,000	7.0%	$12,709
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$25,000	$25,000	7.0%	$9,061
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$25,000	$25,000	7.0%	$6,460
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$25,000	$25,000	7.0%	$4,606
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$25,000	$25,000	7.0%	$3,284
TOTAL	**$0**	**$0**	**$150,000**	**$150,000**		**$53,945**
					PV O&M	**$53,945**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
FERRY BOULEVARD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$180,740	$0	$0	$180,740	7.0%	$180,740
1	$0	$113,679	$0	$113,679	7.0%	$106,242
2	$0	$113,679	$0	$113,679	7.0%	$99,291
3	$0	$73,891	$0	$73,891	7.0%	$60,317
4	$0	$73,891	$0	$73,891	7.0%	$56,371
5	$0	$73,891	$25,000	$98,891	7.0%	$70,508
6	$0	$73,891	$0	$73,891	7.0%	$49,237
7	$0	$73,891	$0	$73,891	7.0%	$46,016
8	$0	$73,891	$0	$73,891	7.0%	$43,005
9	$0	$73,891	$0	$73,891	7.0%	$40,192
10	$0	$73,891	$25,000	$98,891	7.0%	$50,271
11	$0	$73,891	$0	$73,891	7.0%	$35,105
12	$0	$73,891	$0	$73,891	7.0%	$32,809
13	$0	$73,891	$0	$73,891	7.0%	$30,662
14	$0	$73,891	$0	$73,891	7.0%	$28,656
15	$0	$73,891	$25,000	$98,891	7.0%	$35,843
16	$0	$73,891	$0	$73,891	7.0%	$25,030
17	$0	$73,891	$0	$73,891	7.0%	$23,392
18	$0	$73,891	$0	$73,891	7.0%	$21,862
19	$0	$73,891	$0	$73,891	7.0%	$20,432
20	$0	$73,891	$25,000	$98,891	7.0%	$25,555
21	$0	$73,891	$0	$73,891	7.0%	$17,846
22	$0	$73,891	$0	$73,891	7.0%	$16,678
23	$0	$73,891	$0	$73,891	7.0%	$15,587
24	$0	$73,891	$0	$73,891	7.0%	$14,567
25	$0	$73,891	$25,000	$98,891	7.0%	$18,221
26	$0	$73,891	$0	$73,891	7.0%	$12,724
27	$0	$73,891	$0	$73,891	7.0%	$11,891
28	$0	$73,891	$0	$73,891	7.0%	$11,113
29	$0	$73,891	$0	$73,891	7.0%	$10,386
30	$0	$73,891	$25,000	$98,891	7.0%	$12,991
TOTAL	**$180,740**	**$2,296,316**	**$150,000**	**$2,627,056**		**$1,223,542**
					PV O&M	**$1,042,803**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
FERRY BOULEVARD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	4	LS	$22,655	$90,618
	Subtotal				**$90,618**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	60	LF	$35.79	$2,147
2.3	Install PVC Well Screens (2" diameter)	40	LF	$19.69	$788
2.4	Install PVC Well Casing (2" diameter)	20	LF	$14.79	$296
2.5	Install Filter Pack	48	LF	$15.52	$745
2.6	Install Bentonite Seal	4	EA	$57.23	$229
2.7	Install Annular Seal	8	LF	$69.04	$552
2.8	PVC Well Plugs	4	EA	$27.86	$111
2.9	Flush-Mount Protective Cover with Locking Cap	4	EA	$451.55	$1,806
2.10	Surface Pad, Concrete 2' x 2'	4	EA	$154.79	$619
2.11	Well Development (2 HR/WELL)	8	EA	$228.23	$1,826
2.12	IDW Transportation/Disposal (drums)	4	EA	$508.52	$2,034
	Subtotal				**$13,906**
3.0	**Fencing and Signage**				
3.1	Chain Link Fence	2,692	LF	$27.57	$74,218
3.2	Signage	27	EA	$73.95	$1,997
	Subtotal				**$76,215**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction**				
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization[4]	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of RW	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
FERRY BOULEVARD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST
8.0 Construction of Low-Permeability Cap					
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Place, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405.12	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0 Flood Storage Mitigation/Stormwater Management					
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$180,740**
TOTAL CAPITAL COST FOR ALTERNATIVE 2					**$180,740**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Ferry Boulevard Properties.

RW = Raymark Waste
PVC = polyvinyl chloride
IDW = investigation derived waste
LS = lump sum
EA = each
SF = square feet
LF = linear foot
MSL = thousand square feet
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
FERRY BLVD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	28	HR	$110	$3,080	see cost assumptions
OM.1.3	Sampling Labor - Sampler	14	HR	$90	$1,260	see cost assumptions
OM.1.4	Analytical Costs	7	EA	$697	$4,880	see cost assumptions
OM.1.5	Data Validation	7	HR	$110	$770	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$13,262**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.27	MSF	$56.31	$15	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	7,150	SF	$1.81	$12,960	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	90	LF	$27.57	$2,474	see cost assumptions
OM 2.6	Sign Replacement[5]	108	EA	$73.95	$7,987	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	2	EA	$321.75	$644	see cost assumptions
	Subtotal				**$39,529**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	4	EA	$5,000.00	$20,000	see cost assumptions
	Subtotal				**$21,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$113,679**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$73,891**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Ferry Boulevard Property Group.

[2] Estimated that 1% of vegetated surfaces would require repair annually (need for repair to be established during 5-Year Reviews).

[3] Estimated 5% of asphalt surfaces will require repair annually (need for repair to be established during 5-Year Reviews).

[4] Estimated that 100% of fencing would require replacement over the period of O&M (need for repair to be established during 5-Year Reviews).

[5] Estimated that signage would require replacement 4 times over the period of O&M (need for repair to be established during 5-Year Reviews).

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
FERRY BLVD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$7,629,583	$0	$0	$7,629,583	7.0%	$7,629,583
1	$0	$105,934	$0	$105,934	7.0%	$99,003
2	$0	$105,934	$0	$105,934	7.0%	$92,527
3	$0	$66,146	$0	$66,146	7.0%	$53,995
4	$0	$66,146	$0	$66,146	7.0%	$50,463
5	$0	$66,146	$25,000	$91,146	7.0%	$64,986
6	$0	$66,146	$0	$66,146	7.0%	$44,076
7	$0	$66,146	$0	$66,146	7.0%	$41,193
8	$0	$66,146	$0	$66,146	7.0%	$38,498
9	$0	$66,146	$0	$66,146	7.0%	$35,979
10	$0	$66,146	$25,000	$91,146	7.0%	$46,334
11	$0	$66,146	$0	$66,146	7.0%	$31,426
12	$0	$66,146	$0	$66,146	7.0%	$29,370
13	$0	$66,146	$0	$66,146	7.0%	$27,448
14	$0	$66,146	$0	$66,146	7.0%	$25,653
15	$0	$66,146	$25,000	$91,146	7.0%	$33,036
16	$0	$66,146	$0	$66,146	7.0%	$22,406
17	$0	$66,146	$0	$66,146	7.0%	$20,940
18	$0	$66,146	$0	$66,146	7.0%	$19,570
19	$0	$66,146	$0	$66,146	7.0%	$18,290
20	$0	$66,146	$25,000	$91,146	7.0%	$23,554
21	$0	$66,146	$0	$66,146	7.0%	$15,975
22	$0	$66,146	$0	$66,146	7.0%	$14,930
23	$0	$66,146	$0	$66,146	7.0%	$13,953
24	$0	$66,146	$0	$66,146	7.0%	$13,041
25	$0	$66,146	$25,000	$91,146	7.0%	$16,794
26	$0	$66,146	$0	$66,146	7.0%	$11,390
27	$0	$66,146	$0	$66,146	7.0%	$10,645
28	$0	$66,146	$0	$66,146	7.0%	$9,949
29	$0	$66,146	$0	$66,146	7.0%	$9,298
30	$0	$66,146	$25,000	$91,146	7.0%	$11,974
TOTAL	**$7,629,583**	**$2,063,965**	**$150,000**	**$9,843,547**		**$8,576,277**
					PV O&M	**$946,694**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
FERRY BOULEVARD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	4	LS	$22,655	$90,618
	Subtotal				**$90,618**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	60	LF	$35.79	$2,147
2.3	Install PVC Well Screens (2" diameter)	40	LF	$19.69	$788
2.4	Install PVC Well Casing (2" diameter)	20	LF	$14.79	$296
2.5	Install Filter Pack	48	LF	$15.52	$745
2.6	Install Bentonite Seal	4	EA	$57.23	$229
2.7	Install Annular Seal	8	LF	$69.04	$552
2.8	PVC Well Plugs	4	EA	$27.86	$111
2.9	Flush-Mount Protective Cover with Locking Cap	4	EA	$451.55	$1,806
2.10	Surface Pad, Concrete 2' x 2'	4	EA	$154.79	$619
2.11	Well Development (2 HR/WELL)	8	EA	$228.23	$1,826
2.12	IDW Transportation/Disposal (drums)	4	EA	$508.52	$2,034
	Subtotal				**$13,906**
3.0	**Fencing and Signage[2]**				
3.1	Chain Link Fence	2,692	LF	$27.57	$74,218
3.2	Signage	27	EA	$73.95	$1,997
	Subtotal				**$76,215**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	12	MONTH	$4,531	$54,371
	Subtotal				**$83,822**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	2	ACRE	$3,968.29	$7,937
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	2,692	LF	$8.97	$24,137
	Subtotal				**$52,744**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction**				
6.1	Excavate and Load RW/Soil[3]	28,463	CY	$2.12	$60,443
6.2	Haul RW/Soil to Stockpile Area[4]	34,156	CY	$4.00	$136,638
6.3	Perimeter Air Sampling	640	EA	$243.76	$156,118
6.4	Equipment Decontamination	1,423	HR	$54.56	$77,653
6.5	Stockpile Management	34,156	CY	$1.44	$49,087
6.6	Stockpile Characterization[5]	69	EA	$1,535.00	$105,915
	Subtotal				**$585,855**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks[6]	19,489	CY	$2.44	$47,594
7.2	Transport RW to in-town consolidation[7]	17,540	CY	$5.52	$96,881
7.3	Equipment Decontamination	1,423	HR	$54.56	$77,653
7.4	Out-of-Town Transportation of Waste[7, 8]	2,923	TON	$170.00	$496,967
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)[7, 8]	2,923	TON	$192.00	$561,280
	Subtotal				**$1,280,375**

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
FERRY BOULEVARD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver,Place and Compact RW/Soil Excavated Material[9]	13,200	CY	$2.40	$31,712
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[9]	5,704	CY	$27.00	$153,972
8.3	Install Geosynthetic Clay Liner (bottom layer)	280,000	SF	$2.86	$801,489
8.4	Install 60 mil HDPE liner	280,000	SF	$2.84	$795,729
8.5	Install Geosynthetic Drainage Layer	280,000	SF	$0.65	$183,118
8.6	Furnish, Spread, and Compact Soil Layer (24")[9]	346	CY	$11.83	$4,097
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	280,000	SF	$1.29	$361,200
8.8	Furnish, Place, and Spread Topsoil (6")[9]	2,791	CY	$34.65	$96,698
8.9	Hydroseeding with Mulch and Fertilizer	137	MSF	$43.97	$6,024
8.10	Place, Spread, and Compact Asphalt Base Course (12")	5,296	ECY	$9.35	$49,520
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	143,000	SF	$2.27	$324,610
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	31,111	SY	$2.21	$68,756
	Subtotal				**$2,902,853**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$5,086,388**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$305,183
10.2	Engineering and Design (12%)				$610,367
10.3	Construction management (8%)				$406,911
10.4	Location Adjustment (9%)				$457,775
10.5	Contingency (15%)				$762,958
TOTAL OTHER COSTS					**$2,543,194**
TOTAL CAPITAL COST FOR ALTERNATIVE 3					**$7,629,583**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Ferry Boulevard Properties.

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to excavated to a depth of 2.5- or 3-ft below ground surface and additional soil that requires excavation to faciliate cap construction.

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less additionally excavated soil).

[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[8] A conversion factor of 1.5 was used to convert CY to TON.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[10] Impacts to floodplains will be evaluated during Remedial Design and will require compensation via backfill material selection to ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
FERRY BLVD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	28	HR	$110	$3,080	see cost assumptions
OM.1.3	Sampling Labor - Sampler	14	HR	$90	$1,260	see cost assumptions
OM.1.4	Analytical Costs	7	EA	$697	$4,880	see cost assumptions
OM.1.5	Data Validation	7	HR	$110	$770	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$13,262**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	274	MSF	$7.34	$2,010	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	1.37	MSF	$56.31	$77	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	7,150	SF	$1.81	$12,960	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	4	EA	$321.75	$1,287	see cost assumptions
	Subtotal				**$31,784**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	4	EA	$5,000.00	$20,000	see cost assumptions
	Subtotal				**$21,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$105,934**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$66,146**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Ferry Boulevard Properties.

[2] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[3] Assumed 5% of asphalt surfaces will require repair annually.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
FERRY BLVD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$18,323,308	$0	0	$18,323,308	7.0%	$18,323,308
1	$0	$105,934	$0	$105,934	7.0%	$99,003
2	$0	$105,934	$0	$105,934	7.0%	$92,527
3	$0	$66,146	$0	$66,146	7.0%	$53,995
4	$0	$66,146	$0	$66,146	7.0%	$50,463
5	$0	$66,146	$25,000	$91,146	7.0%	$64,986
6	$0	$66,146	$0	$66,146	7.0%	$44,076
7	$0	$66,146	$0	$66,146	7.0%	$41,193
8	$0	$66,146	$0	$66,146	7.0%	$38,498
9	$0	$66,146	$0	$66,146	7.0%	$35,979
10	$0	$66,146	$25,000	$91,146	7.0%	$46,334
11	$0	$66,146	$0	$66,146	7.0%	$31,426
12	$0	$66,146	$0	$66,146	7.0%	$29,370
13	$0	$66,146	$0	$66,146	7.0%	$27,448
14	$0	$66,146	$0	$66,146	7.0%	$25,653
15	$0	$66,146	$25,000	$91,146	7.0%	$33,036
16	$0	$66,146	$0	$66,146	7.0%	$22,406
17	$0	$66,146	$0	$66,146	7.0%	$20,940
18	$0	$66,146	$0	$66,146	7.0%	$19,570
19	$0	$66,146	$0	$66,146	7.0%	$18,290
20	$0	$66,146	$25,000	$91,146	7.0%	$23,554
21	$0	$66,146	$0	$66,146	7.0%	$15,975
22	$0	$66,146	$0	$66,146	7.0%	$14,930
23	$0	$66,146	$0	$66,146	7.0%	$13,953
24	$0	$66,146	$0	$66,146	7.0%	$13,041
25	$0	$66,146	$25,000	$91,146	7.0%	$16,794
26	$0	$66,146	$0	$66,146	7.0%	$11,390
27	$0	$66,146	$0	$66,146	7.0%	$10,645
28	$0	$66,146	$0	$66,146	7.0%	$9,949
29	$0	$66,146	$0	$66,146	7.0%	$9,298
30	$0	$66,146	$25,000	$91,146	7.0%	$11,974
TOTAL	**$18,323,308**	**$2,063,965**	**$150,000**	**$20,537,272**		**$19,270,002**
					PV O&M	**$946,694**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
FERRY BOULEVARD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	4	LS	$22,655	$90,618
	Subtotal				**$90,618**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	60	LF	$35.79	$2,147
2.3	Install PVC Well Screens (2" diameter)	40	LF	$19.69	$788
2.4	Install PVC Well Casing (2" diameter)	20	LF	$14.79	$296
2.5	Install Filter Pack	48	LF	$15.52	$745
2.6	Install Bentonite Seal	4	EA	$57.23	$229
2.7	Install Annular Seal	8	LF	$69.04	$552
2.8	PVC Well Plugs	4	EA	$27.86	$111
2.9	Flush-Mount Protective Cover with Locking Cap	4	EA	$451.55	$1,806
2.10	Surface Pad, Concrete 2' x 2'	4	EA	$154.79	$619
2.11	Well Development (2 HR/WELL)	8	EA	$228.23	$1,826
2.12	IDW Transportation/Disposal (drums)	4	EA	$508.52	$2,034
	Subtotal				**$13,906**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	2,692	LF	$27.57	$74,218
3.2	Signage	27	EA	$73.95	$1,997
	Subtotal				**$76,215**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	12	MONTH	$4,531	$54,371
	Subtotal				**$83,822**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	2	ACRE	$3,968.29	$7,937
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	2,692	LF	$8.97	$24,137
	Subtotal				**$52,744**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil[3]	28,463	CY	$2.12	$60,443
6.2	Haul RW/Soil to Stockpile Area[4]	34,156	CY	$4.00	$136,638
6.3	Perimeter Air Sampling	640	EA	$243.76	$156,118
6.4	Equipment Decontamination	1,423	HR	$54.56	$77,653
6.5	Stockpile Management	34,156	CY	$1.44	$49,087
6.6	Stockpile Characterization[5]	27	EA	$1,535.00	$41,445
	Subtotal				**$521,385**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load Raymark Waste into Trucks[6]	19,489	CY	$2.44	$47,594
7.2	Transport Raymark Waste to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	1,423	HR	$54.56	$77,653
7.4	Out-of-Town Transportation of Waste[7]	29,233	TON	$170.00	$4,969,667
7.5	Out-of-Town Disposal of Waste (no treatment)[7, 8]	26,310	TON	$107.10	$2,817,801
7.6	Out-of-Town Treatment of Raymark Waste[7, 8]	2,923	TON	$192.00	$561,280
	Subtotal				**$8,473,995**

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
FERRY BOULEVARD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver,Place and Compact RW/Soil Excavated Material[9]	13,200	CY	$2.40	$31,712
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[9]	5,704	CY	$27.00	$153,972
8.3	Install Geosynthetic Clay Liner (bottom layer)	280,000	SF	$2.86	$801,489
8.4	Install 60 mil HDPE liner	280,000	SF	$2.84	$795,729
8.5	Install Geosynthetic Drainage Layer	280,000	SF	$0.65	$183,118
8.6	Furnish, Spread, and Compact Soil Layer (24")[9]	346	CY	$11.83	$4,097
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	280,000	SF	$1.29	$361,200
8.8	Furnish, Place, and Spread Topsoil (6")[9]	2,791	CY	$34.65	$96,698
8.9	Hydroseeding with Mulch and Fertilizer	137	MSF	$43.97	$6,024
8.10	Place, Spread, and Compact Asphalt Base Course (12")	5,296	ECY	$9.35	$49,520
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	143,000	SF	$2.27	$324,610
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	31,111	SY	$2.21	$68,756
	Subtotal				**$2,902,853**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$12,215,538**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$732,932
10.2	Engineering and Design (12%)				$1,465,865
10.3	Construction management (8%)				$977,243
10.4	Location Adjustment (9%)				$1,099,398
10.5	Contingency (15%)				$1,832,331
TOTAL OTHER COSTS					**$6,107,769**
TOTAL CAPITAL COST FOR ALTERNATIVE 4					**$18,323,308**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Ferry Boulevard Properties.

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to excavated to a depth of 2.5- or 3-ft below ground surface and additional soil that requires excavation to faciliate cap construction.

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500).

[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less additionally excavated soil).

[7] A conversion factor of 1.5 was used to convert CY to TON.

[8] Volume of RW for disposal assumes 10% would be hazardous requiring treatment prior to disposal.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[10] Impacts to floodplains will be evaluated during Remedial Design and will require compensation via backfill material selection to ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

PRESENT VALUE ANALYSIS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
FERRY BLVD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$7,697,916	$0	$0	$7,697,916	7.0%	$7,697,916
1	$0	$91,128	$0	$91,128	7.0%	$85,167
2	$0	$91,128	$0	$91,128	7.0%	$79,595
3	$0	$38,079	$0	$38,079	7.0%	$31,084
4	$0	$38,079	$0	$38,079	7.0%	$29,050
5	$0	$38,079	$25,000	$63,079	7.0%	$44,974
6	$0	$38,079	$0	$38,079	7.0%	$25,373
7	$0	$38,079	$0	$38,079	7.0%	$23,713
8	$0	$38,079	$0	$38,079	7.0%	$22,162
9	$0	$38,079	$0	$38,079	7.0%	$20,712
10	$0	$38,079	$25,000	$63,079	7.0%	$32,066
11	$0	$38,079	$0	$38,079	7.0%	$18,091
12	$0	$38,079	$0	$38,079	7.0%	$16,907
13	$0	$38,079	$0	$38,079	7.0%	$15,801
14	$0	$38,079	$0	$38,079	7.0%	$14,768
15	$0	$38,079	$25,000	$63,079	7.0%	$22,863
16	$0	$38,079	$0	$38,079	7.0%	$12,899
17	$0	$38,079	$0	$38,079	7.0%	$12,055
18	$0	$38,079	$0	$38,079	7.0%	$11,266
19	$0	$38,079	$0	$38,079	7.0%	$10,529
20	$0	$38,079	$25,000	$63,079	7.0%	$16,301
21	$0	$38,079	$0	$38,079	7.0%	$9,196
22	$0	$38,079	$0	$38,079	7.0%	$8,595
23	$0	$38,079	$0	$38,079	7.0%	$8,033
24	$0	$38,079	$0	$38,079	7.0%	$7,507
25	$0	$38,079	$25,000	$63,079	7.0%	$11,622
26	$0	$38,079	$0	$38,079	7.0%	$6,557
27	$0	$38,079	$0	$38,079	7.0%	$6,128
28	$0	$38,079	$0	$38,079	7.0%	$5,727
29	$0	$38,079	$0	$38,079	7.0%	$5,352
30	$0	$38,079	$25,000	$63,079	7.0%	$8,286
TOTAL	**$7,697,916**	**$1,248,460**	**$150,000**	**$9,096,376**		**$8,320,296**
					PV O&M	**$622,380**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
FERRY BOULEVARD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	4	LS	$22,655	$90,618
	Subtotal				**$90,618**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	60	LF	$35.79	$2,147
2.3	Install PVC Well Screens (2" diameter)	40	LF	$19.69	$788
2.4	Install PVC Well Casing (2" diameter)	20	LF	$14.79	$296
2.5	Install Filter Pack	48	LF	$15.52	$745
2.6	Install Bentonite Seal	4	EA	$57.23	$229
2.7	Install Annular Seal	8	LF	$69.04	$552
2.8	PVC Well Plugs	4	EA	$27.86	$111
2.9	Flush-Mount Protective Cover with Locking Cap	4	EA	$451.55	$1,806
2.10	Surface Pad, Concrete 2' x 2'	4	EA	$154.79	$619
2.11	Well Development (2 HR/WELL)	8	EA	$228.23	$1,826
2.12	IDW Transportation/Disposal (drums)	4	EA	$508.52	$2,034
	Subtotal				**$13,906**
3.0	**Fencing and Signage[2]**				
3.1	Chain Link Fence	2,692	LF	$27.57	$74,218
3.2	Signage	27	EA	$73.95	$1,997
	Subtotal				**$76,215**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	20	MONTH	$4,531	$90,618
	Subtotal				**$120,069**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	2	ACRE	$3,968.29	$7,937
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	2,692	LF	$8.97	$24,137
	Subtotal				**$52,744**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
6.1	Excavate and Load RW/Soil[3]	39,129	CY	$2.12	$83,093
6.2	Haul RW/Soil to Stockpile Area[4]	46,955	CY	$4.00	$187,841
6.3	Perimeter Air Sampling	880	EA	$243.76	$214,620
6.4	Equipment Decontamination	1,956	HR	$54.56	$106,753
6.5	Stockpile Management	46,955	CY	$1.44	$67,482
6.6	Stockpile Characterization[5]	94	EA	$1,535.00	$144,290
	Subtotal				**$804,078**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks[6]	45,333	CY	$2.44	$110,709
7.2	Transport RW to in-town consolidation[7]	40,800	CY	$5.52	$225,356
7.3	Equipment Decontamination	1,956	HR	$54.56	$106,753
7.4	Out-of-Town Transportation of Waste[7, 8]	6,800	TON	$170.00	$1,156,000
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)[7, 8]	6,800	TON	$192.00	$1,305,600
	Subtotal				**$2,904,417**

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
FERRY BOULEVARD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[9]	1459	CY	$2.40	$3,506
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[10]	170,000	SF	$1.29	$219,300
8.8	Furnish, Place, and Spread Topsoil (6")[9]	922	CY	$34.65	$31,932
8.9	Hydroseeding with Mulch and Fertilizer	45	MSF	$43.97	$1,989
8.10	Place, Spread, and Compact Asphalt Base Course (12")	5,296	ECY	$9.35	$49,520
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	143,000	SF	$2.27	$324,610
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[8]	31,393	CY	$11.83	$371,367
8.14	Install Nonwoven Geotextile Fabric	18,889	SY	$2.21	$41,744
	Subtotal				**$1,069,896**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$5,131,944**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$307,917
10.2	Engineering and Design (12%)				$615,833
10.3	Construction management (8%)				$410,556
10.4	Location Adjustment (9%)				$461,875
10.5	Contingency (15%)				$769,792
TOTAL OTHER COSTS					**$2,565,972**
TOTAL CAPITAL COST FOR ALTERNATIVE 5					**$7,697,916**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Ferry Boulevard Properties.

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to excavated to a depth of 6-ft below ground surface and additional soil that would be required to be removed to facilitate compliance with safety standards for benching/sloping.

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[8] A conversion factor of 1.5 was used to convert CY to TON.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[10] Delineation ("warning") layer included for excavation area where waste is left-in-place.

11 All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
FERRY BLVD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	28	HR	$110	$3,080	see cost assumptions
OM.1.3	Sampling Labor - Sampler	14	HR	$90	$1,260	see cost assumptions
OM.1.4	Analytical Costs	7	EA	$697	$4,880	see cost assumptions
OM.1.5	Data Validation	7	HR	$110	$770	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$13,262**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	10	HR	$110.00	$1,100	see cost assumptions
OM.2.2	Mowing (twice per year)[2]	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[3]	0.45	MSF	$56.31	$25	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[4]	7,150	SF	$1.81	$12,960	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[5]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[6]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	2	EA	$321.75	$644	see cost assumptions
	Subtotal				**$16,979**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	4	EA	$5,000.00	$20,000	see cost assumptions
	Subtotal				**$21,100**	
ANNUAL O&M COST (YEARS 1-2)[7]					**$91,128**	
ANNUAL O&M COST (YEARS 3-30)[8]					**$38,079**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Ferry Boulevard Properties.

[2] Mowing would not be required for excavation of Raymark waste to the seasonal high groundwater table.

[3] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[4] Assumed 5% of asphalt surfaces will require repair annually.

[5] Assume fencing will not be required following remedial action.

[6] Assume signage will not be required following remedial action.

[7] O&M for Years 1 and 2 include quarterly groundwater monitoring with annual inspection/repairs of ground surface and annual deed inspection, with one annual report for all O&M activities.

[8] O&M for Years 3 - 30 include annual inspection and repairs to ground surface and annual deed inspection, but may not require additional groundwater sampling pending analytical data and concurrence from the State following the first 2 years of data collection, therefore additional groundwater sampling is not included.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
FERRY BLVD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$32,588,135	$0	$0	$32,588,135	7.0%	$32,588,135
1	$0	$91,128	$0	$91,128	7.0%	$85,167
2	$0	$91,128	$0	$91,128	7.0%	$79,595
3	$0	$38,079	$0	$38,079	7.0%	$31,084
4	$0	$38,079	$0	$38,079	7.0%	$29,050
5	$0	$38,079	$25,000	$63,079	7.0%	$44,974
6	$0	$38,079	$0	$38,079	7.0%	$25,373
7	$0	$38,079	$0	$38,079	7.0%	$23,713
8	$0	$38,079	$0	$38,079	7.0%	$22,162
9	$0	$38,079	$0	$38,079	7.0%	$20,712
10	$0	$38,079	$25,000	$63,079	7.0%	$32,066
11	$0	$38,079	$0	$38,079	7.0%	$18,091
12	$0	$38,079	$0	$38,079	7.0%	$16,907
13	$0	$38,079	$0	$38,079	7.0%	$15,801
14	$0	$38,079	$0	$38,079	7.0%	$14,768
15	$0	$38,079	$25,000	$63,079	7.0%	$22,863
16	$0	$38,079	$0	$38,079	7.0%	$12,899
17	$0	$38,079	$0	$38,079	7.0%	$12,055
18	$0	$38,079	$0	$38,079	7.0%	$11,266
19	$0	$38,079	$0	$38,079	7.0%	$10,529
20	$0	$38,079	$25,000	$63,079	7.0%	$16,301
21	$0	$38,079	$0	$38,079	7.0%	$9,196
22	$0	$38,079	$0	$38,079	7.0%	$8,595
23	$0	$38,079	$0	$38,079	7.0%	$8,033
24	$0	$38,079	$0	$38,079	7.0%	$7,507
25	$0	$38,079	$25,000	$63,079	7.0%	$11,622
26	$0	$38,079	$0	$38,079	7.0%	$6,557
27	$0	$38,079	$0	$38,079	7.0%	$6,128
28	$0	$38,079	$0	$38,079	7.0%	$5,727
29	$0	$38,079	$0	$38,079	7.0%	$5,352
30	$0	$38,079	$25,000	$63,079	7.0%	$8,286
TOTAL	**$32,588,135**	**$1,248,460**	**$150,000**	**$33,986,594**		**$33,210,515**
					PV O&M	**$622,380**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
FERRY BOULEVARD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	4	LS	$22,655	$90,618
	Subtotal				**$90,618**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	60	LF	$35.79	$2,147
2.3	Install PVC Well Screens (2" diameter)	40	LF	$19.69	$788
2.4	Install PVC Well Casing (2" diameter)	20	LF	$14.79	$296
2.5	Install Filter Pack	48	LF	$15.52	$745
2.6	Install Bentonite Seal	4	EA	$57.23	$229
2.7	Install Annular Seal	8	LF	$69.04	$552
2.8	PVC Well Plugs	4	EA	$27.86	$111
2.9	Flush-Mount Protective Cover with Locking Cap	4	EA	$451.55	$1,806
2.10	Surface Pad, Concrete 2' x 2'	4	EA	$154.79	$619
2.11	Well Development (2 HR/WELL)	8	EA	$228.23	$1,826
2.12	IDW Transportation/Disposal (drums)	4	EA	$508.52	$2,034
	Subtotal				**$13,906**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	2,692	LF	$27.57	$74,218
3.2	Signage	27	EA	$73.95	$1,997
	Subtotal				**$76,215**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	20	MONTH	$4,531	$90,618
	Subtotal				**$120,069**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	2	ACRE	$3,968.29	$7,937
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	2692	LF	$8.97	$24,137
	Subtotal				**$52,744**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[3]	39,129	CY	$2.12	$83,093
6.2	Haul RW/Soil to Stockpile Area[4]	46,955	CY	$4.00	$187,841
6.3	Perimeter Air Sampling	880	EA	$243.76	$214,620
6.4	Equipment Decontamination	1,956	HR	$54.56	$106,753
6.5	Stockpile Management	46,955	CY	$1.44	$67,482
6.6	Stockpile Characterization[5]	3	EA	$1,535.00	$4,605
	Subtotal				**$664,393**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	45,333	CY	$2.44	$110,709
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	1,956	HR	$54.56	$106,753
7.4	Out-of-Town Transportation of RW[7]	68,000	TON	$170.00	$11,560,000
7.5	Out-of-Town Disposal of RW (no treatment)[7, 8]	61,200	TON	$107.10	$6,554,520
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	6,800	TON	$192.00	$1,305,600
	Subtotal				**$19,637,581**

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
FERRY BOULEVARD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[9]	1459	CY	$2.40	$3,506
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[10]	170000	SF	$1.29	$219,300
8.8	Furnish, Place, and Spread Topsoil (6")[9]	922	CY	$34.65	$31,932
8.9	Hydroseeding with Mulch and Fertilizer	45	MSF	$43.97	$1,989
8.10	Place, Spread, and Compact Asphalt Base Course (12")	5296	ECY	$9.35	$49,520
8.11	Place Asphalt Concrete (6" base, 3" binder, 3" topping)	143000	SF	$2.27	$324,610
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	31393	CY	$11.83	$371,367
8.14	Install Nonwoven Geotextile Fabric	18889	SY	$2.21	$41,744
	Subtotal				**$1,069,896**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$21,725,423**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$1,303,525
10.2	Engineering and Design (12%)				$2,607,051
10.3	Construction management (8%)				$1,738,034
10.4	Location Adjustment (9%)				$1,955,288
10.5	Contingency (15%)				$3,258,813
TOTAL OTHER COSTS					**$10,862,712**
TOTAL CAPITAL COST FOR ALTERNATIVE 6					**$32,588,135**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Ferry Boulevard Properties.

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to excavated to a depth of 6-ft below ground surface and additional soil that would be required to be removed to facilitate compliance with safety standards for benching/sloping.

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[7] A conversion factor of 1.5 was used to convert CY to TON.

[8] Volume of RW for disposal assumes 10% would be hazardous requiring treatment prior to disposal.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[10] Delineation ("warning") layer included for excavation area where waste is left-in-place.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

PRESENT VALUE ANALYSIS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
FERRY BLVD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$3,714,099	$0	0	$3,714,099	7.0%	$3,714,099
1	$0	$104,258	$0	$104,258	7.0%	$97,437
2	$0	$104,258	$0	$104,258	7.0%	$91,063
3	$0	$64,470	$0	$64,470	7.0%	$52,627
4	$0	$64,470	$0	$64,470	7.0%	$49,184
5	$0	$64,470	$25,000	$89,470	7.0%	$63,791
6	$0	$64,470	$0	$64,470	7.0%	$42,959
7	$0	$64,470	$0	$64,470	7.0%	$40,149
8	$0	$64,470	$0	$64,470	7.0%	$37,522
9	$0	$64,470	$0	$64,470	7.0%	$35,068
10	$0	$64,470	$25,000	$89,470	7.0%	$45,482
11	$0	$64,470	$0	$64,470	7.0%	$30,629
12	$0	$64,470	$0	$64,470	7.0%	$28,626
13	$0	$64,470	$0	$64,470	7.0%	$26,753
14	$0	$64,470	$0	$64,470	7.0%	$25,003
15	$0	$64,470	$25,000	$89,470	7.0%	$32,428
16	$0	$64,470	$0	$64,470	7.0%	$21,838
17	$0	$64,470	$0	$64,470	7.0%	$20,410
18	$0	$64,470	$0	$64,470	7.0%	$19,074
19	$0	$64,470	$0	$64,470	7.0%	$17,827
20	$0	$64,470	$25,000	$89,470	7.0%	$23,121
21	$0	$64,470	$0	$64,470	7.0%	$15,570
22	$0	$64,470	$0	$64,470	7.0%	$14,552
23	$0	$64,470	$0	$64,470	7.0%	$13,600
24	$0	$64,470	$0	$64,470	7.0%	$12,710
25	$0	$64,470	$25,000	$89,470	7.0%	$16,485
26	$0	$64,470	$0	$64,470	7.0%	$11,102
27	$0	$64,470	$0	$64,470	7.0%	$10,375
28	$0	$64,470	$0	$64,470	7.0%	$9,697
29	$0	$64,470	$0	$64,470	7.0%	$9,062
30	$0	$64,470	$25,000	$89,470	7.0%	$11,753
TOTAL	**$3,714,099**	**$2,013,689**	**$150,000**	**$5,877,788**		**$4,639,997**
					PV O&M	**$925,899**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
FERRY BOULEVARD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	4	LS	$22,655	$90,618
	Subtotal				**$90,618**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	60	LF	$35.79	$2,147
2.3	Install PVC Well Screens (2" diameter)	40	LF	$19.69	$788
2.4	Install PVC Well Casing (2" diameter)	20	LF	$14.79	$296
2.5	Install Filter Pack	48	LF	$15.52	$745
2.6	Install Bentonite Seal	4	EA	$57.23	$229
2.7	Install Annular Seal	8	LF	$69.04	$552
2.8	PVC Well Plugs	4	EA	$27.86	$111
2.9	Flush-Mount Protective Cover with Locking Cap	4	EA	$451.55	$1,806
2.10	Surface Pad, Concrete 2' x 2'	4	EA	$154.79	$619
2.11	Well Development (2 HR/WELL)	8	EA	$228.23	$1,826
2.12	IDW Transportation/Disposal (drums)	4	EA	$508.52	$2,034
	Subtotal				**$13,906**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	2,692	LF	$27.57	$74,218
3.2	Signage	27	EA	$73.95	$1,997
	Subtotal				**$76,215**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	8	MONTH	$4,531	$36,247
	Subtotal				**$65,698**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	2	ACRE	$3,968.29	$7,937
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	2,692	LF	$8.97	$24,137
	Subtotal				**$52,744**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	14,593	CY	$2.12	$30,988
6.2	Haul RW to Stockpile Area[4]	17,511	CY	$4.00	$70,053
6.3	Perimeter Air Sampling	328	EA	$243.76	$80,040
6.4	Equipment Decontamination	730	HR	$54.56	$39,812
6.5	Stockpile Management	17,511	CY	$1.44	$25,166
6.6	Stockpile Characterization[5]	36	EA	$1,535.00	$55,260
	Subtotal				**$301,319**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	17,511	CY	$2.44	$42,764
7.2	Transport RW to in-town consolidation[7]	15,760	CY	$5.52	$87,049
7.3	Equipment Decontamination	730	HR	$54.56	$39,812
7.4	Out-of-Town Transportation of Waste[7, 8]	2,627	TON	$170.00	$446,533
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	2,627	TON	$192.00	$504,320
	Subtotal				**$1,120,479**

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
FERRY BOULEVARD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[9]	170,000	SF	$1.29	$219,300
8.8	Furnish, Place, and Spread Topsoil (6")[10]	550	CY	$34.65	$19,057
8.9	Hydroseeding with Mulch and Fertilizer	27	MSF	$43.97	$1,187
8.10	Place, Spread, and Compact Asphalt Base Course (12")	5,296	ECY	$9.35	$49,520
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	143,000	SF	$2.27	$324,610
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	6,233	CY	$11.83	$73,739
8.14	Install Nonwoven Geotextile Fabric	18,889	SY	$2.21	$41,744
	Subtotal				**$755,086**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$2,476,066**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$148,564
10.2	Engineering and Design (12%)				$297,128
10.3	Construction management (8%)				$198,085
10.4	Location Adjustment (9%)				$222,846
10.5	Contingency (15%)				$371,410
TOTAL OTHER COSTS					**$1,238,033**
TOTAL CAPITAL COST FOR ALTERNATIVE 7					**$3,714,099**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Ferry Boulevard Properties.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 2 or 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal.
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
FERRY BLVD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	28	HR	$110	$3,080	see cost assumptions
OM.1.3	Sampling Labor - Sampler	14	HR	$90	$1,260	see cost assumptions
OM.1.4	Analytical Costs	7	EA	$697	$4,880	see cost assumptions
OM.1.5	Data Validation	7	HR	$110	$770	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$13,262**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	54	MSF	$7.34	$396	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.27	MSF	$56.31	$15	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	7,150	SF	$1.81	$12,960	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	4	EA	$321.75	$1,287	see cost assumptions
	Subtotal				**$30,108**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	4	EA	$5,000.00	$20,000	see cost assumptions
	Subtotal				**$21,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$104,258**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$64,470**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Ferry Boulevard Properties.

[2] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[3] Assumed 5% of asphalt surfaces will require repair annually.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
FERRY BLVD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$13,326,601	$0	0	$13,326,601	7.0%	$13,326,601
1	$0	$104,258	$0	$104,258	7.0%	$97,437
2	$0	$104,258	$0	$104,258	7.0%	$91,063
3	$0	$64,470	$0	$64,470	7.0%	$52,627
4	$0	$64,470	$0	$64,470	7.0%	$49,184
5	$0	$64,470	$25,000	$89,470	7.0%	$63,791
6	$0	$64,470	$0	$64,470	7.0%	$42,959
7	$0	$64,470	$0	$64,470	7.0%	$40,149
8	$0	$64,470	$0	$64,470	7.0%	$37,522
9	$0	$64,470	$0	$64,470	7.0%	$35,068
10	$0	$64,470	$25,000	$89,470	7.0%	$45,482
11	$0	$64,470	$0	$64,470	7.0%	$30,629
12	$0	$64,470	$0	$64,470	7.0%	$28,626
13	$0	$64,470	$0	$64,470	7.0%	$26,753
14	$0	$64,470	$0	$64,470	7.0%	$25,003
15	$0	$64,470	$25,000	$89,470	7.0%	$32,428
16	$0	$64,470	$0	$64,470	7.0%	$21,838
17	$0	$64,470	$0	$64,470	7.0%	$20,410
18	$0	$64,470	$0	$64,470	7.0%	$19,074
19	$0	$64,470	$0	$64,470	7.0%	$17,827
20	$0	$64,470	$25,000	$89,470	7.0%	$23,121
21	$0	$64,470	$0	$64,470	7.0%	$15,570
22	$0	$64,470	$0	$64,470	7.0%	$14,552
23	$0	$64,470	$0	$64,470	7.0%	$13,600
24	$0	$64,470	$0	$64,470	7.0%	$12,710
25	$0	$64,470	$25,000	$89,470	7.0%	$16,485
26	$0	$64,470	$0	$64,470	7.0%	$11,102
27	$0	$64,470	$0	$64,470	7.0%	$10,375
28	$0	$64,470	$0	$64,470	7.0%	$9,697
29	$0	$64,470	$0	$64,470	7.0%	$9,062
30	$0	$64,470	$25,000	$89,470	7.0%	$11,753
TOTAL	**$13,326,601**	**$2,013,689**	**$150,000**	**$15,490,290**		**$14,252,499**
					PV O&M	**$925,899**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
FERRY BOULEVARD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	4	LS	$22,655	$90,618
	Subtotal				**$90,618**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	60	LF	$35.79	$2,147
2.3	Install PVC Well Screens (2" diameter)	40	LF	$19.69	$788
2.4	Install PVC Well Casing (2" diameter)	20	LF	$14.79	$296
2.5	Install Filter Pack	48	LF	$15.52	$745
2.6	Install Bentonite Seal	4	EA	$57.23	$229
2.7	Install Annular Seal	8	LF	$69.04	$552
2.8	PVC Well Plugs	4	EA	$27.86	$111
2.9	Flush-Mount Protective Cover with Locking Cap	4	EA	$451.55	$1,806
2.10	Surface Pad, Concrete 2' x 2'	4	EA	$154.79	$619
2.11	Well Development (2 HR/WELL)	8	EA	$228.23	$1,826
2.12	IDW Transportation/Disposal (drums)	4	EA	$508.52	$2,034
	Subtotal				**$13,906**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	2,692	LF	$27.57	$74,218
3.2	Signage	27	EA	$73.95	$1,997
	Subtotal				**$76,215**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	8	MONTH	$4,531	$36,247
	Subtotal				**$65,698**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	2	ACRE	$3,968.29	$7,937
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	2,692	LF	$8.97	$24,137
	Subtotal				**$52,744**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	14,593	CY	$2.12	$30,988
6.2	Haul RW to Stockpile Area[4]	17,511	CY	$4.00	$70,053
6.3	Perimeter Air Sampling	328	EA	$243.76	$80,040
6.4	Equipment Decontamination	730	HR	$54.56	$39,812
6.5	Stockpile Management	17,511	CY	$1.44	$25,166
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$246,059**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[5]	17,511	CY	$2.44	$42,764
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	730	HR	$54.56	$39,812
7.4	Out-of-Town Transportation of Waste[6]	26,267	TON	$170.00	$4,465,333
7.5	Out-of-Town Disposal of RW (no treatment)[6, 7]	23,640	TON	$107.10	$2,531,844
7.6	Out-of-Town Disposal of RW (treatment)[6, 7]	2,627	TON	$192.00	$504,320
	Subtotal				**$7,584,073**

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
FERRY BOULEVARD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	170,000	SF	$1.29	$219,300
8.8	Furnish, Place, and Spread Topsoil (6")[9]	550	CY	$34.65	$19,057
8.9	Hydroseeding with Mulch and Fertilizer	27	MSF	$43.97	$1,187
8.10	Place, Spread, and Compact Asphalt Base Course (12")	5,296	ECY	$9.35	$49,520
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	143,000	SF	$2.27	$324,610
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	6,233	CY	$11.83	$73,739
8.14	Install Nonwoven Geotextile Fabric	18,889	SY	$2.21	$41,744
	Subtotal				**$755,086**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$8,884,400**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$533,064
10.2	Engineering and Design (12%)				$1,066,128
10.3	Construction management (8%)				$710,752
10.4	Location Adjustment (9%)				$799,596
10.5	Contingency (15%)				$1,332,660
TOTAL OTHER COSTS					**$4,442,200**
TOTAL CAPITAL COST FOR ALTERNATIVE 8					**$13,326,601**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Ferry Boulevard Properties.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 2 or 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area for characterization includes a bulking factor of 1.2.
[5] Volume includes all RW intended for disposal.
[6] A conversion factor of 1.5 was used to convert CY to TON.
[7] Volume of RW for Out-of-Town disposal assumes that 10% would be hazardous requiring treatment prior to disposal.
[8] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[10] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

PRESENT VALUE ANALYSIS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
FERRY BLVD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate	Present Value
0	$5,484,294	$0	0	$5,484,294	7.0%	$5,484,294
1	$0	$104,258	$0	$104,258	7.0%	$97,437
2	$0	$104,258	$0	$104,258	7.0%	$91,063
3	$0	$64,470	$0	$64,470	7.0%	$52,627
4	$0	$64,470	$0	$64,470	7.0%	$49,184
5	$0	$64,470	$25,000	$89,470	7.0%	$63,791
6	$0	$64,470	$0	$64,470	7.0%	$42,959
7	$0	$64,470	$0	$64,470	7.0%	$40,149
8	$0	$64,470	$0	$64,470	7.0%	$37,522
9	$0	$64,470	$0	$64,470	7.0%	$35,068
10	$0	$64,470	$25,000	$89,470	7.0%	$45,482
11	$0	$64,470	$0	$64,470	7.0%	$30,629
12	$0	$64,470	$0	$64,470	7.0%	$28,626
13	$0	$64,470	$0	$64,470	7.0%	$26,753
14	$0	$64,470	$0	$64,470	7.0%	$25,003
15	$0	$64,470	$25,000	$89,470	7.0%	$32,428
16	$0	$64,470	$0	$64,470	7.0%	$21,838
17	$0	$64,470	$0	$64,470	7.0%	$20,410
18	$0	$64,470	$0	$64,470	7.0%	$19,074
19	$0	$64,470	$0	$64,470	7.0%	$17,827
20	$0	$64,470	$25,000	$89,470	7.0%	$23,121
21	$0	$64,470	$0	$64,470	7.0%	$15,570
22	$0	$64,470	$0	$64,470	7.0%	$14,552
23	$0	$64,470	$0	$64,470	7.0%	$13,600
24	$0	$64,470	$0	$64,470	7.0%	$12,710
25	$0	$64,470	$25,000	$89,470	7.0%	$16,485
26	$0	$64,470	$0	$64,470	7.0%	$11,102
27	$0	$64,470	$0	$64,470	7.0%	$10,375
28	$0	$64,470	$0	$64,470	7.0%	$9,697
29	$0	$64,470	$0	$64,470	7.0%	$9,062
30	$0	$64,470	$25,000	$89,470	7.0%	$11,753
TOTAL	**$5,484,294**	**$2,013,689**	**$150,000**	**$7,647,983**		**$6,410,192**
					PV O&M	**$925,899**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
FERRY BOULEVARD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	4	LS	$22,655	$90,618
	Subtotal				**$90,618**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	60	LF	$35.79	$2,147
2.3	Install PVC Well Screens (2" diameter)	40	LF	$19.69	$788
2.4	Install PVC Well Casing (2" diameter)	20	LF	$14.79	$296
2.5	Install Filter Pack	48	LF	$15.52	$745
2.6	Install Bentonite Seal	4	EA	$57.23	$229
2.7	Install Annular Seal	8	LF	$69.04	$552
2.8	PVC Well Plugs	4	EA	$27.86	$111
2.9	Flush-Mount Protective Cover with Locking Cap	4	EA	$451.55	$1,806
2.10	Surface Pad, Concrete 2' x 2'	4	EA	$154.79	$619
2.11	Well Development (2 HR/WELL)	8	EA	$228.23	$1,826
2.12	IDW Transportation/Disposal (drums)	4	EA	$508.52	$2,034
	Subtotal				**$13,906**
3.0	**Fencing and Signage[2]**				
3.1	Chain Link Fence	2,692	LF	$27.57	$74,218
3.2	Signage	27	EA	$73.95	$1,997
	Subtotal				**$76,215**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	12	MONTH	$4,531	$54,371
	Subtotal				**$83,822**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	2	ACRE	$3,968.29	$7,937
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	2,692	LF	$8.97	$24,137
	Subtotal				**$52,744**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
6.1	Excavate and Load RW[3]	25,185	CY	$2.12	$53,483
6.2	Haul RW to Stockpile Area[4]	30,222	CY	$4.00	$120,903
6.3	Perimeter Air Sampling	567	EA	$243.76	$138,140
6.4	Equipment Decontamination	1,259	HR	$54.56	$68,711
6.5	Stockpile Management	30,222	CY	$1.44	$43,434
6.6	Stockpile Characterization[5]	61	EA	$1,535.00	$93,635
	Subtotal				**$518,305**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks[6]	30,222	CY	$2.44	$73,806
7.2	Transport RW to in-town consolidation[7]	27,200	CY	$5.52	$150,237
7.3	Equipment Decontamination	1,259	HR	$54.56	$68,711
7.4	Out-of-Town Transportation of Waste[7, 8]	4,533	TON	$170.00	$770,667
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	4,533	TON	$192.00	$870,400
	Subtotal				**$1,933,821**

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
FERRY BOULEVARD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[9]	170,000	SF	$1.29	$219,300
8.8	Furnish, Place, and Spread Topsoil (6")[10]	280	CY	$34.65	$9,702
8.9	Hydroseeding with Mulch and Fertilizer	27	MSF	$43.97	$1,187
8.10	Place, Spread, and Compact Asphalt Base Course (12")	5296	ECY	$9.35	$49,520
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	143000	SF	$2.27	$324,610
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	18155	CY	$11.83	$214,772
8.14	Install Nonwoven Geotextile Fabric	18889	SY	$2.21	$41,744
	Subtotal				**$886,764**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$3,656,196**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$219,372
10.2	Engineering and Design (12%)				$438,743
10.3	Construction management (8%)				$292,496
10.4	Location Adjustment (9%)				$329,058
10.5	Contingency (15%)				$548,429
TOTAL OTHER COSTS					**$1,828,098**
TOTAL CAPITAL COST FOR ALTERNATIVE 9					**$5,484,294**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Ferry Boulevard Properties.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal.
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

PRESENT VALUE ANALYSIS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
FERRY BLVD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$22,077,005	$0	0	$22,077,005	7.0%	$22,077,005
1	$0	$104,258	$0	$104,258	7.0%	$97,437
2	$0	$104,258	$0	$104,258	7.0%	$91,063
3	$0	$64,470	$0	$64,470	7.0%	$52,627
4	$0	$64,470	$0	$64,470	7.0%	$49,184
5	$0	$64,470	$25,000	$89,470	7.0%	$63,791
6	$0	$64,470	$0	$64,470	7.0%	$42,959
7	$0	$64,470	$0	$64,470	7.0%	$40,149
8	$0	$64,470	$0	$64,470	7.0%	$37,522
9	$0	$64,470	$0	$64,470	7.0%	$35,068
10	$0	$64,470	$25,000	$89,470	7.0%	$45,482
11	$0	$64,470	$0	$64,470	7.0%	$30,629
12	$0	$64,470	$0	$64,470	7.0%	$28,626
13	$0	$64,470	$0	$64,470	7.0%	$26,753
14	$0	$64,470	$0	$64,470	7.0%	$25,003
15	$0	$64,470	$25,000	$89,470	7.0%	$32,428
16	$0	$64,470	$0	$64,470	7.0%	$21,838
17	$0	$64,470	$0	$64,470	7.0%	$20,410
18	$0	$64,470	$0	$64,470	7.0%	$19,074
19	$0	$64,470	$0	$64,470	7.0%	$17,827
20	$0	$64,470	$25,000	$89,470	7.0%	$23,121
21	$0	$64,470	$0	$64,470	7.0%	$15,570
22	$0	$64,470	$0	$64,470	7.0%	$14,552
23	$0	$64,470	$0	$64,470	7.0%	$13,600
24	$0	$64,470	$0	$64,470	7.0%	$12,710
25	$0	$64,470	$25,000	$89,470	7.0%	$16,485
26	$0	$64,470	$0	$64,470	7.0%	$11,102
27	$0	$64,470	$0	$64,470	7.0%	$10,375
28	$0	$64,470	$0	$64,470	7.0%	$9,697
29	$0	$64,470	$0	$64,470	7.0%	$9,062
30	$0	$64,470	$25,000	$89,470	7.0%	$11,753
TOTAL	**$22,077,005**	**$2,013,689**	**$150,000**	**$24,240,694**		**$23,002,904**
					PV O&M	**$925,899**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
FERRY BOULEVARD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	4	LS	$22,655	$90,618
	Subtotal				**$90,618**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	60	LF	$35.79	$2,147
2.3	Install PVC Well Screens (2" diameter)	40	LF	$19.69	$788
2.4	Install PVC Well Casing (2" diameter)	20	LF	$14.79	$296
2.5	Install Filter Pack	48	LF	$15.52	$745
2.6	Install Bentonite Seal	4	EA	$57.23	$229
2.7	Install Annular Seal	8	LF	$69.04	$552
2.8	PVC Well Plugs	4	EA	$27.86	$111
2.9	Flush-Mount Protective Cover with Locking Cap	4	EA	$451.55	$1,806
2.10	Surface Pad, Concrete 2' x 2'	4	EA	$154.79	$619
2.11	Well Development (2 HR/WELL)	8	EA	$228.23	$1,826
2.12	IDW Transportation/Disposal (drums)	4	EA	$508.52	$2,034
	Subtotal				**$13,906**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	2,692	LF	$27.57	$74,218
3.2	Signage	27	EA	$73.95	$1,997
	Subtotal				**$76,215**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	12	MONTH	$4,531	$54,371
	Subtotal				**$83,822**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	2	ACRE	$3,968.29	$7,937
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	2,692	LF	$8.97	$24,137
	Subtotal				**$52,744**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	25,185	CY	$2.12	$53,483
6.2	Haul RW to Stockpile Area[4]	30,222	CY	$4.00	$120,903
6.3	Perimeter Air Sampling	567	EA	$243.76	$138,140
6.4	Equipment Decontamination	1,259	HR	$54.56	$68,711
6.5	Stockpile Management	30,222	CY	$1.44	$43,434
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$424,670**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[5]	30,222	CY	$2.44	$73,806
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	1,259	HR	$54.56	$68,711
7.4	Out-of-Town Transportation of Waste[6]	45,333	TON	$170.00	$7,706,667
7.5	Out-of-Town Disposal of RW (no treatment)[6, 7]	40,800	TON	$107.10	$4,369,680
7.6	Out-of-Town Disposal of RW (treatment)[6, 7]	4,533	TON	$192.00	$870,400
	Subtotal				**$13,089,264**

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
FERRY BOULEVARD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	170,000	SF	$1.29	$219,300
8.8	Furnish, Place, and Spread Topsoil (6")[9]	280	CY	$34.65	$9,702
8.9	Hydroseeding with Mulch and Fertilizer	27	MSF	$43.97	$1,187
8.10	Place, Spread, and Compact Asphalt Base Course (12")	5,296	ECY	$9.35	$49,520
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	143,000	SF	$2.27	$324,610
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	18,155	CY	$11.83	$214,772
8.14	Install Nonwoven Geotextile Fabric	18,889	SY	$2.21	$41,744
	Subtotal				**$886,764**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$14,718,003**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$883,080
10.2	Engineering and Design (12%)				$1,766,160
10.3	Construction management (8%)				$1,177,440
10.4	Location Adjustment (9%)				$1,324,620
10.5	Contingency (15%)				$2,207,701
TOTAL OTHER COSTS					**$7,359,002**
TOTAL CAPITAL COST FOR ALTERNATIVE 10					**$22,077,005**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Ferry Boulevard Properties.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Volume includes all RW intended for disposal.
[6] A conversion factor of 1.5 was used to convert CY to TON.
[7] Volume of RW for Out-of-Town disposal assumes that 10% would be hazardous requiring treatment prior to disposal.
[8] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[10] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

G-4

LOT BEHIND 326 FERRY BOULEVARD AND VACANT LOT AT HOUSATONIC AVENUE

COST ESTIMATE BACKUP SHEETS

PRESENT VALUE ANALYSIS
ALTERNATIVE 1 - NO ACTION
LOT BEHIND 326 FERRY BLVD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$15,000	$15,000	7.0%	$10,695
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$15,000	$15,000	7.0%	$7,625
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$15,000	$15,000	7.0%	$5,437
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$15,000	$15,000	7.0%	$3,876
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$15,000	$15,000	7.0%	$2,764
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$15,000	$15,000	7.0%	$1,971
TOTAL	**$0**	**$0**	**$90,000**	**$90,000**		**$32,367**
					PV O&M	**$32,367**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
LOT BEHIND 326 FERRY BLVD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review [1]	Total	Discount Rate[2]	Present Value
0	$86,948	$0	$0	$86,948	7.0%	$86,948
1	$0	$73,157	$0	$73,157	7.0%	$68,371
2	$0	$73,157	$0	$73,157	7.0%	$63,898
3	$0	$41,932	$0	$41,932	7.0%	$34,229
4	$0	$41,932	$0	$41,932	7.0%	$31,990
5	$0	$41,932	$15,000	$56,932	7.0%	$40,592
6	$0	$41,932	$0	$41,932	7.0%	$27,941
7	$0	$41,932	$0	$41,932	7.0%	$26,113
8	$0	$41,932	$0	$41,932	7.0%	$24,405
9	$0	$41,932	$0	$41,932	7.0%	$22,808
10	$0	$41,932	$15,000	$56,932	7.0%	$28,941
11	$0	$41,932	$0	$41,932	7.0%	$19,922
12	$0	$41,932	$0	$41,932	7.0%	$18,618
13	$0	$41,932	$0	$41,932	7.0%	$17,400
14	$0	$41,932	$0	$41,932	7.0%	$16,262
15	$0	$41,932	$15,000	$56,932	7.0%	$20,635
16	$0	$41,932	$0	$41,932	7.0%	$14,204
17	$0	$41,932	$0	$41,932	7.0%	$13,275
18	$0	$41,932	$0	$41,932	7.0%	$12,406
19	$0	$41,932	$0	$41,932	7.0%	$11,595
20	$0	$41,932	$15,000	$56,932	7.0%	$14,712
21	$0	$41,932	$0	$41,932	7.0%	$10,127
22	$0	$41,932	$0	$41,932	7.0%	$9,465
23	$0	$41,932	$0	$41,932	7.0%	$8,845
24	$0	$41,932	$0	$41,932	7.0%	$8,267
25	$0	$41,932	$15,000	$56,932	7.0%	$10,490
26	$0	$41,932	$0	$41,932	7.0%	$7,221
27	$0	$41,932	$0	$41,932	7.0%	$6,748
28	$0	$41,932	$0	$41,932	7.0%	$6,307
29	$0	$41,932	$0	$41,932	7.0%	$5,894
30	$0	$41,932	$15,000	$56,932	7.0%	$7,479
TOTAL	**$86,948**	**$1,320,416**	**$90,000**	**$1,497,364**		**$696,109**
					PV O&M	**$609,161**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
LOT BEHIND 326 FERRY BOULEVARD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	2	LS	$22,655	$45,309
	Subtotal				**$45,309**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	30	LF	$35.79	$1,074
2.3	Install PVC Well Screens (2" diameter)	20	LF	$19.69	$394
2.4	Install PVC Well Casing (2" diameter)	10	LF	$14.79	$148
2.5	Install Filter Pack	24	LF	$15.52	$372
2.6	Install Bentonite Seal	2	EA	$57.23	$114
2.7	Install Annular Seal	4	LF	$69.04	$276
2.8	PVC Well Plugs	2	EA	$27.86	$56
2.9	Flush-Mount Protective Cover with Locking Cap	2	EA	$451.55	$903
2.10	Surface Pad, Concrete 2' x 2'	2	EA	$154.79	$310
2.11	Well Development (2 HR/WELL)	4	EA	$228.23	$913
2.12	IDW Transportation/Disposal (drums)	2	EA	$508.52	$1,017
	Subtotal				**$8,330**
3.0 Fencing and Signage					
3.1	Chain Link Fence	1,176	LF	$27.57	$32,422
3.2	Signage	12	EA	$73.95	$887
	Subtotal				**$33,310**
TOTAL DIRECT COSTS					**$86,948**
TOTAL CAPITAL COST FOR ALTERNATIVE 2					**$86,948**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue Property.
PVC = polyvinyl chloride
IDW = investigation derived waste
LS = lump sum
EA = each
LF = linear foot

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
LOT BEHIND 326 FERRY BLVD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	20	HR	$110	$2,200	see cost assumptions
OM.1.3	Sampling Labor - Sampler	10	HR	$90	$900	see cost assumptions
OM.1.4	Analytical Costs	5	EA	$697	$3,486	see cost assumptions
OM.1.5	Data Validation	5	HR	$110	$550	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$10,408**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.39	MSF	$56.31	$22	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	39	LF	$27.57	$1,081	see cost assumptions
OM 2.6	Sign Replacement[5]	48	EA	$73.95	$3,550	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	1	EA	$321.75	$322	see cost assumptions
	Subtotal				**$20,424**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	2	EA	$5,000	$10,000	see cost assumptions
	Subtotal				**$11,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$73,157**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$41,932**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue Property.

[2] Estimated that 1% of vegetated surfaces would require repair annually (need for repair to be established during 5-Year Reviews).

[3] Assume that there is no Raymark waste below paved surfaces at this property group.

[4] Estimated that 100% of fencing would require replacement over the period of O&M (need for repair to be established during 5-Year Reviews).

[5] Estimated that signage would require replacement 4 times over the period of O&M (need for repair to be established during 5-Year Reviews).

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
LOT BEHIND 326 FERRY BLVD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$1,905,640	$0	$0	$1,905,640	7.0%	$1,905,640
1	$0	$70,062	$0	$70,062	7.0%	$65,479
2	$0	$70,062	$0	$70,062	7.0%	$61,195
3	$0	$38,838	$0	$38,838	7.0%	$31,703
4	$0	$38,838	$0	$38,838	7.0%	$29,629
5	$0	$38,838	$15,000	$53,838	7.0%	$38,385
6	$0	$38,838	$0	$38,838	7.0%	$25,879
7	$0	$38,838	$0	$38,838	7.0%	$24,186
8	$0	$38,838	$0	$38,838	7.0%	$22,604
9	$0	$38,838	$0	$38,838	7.0%	$21,125
10	$0	$38,838	$15,000	$53,838	7.0%	$27,368
11	$0	$38,838	$0	$38,838	7.0%	$18,451
12	$0	$38,838	$0	$38,838	7.0%	$17,244
13	$0	$38,838	$0	$38,838	7.0%	$16,116
14	$0	$38,838	$0	$38,838	7.0%	$15,062
15	$0	$38,838	$15,000	$53,838	7.0%	$19,513
16	$0	$38,838	$0	$38,838	7.0%	$13,156
17	$0	$38,838	$0	$38,838	7.0%	$12,295
18	$0	$38,838	$0	$38,838	7.0%	$11,491
19	$0	$38,838	$0	$38,838	7.0%	$10,739
20	$0	$38,838	$15,000	$53,838	7.0%	$13,913
21	$0	$38,838	$0	$38,838	7.0%	$9,380
22	$0	$38,838	$0	$38,838	7.0%	$8,766
23	$0	$38,838	$0	$38,838	7.0%	$8,193
24	$0	$38,838	$0	$38,838	7.0%	$7,657
25	$0	$38,838	$15,000	$53,838	7.0%	$9,920
26	$0	$38,838	$0	$38,838	7.0%	$6,688
27	$0	$38,838	$0	$38,838	7.0%	$6,250
28	$0	$38,838	$0	$38,838	7.0%	$5,841
29	$0	$38,838	$0	$38,838	7.0%	$5,459
30	$0	$38,838	$15,000	$53,838	7.0%	$7,072
TOTAL	**$1,905,640**	**$1,227,575**	**$90,000**	**$3,223,216**		**$2,476,399**
					PV O&M	**$570,758**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
LOT BEHIND 326 FERRY BOULEVARD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	2	LS	$22,655	$45,309
	Subtotal				**$45,309**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	30	LF	$35.79	$1,074
2.3	Install PVC Well Screens (2" diameter)	20	LF	$19.69	$394
2.4	Install PVC Well Casing (2" diameter)	10	LF	$14.79	$148
2.5	Install Filter Pack	24	LF	$15.52	$372
2.6	Install Bentonite Seal	2	EA	$57.23	$114
2.7	Install Annular Seal	4	LF	$69.04	$276
2.8	PVC Well Plugs	2	EA	$27.86	$56
2.9	Flush-Mount Protective Cover with Locking Cap	2	EA	$451.55	$903
2.10	Surface Pad, Concrete 2' x 2'	2	EA	$154.79	$310
2.11	Well Development (2 HR/WELL)	4	EA	$228.23	$913
2.12	IDW Transportation/Disposal (drums)	2	EA	$508.52	$1,017
	Subtotal				**$8,330**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	1,176	LF	$27.57	$32,422
3.2	Signage	12	EA	$73.95	$887
	Subtotal				**$33,310**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	6	MONTH	$4,531	$27,185
	Subtotal				**$56,636**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	2	ACRE	$3,968.29	$7,937
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	1,176	LF	$8.97	$10,544
	Subtotal				**$39,152**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil[3]	6,667	CY	$2.12	$14,157
6.2	Haul RW/Soil to Stockpile Area[4]	8,000	CY	$4.00	$32,004
6.3	Perimeter Air Sampling	150	EA	$243.76	$36,566
6.4	Equipment Decontamination	333	HR	$54.56	$18,188
6.5	Stockpile Management	8,000	CY	$1.44	$11,497
6.6	Stockpile Characterization[5]	16	EA	$1,535.00	$24,560
	Subtotal				**$136,973**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	5,200	CY	$2.44	$12,699
7.2	Transport RW to in-town consolidation[7]	4,680	CY	$5.52	$25,850
7.3	Equipment Decontamination	333	HR	$54.56	$18,188
7.4	Out-of-Town Transportation of Waste[7, 8]	780	TON	$170.00	$132,600
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)[7, 8]	780	TON	$192.00	$149,760
	Subtotal				**$339,097**

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
LOT BEHIND 326 FERRY BOULEVARD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver,Place and Compact RW/Soil Excavated Material[9]	2,520	CY	$2.40	$6,054
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[9]	1,222	CY	$27.00	$32,994
8.3	Install Geosynthetic Clay Liner (bottom layer)	60,000	SF	$2.86	$171,748
8.4	Install 60 mil HDPE liner	60,000	SF	$2.84	$170,513
8.5	Install Geosynthetic Drainage Layer	60,000	SF	$0.65	$39,239
8.6	Furnish, Spread, and Compact Soil Layer (24")[9]	2,369	CY	$11.83	$28,023
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	60,000	SF	$1.29	$77,400
8.8	Furnish, Place, and Spread Topsoil (6")[9]	1,222	CY	$34.65	$42,350
8.9	Hydroseeding with Mulch and Fertilizer	60	MSF	$43.97	$2,638
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	6,667	SY	$2.21	$14,733
	Subtotal				**$611,621**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$1,270,427**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$76,226
10.2	Engineering and Design (12%)				$152,451
10.3	Construction management (8%)				$101,634
10.4	Location Adjustment (9%)				$114,338
10.5	Contingency (15%)				$190,564
TOTAL OTHER COSTS					**$635,213**
TOTAL CAPITAL COST FOR ALTERNATIVE 3					**$1,905,640**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue Property.

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to be excavated to a depth of 3-ft below ground surface and additional non-RW soil required to faciliate cap construction.

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less additionally excavated soil),

[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[8] A conversion factor of 1.5 was used to convert CY to TON.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use on-site pending analytical results for PHCs and was deducted from backfill estimates.

[10] Impacts to floodplains would be evaluated during Remedial Design and will require compensation via backfill material selection to ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
LOT BEHIND 326 FERRY BLVD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0	**Groundwater Monitoring (per event)**					
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	20	HR	$110	$2,200	see cost assumptions
OM.1.3	Sampling Labor - Sampler	10	HR	$90	$900	see cost assumptions
OM.1.4	Analytical Costs	5	EA	$697	$3,486	see cost assumptions
OM.1.5	Data Validation	5	HR	$110	$550	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$10,408**	
OM.2.0	**Ground Surface Inspections, Maintenance, and Repairs (per year)**					
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	120	MSF	$7.34	$880	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.60	MSF	$56.31	$34	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	3	EA	$321.75	$965	see cost assumptions
	Subtotal				**$17,329**	
OM.3.0	**Deed Restrictions**					
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	2	EA	$5,000	$10,000	see cost assumptions
	Subtotal				**$11,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$70,062**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$38,838**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue

[2] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[3] Assume that there is no Raymark waste below paved surfaces at this property group.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
LOT BEHIND 326 FERRY BLVD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$4,761,704	$0	0	$4,761,704	7.0%	$4,761,704
1	$0	$70,062	$0	$70,062	7.0%	$65,479
2	$0	$70,062	$0	$70,062	7.0%	$61,195
3	$0	$38,838	$0	$38,838	7.0%	$31,703
4	$0	$38,838	$0	$38,838	7.0%	$29,629
5	$0	$38,838	$15,000	$53,838	7.0%	$38,385
6	$0	$38,838	$0	$38,838	7.0%	$25,879
7	$0	$38,838	$0	$38,838	7.0%	$24,186
8	$0	$38,838	$0	$38,838	7.0%	$22,604
9	$0	$38,838	$0	$38,838	7.0%	$21,125
10	$0	$38,838	$15,000	$53,838	7.0%	$27,368
11	$0	$38,838	$0	$38,838	7.0%	$18,451
12	$0	$38,838	$0	$38,838	7.0%	$17,244
13	$0	$38,838	$0	$38,838	7.0%	$16,116
14	$0	$38,838	$0	$38,838	7.0%	$15,062
15	$0	$38,838	$15,000	$53,838	7.0%	$19,513
16	$0	$38,838	$0	$38,838	7.0%	$13,156
17	$0	$38,838	$0	$38,838	7.0%	$12,295
18	$0	$38,838	$0	$38,838	7.0%	$11,491
19	$0	$38,838	$0	$38,838	7.0%	$10,739
20	$0	$38,838	$15,000	$53,838	7.0%	$13,913
21	$0	$38,838	$0	$38,838	7.0%	$9,380
22	$0	$38,838	$0	$38,838	7.0%	$8,766
23	$0	$38,838	$0	$38,838	7.0%	$8,193
24	$0	$38,838	$0	$38,838	7.0%	$7,657
25	$0	$38,838	$15,000	$53,838	7.0%	$9,920
26	$0	$38,838	$0	$38,838	7.0%	$6,688
27	$0	$38,838	$0	$38,838	7.0%	$6,250
28	$0	$38,838	$0	$38,838	7.0%	$5,841
29	$0	$38,838	$0	$38,838	7.0%	$5,459
30	$0	$38,838	$15,000	$53,838	7.0%	$7,072
TOTAL	**$4,761,704**	**$1,227,575**	**$90,000**	**$6,079,279**		**$5,332,462**
					PV O&M	**$570,758**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
LOT BEHIND 326 FERRY BOULEVARD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	2	LS	$22,655	$45,309
	Subtotal				**$45,309**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	30	LF	$35.79	$1,074
2.3	Install PVC Well Screens (2" diameter)	20	LF	$19.69	$394
2.4	Install PVC Well Casing (2" diameter)	10	LF	$14.79	$148
2.5	Install Filter Pack	24	LF	$15.52	$372
2.6	Install Bentonite Seal	2	EA	$57.23	$114
2.7	Install Annular Seal	4	LF	$69.04	$276
2.8	PVC Well Plugs	2	EA	$27.86	$56
2.9	Flush-Mount Protective Cover with Locking Cap	2	EA	$451.55	$903
2.10	Surface Pad, Concrete 2' x 2'	2	EA	$154.79	$310
2.11	Well Development (2 HR/WELL)	4	EA	$228.23	$913
2.12	IDW Transportation/Disposal (drums)	2	EA	$508.52	$1,017
	Subtotal				**$8,330**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	1,176	LF	$27.57	$32,422
3.2	Signage	12	EA	$73.95	$887
	Subtotal				**$33,310**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	6	MONTH	$4,531	$27,185
	Subtotal				**$56,636**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	2	ACRE	$3,968.29	$7,937
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	1,176	LF	$8.97	$10,544
	Subtotal				**$39,152**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil[3]	6,667	CY	$2.12	$14,157
6.2	Haul RW/Soil to Stockpile Area[4]	8,000	CY	$4.00	$32,004
6.3	Perimeter Air Sampling	150	EA	$243.76	$36,566
6.4	Equipment Decontamination	333	HR	$54.56	$18,188
6.5	Stockpile Management	8,000	CY	$1.44	$11,497
6.6	Stockpile Characterization[5]	6	EA	$1,535.00	$9,210
	Subtotal				**$121,623**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load Raymark Waste into Trucks[6]	5,200	CY	$2.44	$12,699
7.2	Transport Raymark Waste to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	333	HR	$54.56	$18,188
7.4	Out-of-Town Transportation of Waste[7]	7,800	TON	$170.00	$1,326,000
7.5	Out-of-Town Disposal of Waste (no treatment)[7, 8]	7,020	TON	$107.10	$751,842
7.6	Out-of-Town Treatment of Raymark Waste[7, 8]	780	TON	$192.00	$149,760
	Subtotal				**$2,258,489**

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
LOT BEHIND 326 FERRY BOULEVARD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver,Place and Compact RW/Soil Excavated Material[9]	2,520	CY	$2.40	$6,054
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[9]	1,222	CY	$27.00	$32,994
8.3	Install Geosynthetic Clay Liner (bottom layer)	60,000	SF	$2.86	$171,748
8.4	Install 60 mil HDPE liner	60,000	SF	$2.84	$170,513
8.5	Install Geosynthetic Drainage Layer	60,000	SF	$0.65	$39,239
8.6	Furnish, Spread, and Compact Soil Layer (24")[9]	2,369	CY	$11.83	$28,023
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	60,000	SF	$1.29	$77,400
8.8	Furnish, Place, and Spread Topsoil (6")[9]	1,222	CY	$34.65	$42,350
8.9	Hydroseeding with Mulch and Fertilizer	60	MSF	$43.97	$2,638
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	6,667	SY	$2.21	$14,733
	Subtotal				**$611,621**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$3,174,469**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$190,468
10.2	Engineering and Design (12%)				$380,936
10.3	Construction management (8%)				$253,958
10.4	Location Adjustment (9%)				$285,702
10.5	Contingency (15%)				$476,170
TOTAL OTHER COSTS					**$1,587,235**
TOTAL CAPITAL COST FOR ALTERNATIVE 4					**$4,761,704**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue Property.

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to be excavated to a depth of 3-ft below ground surface and additional non-RW soil required to faciliate cap construction.

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500).

[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less additionally excavated soil).

[7] A conversion factor of 1.5 was used to convert CY to TON.

[8] Volume of RW for disposal assumes 10% would be hazardous requiring treatment prior to disposal.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use on-site pending analytical results for PHCs and was deducted from backfill estimates.

[10] Impacts to floodplains would be evaluated during Remedial Design and will require compensation via backfill material selection to ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
LOT BEHIND 326 FERRY BLVD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$1,888,290	$0	$0	$1,888,290	7.0%	$1,888,290
1	$0	$56,431	$0	$56,431	7.0%	$52,739
2	$0	$56,431	$0	$56,431	7.0%	$49,289
3	$0	$14,798	$0	$14,798	7.0%	$12,080
4	$0	$14,798	$0	$14,798	7.0%	$11,289
5	$0	$14,798	$15,000	$29,798	7.0%	$21,246
6	$0	$14,798	$0	$14,798	7.0%	$9,861
7	$0	$14,798	$0	$14,798	7.0%	$9,216
8	$0	$14,798	$0	$14,798	7.0%	$8,613
9	$0	$14,798	$0	$14,798	7.0%	$8,049
10	$0	$14,798	$15,000	$29,798	7.0%	$15,148
11	$0	$14,798	$0	$14,798	7.0%	$7,030
12	$0	$14,798	$0	$14,798	7.0%	$6,571
13	$0	$14,798	$0	$14,798	7.0%	$6,141
14	$0	$14,798	$0	$14,798	7.0%	$5,739
15	$0	$14,798	$15,000	$29,798	7.0%	$10,800
16	$0	$14,798	$0	$14,798	7.0%	$5,013
17	$0	$14,798	$0	$14,798	7.0%	$4,685
18	$0	$14,798	$0	$14,798	7.0%	$4,378
19	$0	$14,798	$0	$14,798	7.0%	$4,092
20	$0	$14,798	$15,000	$29,798	7.0%	$7,700
21	$0	$14,798	$0	$14,798	7.0%	$3,574
22	$0	$14,798	$0	$14,798	7.0%	$3,340
23	$0	$14,798	$0	$14,798	7.0%	$3,122
24	$0	$14,798	$0	$14,798	7.0%	$2,917
25	$0	$14,798	$15,000	$29,798	7.0%	$5,490
26	$0	$14,798	$0	$14,798	7.0%	$2,548
27	$0	$14,798	$0	$14,798	7.0%	$2,381
28	$0	$14,798	$0	$14,798	7.0%	$2,226
29	$0	$14,798	$0	$14,798	7.0%	$2,080
30	$0	$14,798	$15,000	$29,798	7.0%	$3,914
TOTAL	**$1,888,290**	**$527,209**	**$90,000**	**$2,505,499**		**$2,179,560**
					PV O&M	**$291,270**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
LOT BEHIND 326 FERRY BOULEVARD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	2	LS	$22,655	$45,309
	Subtotal				**$45,309**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	30	LF	$35.79	$1,074
2.3	Install PVC Well Screens (2" diameter)	20	LF	$19.69	$394
2.4	Install PVC Well Casing (2" diameter)	10	LF	$14.79	$148
2.5	Install Filter Pack	24	LF	$15.52	$372
2.6	Install Bentonite Seal	2	EA	$57.23	$114
2.7	Install Annular Seal	4	LF	$69.04	$276
2.8	PVC Well Plugs	2	EA	$27.86	$56
2.9	Flush-Mount Protective Cover with Locking Cap	2	EA	$451.55	$903
2.10	Surface Pad, Concrete 2' x 2'	2	EA	$154.79	$310
2.11	Well Development (2 HR/WELL)	4	EA	$228.23	$913
2.12	IDW Transportation/Disposal (drums)	2	EA	$508.52	$1,017
	Subtotal				**$8,330**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	1,176	LF	$27.57	$32,422
3.2	Signage	12	EA	$73.95	$887
	Subtotal				**$33,310**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	6	MONTH	$4,531	$27,185
	Subtotal				**$56,636**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	2	ACRE	$3,968.29	$7,937
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	1,176	LF	$8.97	$10,544
	Subtotal				**$39,152**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[3]	9,244	CY	$2.12	$19,631
6.2	Haul RW/Soil to Stockpile Area[4]	11,093	CY	$4.00	$44,379
6.3	Perimeter Air Sampling	208	EA	$243.76	$50,705
6.4	Equipment Decontamination	462	HR	$54.56	$25,221
6.5	Stockpile Management	11,093	CY	$1.44	$15,943
6.6	Stockpile Characterization[5]	23	EA	$1,535.00	$35,305
	Subtotal				**$191,184**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	10,400	CY	$2.44	$25,398
7.2	Transport RW to in-town consolidation[7]	9,360	CY	$5.52	$51,699
7.3	Equipment Decontamination	462	HR	$54.56	$25,221
7.4	Out-of-Town Transportation of Waste[7, 8]	1,560	TON	$170.00	$265,200
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)[7, 8]	1,560	TON	$192.00	$299,520
	Subtotal				**$667,038**

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
LOT BEHIND 326 FERRY BOULEVARD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[9]	624	CY	$2.40	$1,499
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[10]	39,000	SF	$1.29	$50,310
8.8	Furnish, Place, and Spread Topsoil (6")[9]	953	CY	$34.65	$33,033
8.9	Hydroseeding with Mulch and Fertilizer	47	MSF	$43.97	$2,058
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[8]	8,592	CY	$11.83	$101,636
8.14	Install Nonwoven Geotextile Fabric	1,556	SY	$2.21	$3,438
	Subtotal				**$217,902**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$1,258,860**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$75,532
10.2	Engineering and Design (12%)				$151,063
10.3	Construction management (8%)				$100,709
10.4	Location Adjustment (9%)				$113,297
10.5	Contingency (15%)				$188,829
TOTAL OTHER COSTS					**$629,430**
TOTAL CAPITAL COST FOR ALTERNATIVE 5					**$1,888,290**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to excavated to a depth of 6-ft below ground surface and additional soil that would be required to be removed to facilitate compliance with safety standards for benching/sloping.

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[8] A conversion factor of 1.5 was used to convert CY to TON.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[10] Delineation ("warning") layer included for excavation area where waste is left-in-place.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
LOT BEHIND 326 FERRY BLVD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	20	HR	$110	$2,200	see cost assumptions
OM.1.3	Sampling Labor - Sampler	10	HR	$90	$900	see cost assumptions
OM.1.4	Analytical Costs	5	EA	$697	$3,486	see cost assumptions
OM.1.5	Data Validation	5	HR	$110	$550	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$10,408**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	10	HR	$110.00	$1,100	see cost assumptions
OM.2.2	Mowing (twice per year)[2]	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[3]	0.47	MSF	$56.31	$26	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[4]	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[5]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[6]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	1	EA	$321.75	$322	see cost assumptions
	Subtotal				**$3,698**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	2	EA	$5,000.00	$10,000	see cost assumptions
	Subtotal				**$11,100**	
ANNUAL O&M COST (YEARS 1-2)[7]					**$56,431**	
ANNUAL O&M COST (YEARS 3-30)[8]					**$14,798**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue Property.

[2] Mowing would not be required for excavation of Raymark waste to the seasonal high groundwater table.

[3] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[4] Assume that there is no Raymark waste below paved surfaces at this property group.

[5] Assume fencing will not be required following remedial action.

[6] Assume signage will not be required following remedial action.

[7] O&M for Years 1 and 2 include quarterly groundwater monitoring with annual inspection/repairs of ground surface and annual deed inspection, with one annual report for all O&M activities.

[8] O&M for Years 3 - 30 include annual inspection and repairs to ground surface and annual deed inspection, but may not require additional groundwater sampling pending analytical data and concurrence from the State following the first 2 years of data collection, therefore additional groundwater sampling is not included.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
LOT BEHIND 326 FERRY BLVD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$7,598,115	$0	$0	$7,598,115	7.0%	$7,598,115
1	$0	$56,431	$0	$56,431	7.0%	$52,739
2	$0	$56,431	$0	$56,431	7.0%	$49,289
3	$0	$14,798	$0	$14,798	7.0%	$12,080
4	$0	$14,798	$0	$14,798	7.0%	$11,289
5	$0	$14,798	$15,000	$29,798	7.0%	$21,246
6	$0	$14,798	$0	$14,798	7.0%	$9,861
7	$0	$14,798	$0	$14,798	7.0%	$9,216
8	$0	$14,798	$0	$14,798	7.0%	$8,613
9	$0	$14,798	$0	$14,798	7.0%	$8,049
10	$0	$14,798	$15,000	$29,798	7.0%	$15,148
11	$0	$14,798	$0	$14,798	7.0%	$7,030
12	$0	$14,798	$0	$14,798	7.0%	$6,571
13	$0	$14,798	$0	$14,798	7.0%	$6,141
14	$0	$14,798	$0	$14,798	7.0%	$5,739
15	$0	$14,798	$15,000	$29,798	7.0%	$10,800
16	$0	$14,798	$0	$14,798	7.0%	$5,013
17	$0	$14,798	$0	$14,798	7.0%	$4,685
18	$0	$14,798	$0	$14,798	7.0%	$4,378
19	$0	$14,798	$0	$14,798	7.0%	$4,092
20	$0	$14,798	$15,000	$29,798	7.0%	$7,700
21	$0	$14,798	$0	$14,798	7.0%	$3,574
22	$0	$14,798	$0	$14,798	7.0%	$3,340
23	$0	$14,798	$0	$14,798	7.0%	$3,122
24	$0	$14,798	$0	$14,798	7.0%	$2,917
25	$0	$14,798	$15,000	$29,798	7.0%	$5,490
26	$0	$14,798	$0	$14,798	7.0%	$2,548
27	$0	$14,798	$0	$14,798	7.0%	$2,381
28	$0	$14,798	$0	$14,798	7.0%	$2,226
29	$0	$14,798	$0	$14,798	7.0%	$2,080
30	$0	$14,798	$15,000	$29,798	7.0%	$3,914
TOTAL	**$7,598,115**	**$527,209**	**$90,000**	**$8,215,323**		**$7,889,385**
					PV O&M	**$291,270**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
LOT BEHIND 326 FERRY BOULEVARD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	2	LS	$22,655	$45,309
	Subtotal				**$45,309**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	30	LF	$35.79	$1,074
2.3	Install PVC Well Screens (2" diameter)	20	LF	$19.69	$394
2.4	Install PVC Well Casing (2" diameter)	10	LF	$14.79	$148
2.5	Install Filter Pack	24	LF	$15.52	$372
2.6	Install Bentonite Seal	2	EA	$57.23	$114
2.7	Install Annular Seal	4	LF	$69.04	$276
2.8	PVC Well Plugs	2	EA	$27.86	$56
2.9	Flush-Mount Protective Cover with Locking Cap	2	EA	$451.55	$903
2.10	Surface Pad, Concrete 2' x 2'	2	EA	$154.79	$310
2.11	Well Development (2 HR/WELL)	4	EA	$228.23	$913
2.12	IDW Transportation/Disposal (drums)	2	EA	$508.52	$1,017
	Subtotal				**$8,330**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	1,176	LF	$27.57	$32,422
3.2	Signage	12	EA	$73.95	$887
	Subtotal				**$33,310**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	6	MONTH	$4,531	$27,185
	Subtotal				**$56,636**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	2	ACRE	$3,968.29	$7,937
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	1176	LF	$8.97	$10,544
	Subtotal				**$39,152**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[3]	9,244	CY	$2.12	$19,631
6.2	Haul RW/Soil to Stockpile Area[4]	11,093	CY	$4.00	$44,379
6.3	Perimeter Air Sampling	208	EA	$243.76	$50,705
6.4	Equipment Decontamination	462	HR	$54.56	$25,221
6.5	Stockpile Management	11,093	CY	$1.44	$15,943
6.6	Stockpile Characterization[5]	2	EA	$1,535.00	$3,070
	Subtotal				**$158,949**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	10,400	CY	$2.44	$25,398
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	462	HR	$54.56	$25,221
7.4	Out-of-Town Transportation of RW[7]	15,600	TON	$170.00	$2,652,000
7.5	Out-of-Town Disposal of RW (no treatment)[7, 8]	14,040	TON	$107.10	$1,503,684
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	1,560	TON	$192.00	$299,520
	Subtotal				**$4,505,823**

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
LOT BEHIND 326 FERRY BOULEVARD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[9]	624	CY	$2.40	$1,499
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[10]	39000	SF	$1.29	$50,310
8.8	Furnish, Place, and Spread Topsoil (6")[9]	953	CY	$34.65	$33,033
8.9	Hydroseeding with Mulch and Fertilizer	47	MSF	$43.97	$2,058
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	CY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 3" binder, 3" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	8592	CY	$11.83	$101,636
8.14	Install Nonwoven Geotextile Fabric	1556	SY	$2.21	$3,438
	Subtotal				**$217,902**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$5,065,410**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$303,925
10.2	Engineering and Design (12%)				$607,849
10.3	Construction management (8%)				$405,233
10.4	Location Adjustment (9%)				$455,887
10.5	Contingency (15%)				$759,811
TOTAL OTHER COSTS					**$2,532,705**
TOTAL CAPITAL COST FOR ALTERNATIVE 6					**$7,598,115**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to excavated to a depth of 6-ft below ground surface and additional soil that would be required to be removed to facilitate compliance with safety standards for benching/sloping.

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[7] A conversion factor of 1.5 was used to convert CY to TON.

[8] Volume of RW for disposal assumes 10% would be hazardous requiring treatment prior to disposal.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[10] Delineation ("warning") layer included for excavation area where waste is left-in-place.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
LOT BEHIND 326 FERRY BLVD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate	Present Value
0	$0	$0	0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Notes:

This Alternative is not applicable to this property group - see Section 4.4 of the FS.

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
LOT BEHIND 326 FERRY BOULEVARD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.10	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0 Fencing and Signage					
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.95	$0
	Subtotal				**$0**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of RW	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
LOT BEHIND 326 FERRY BOULEVARD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[8]	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405.12	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 7					**$0**

Notes:
This Alternative is not applicable to this property group - see Section 4.4 of the FS.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
LOT BEHIND 326 FERRY BLVD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	20	HR	$110	$2,200	see cost assumptions
OM.1.3	Sampling Labor - Sampler	10	HR	$90	$900	see cost assumptions
OM.1.4	Analytical Costs	5	EA	$697	$3,486	see cost assumptions
OM.1.5	Data Validation	5	HR	$110	$550	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$10,408**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	78	MSF	$7.34	$572	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.39	MSF	$56.31	$22	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	3	EA	$321.75	$965	see cost assumptions
	Subtotal				**$17,009**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	2	EA	$5,000.00	$10,000	see cost assumptions
	Subtotal				**$11,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$69,742**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$38,518**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue Property.

[2] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[3] Assume that there is no Raymark waste below paved surfaces at this property group.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
LOT BEHIND 326 FERRY BLVD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate	Present Value
0	$0	$0	0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Notes:

This Alternative is not applicable to this property group - see Section 4.4 of the FS.

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
LOT BEHIND 326 FERRY BOULEVARD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.10	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0 Fencing and Signage					
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.95	$0
	Subtotal				**$0**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of RW	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
LOT BEHIND 326 FERRY BOULEVARD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST
8.0 Construction of Low-Permeability Cap or Backfill and Site Restoration					
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[8]	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	CY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405.12	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0 Flood Storage Mitigation/Stormwater Management					
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0 OTHER COSTS					
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 8					**$0**

Notes:
This Alternative is not applicable to this property group - see Section 4.4 of the FS.

PRESENT VALUE ANALYSIS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
LOT BEHIND 326 FERRY BLVD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate	Present Value
0	$1,341,103	$0	0	$1,341,103	7.0%	$1,341,103
1	$0	$69,742	$0	$69,742	7.0%	$65,180
2	$0	$69,742	$0	$69,742	7.0%	$60,915
3	$0	$38,518	$0	$38,518	7.0%	$31,442
4	$0	$38,518	$0	$38,518	7.0%	$29,385
5	$0	$38,518	$15,000	$53,518	7.0%	$38,157
6	$0	$38,518	$0	$38,518	7.0%	$25,666
7	$0	$38,518	$0	$38,518	7.0%	$23,987
8	$0	$38,518	$0	$38,518	7.0%	$22,418
9	$0	$38,518	$0	$38,518	7.0%	$20,951
10	$0	$38,518	$15,000	$53,518	7.0%	$27,206
11	$0	$38,518	$0	$38,518	7.0%	$18,299
12	$0	$38,518	$0	$38,518	7.0%	$17,102
13	$0	$38,518	$0	$38,518	7.0%	$15,983
14	$0	$38,518	$0	$38,518	7.0%	$14,938
15	$0	$38,518	$15,000	$53,518	7.0%	$19,397
16	$0	$38,518	$0	$38,518	7.0%	$13,047
17	$0	$38,518	$0	$38,518	7.0%	$12,194
18	$0	$38,518	$0	$38,518	7.0%	$11,396
19	$0	$38,518	$0	$38,518	7.0%	$10,650
20	$0	$38,518	$15,000	$53,518	7.0%	$13,830
21	$0	$38,518	$0	$38,518	7.0%	$9,303
22	$0	$38,518	$0	$38,518	7.0%	$8,694
23	$0	$38,518	$0	$38,518	7.0%	$8,125
24	$0	$38,518	$0	$38,518	7.0%	$7,594
25	$0	$38,518	$15,000	$53,518	7.0%	$9,861
26	$0	$38,518	$0	$38,518	7.0%	$6,633
27	$0	$38,518	$0	$38,518	7.0%	$6,199
28	$0	$38,518	$0	$38,518	7.0%	$5,793
29	$0	$38,518	$0	$38,518	7.0%	$5,414
30	$0	$38,518	$15,000	$53,518	7.0%	$7,030
TOTAL	**$1,341,103**	**$1,217,977**	**$90,000**	**$2,649,080**		**$1,907,891**
					PV O&M	**$566,788**

Note: Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

1 Five-year review for a single property group = $10,000 and $20,000 for a multiple property group.

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
LOT BEHIND 326 FERRY BOULEVARD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	2	LS	$22,655	$45,309
	Subtotal				**$45,309**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	30	LF	$35.79	$1,074
2.3	Install PVC Well Screens (2" diameter)	20	LF	$19.69	$394
2.4	Install PVC Well Casing (2" diameter)	10	LF	$14.79	$148
2.5	Install Filter Pack	24	LF	$15.52	$372
2.6	Install Bentonite Seal	2	EA	$57.23	$114
2.7	Install Annular Seal	4	LF	$69.04	$276
2.8	PVC Well Plugs	2	EA	$27.86	$56
2.9	Flush-Mount Protective Cover with Locking Cap	2	EA	$451.55	$903
2.10	Surface Pad, Concrete 2' x 2'	2	EA	$154.79	$310
2.11	Well Development (2 HR/WELL)	4	EA	$228.23	$913
2.12	IDW Transportation/Disposal (drums)	2	EA	$508.52	$1,017
	Subtotal				**$8,330**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	1,176	LF	$27.57	$32,422
3.2	Signage	12	EA	$73.95	$887
	Subtotal				**$33,310**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	6	MONTH	$4,531	$27,185
	Subtotal				**$56,636**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	2	ACRE	$3,968.29	$7,937
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	1,176	LF	$8.97	$10,544
	Subtotal				**$39,152**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	5,778	CY	$2.12	$12,270
6.2	Haul RW to Stockpile Area[4]	6,933	CY	$4.00	$27,737
6.3	Perimeter Air Sampling	130	EA	$243.76	$31,691
6.4	Equipment Decontamination	289	HR	$54.56	$15,763
6.5	Stockpile Management	6,933	CY	$1.44	$9,964
6.6	Stockpile Characterization[5]	14	EA	$1,535.00	$21,490
	Subtotal				**$118,914**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	6,933	CY	$2.44	$16,932
7.2	Transport RW to in-town consolidation[7]	6,240	CY	$5.52	$34,466
7.3	Equipment Decontamination	289	HR	$54.56	$15,763
7.4	Out-of-Town Transportation of Waste[7, 8]	1,040	TON	$170.00	$176,800
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	1,040	TON	$192.00	$199,680
	Subtotal				**$443,641**

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
LOT BEHIND 326 FERRY BOULEVARD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[9]	39,000	SF	$1.29	$50,310
8.8	Furnish, Place, and Spread Topsoil (6")[10]	794	CY	$34.65	$27,527
8.9	Hydroseeding with Mulch and Fertilizer	39	MSF	$43.97	$1,715
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405.12	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	5,561	CY	$11.83	$65,787
8.14	Install Nonwoven Geotextile Fabric	1,556	SY	$2.21	$3,438
	Subtotal				**$148,777**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$894,069**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$53,644
10.2	Engineering and Design (12%)				$107,288
10.3	Construction management (8%)				$71,525
10.4	Location Adjustment (9%)				$80,466
10.5	Contingency (15%)				$134,110
TOTAL OTHER COSTS					**$447,034**
TOTAL CAPITAL COST FOR ALTERNATIVE 9					**$1,341,103**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal.
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
LOT BEHIND 326 FERRY BLVD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate	Present Value
0	$5,147,653	$0	0	$5,147,653	7.0%	$5,147,653
1	$0	$69,742	$0	$69,742	7.0%	$65,180
2	$0	$69,742	$0	$69,742	7.0%	$60,915
3	$0	$38,518	$0	$38,518	7.0%	$31,442
4	$0	$38,518	$0	$38,518	7.0%	$29,385
5	$0	$38,518	$15,000	$53,518	7.0%	$38,157
6	$0	$38,518	$0	$38,518	7.0%	$25,666
7	$0	$38,518	$0	$38,518	7.0%	$23,987
8	$0	$38,518	$0	$38,518	7.0%	$22,418
9	$0	$38,518	$0	$38,518	7.0%	$20,951
10	$0	$38,518	$15,000	$53,518	7.0%	$27,206
11	$0	$38,518	$0	$38,518	7.0%	$18,299
12	$0	$38,518	$0	$38,518	7.0%	$17,102
13	$0	$38,518	$0	$38,518	7.0%	$15,983
14	$0	$38,518	$0	$38,518	7.0%	$14,938
15	$0	$38,518	$15,000	$53,518	7.0%	$19,397
16	$0	$38,518	$0	$38,518	7.0%	$13,047
17	$0	$38,518	$0	$38,518	7.0%	$12,194
18	$0	$38,518	$0	$38,518	7.0%	$11,396
19	$0	$38,518	$0	$38,518	7.0%	$10,650
20	$0	$38,518	$15,000	$53,518	7.0%	$13,830
21	$0	$38,518	$0	$38,518	7.0%	$9,303
22	$0	$38,518	$0	$38,518	7.0%	$8,694
23	$0	$38,518	$0	$38,518	7.0%	$8,125
24	$0	$38,518	$0	$38,518	7.0%	$7,594
25	$0	$38,518	$15,000	$53,518	7.0%	$9,861
26	$0	$38,518	$0	$38,518	7.0%	$6,633
27	$0	$38,518	$0	$38,518	7.0%	$6,199
28	$0	$38,518	$0	$38,518	7.0%	$5,793
29	$0	$38,518	$0	$38,518	7.0%	$5,414
30	$0	$38,518	$15,000	$53,518	7.0%	$7,030
TOTAL	**$5,147,653**	**$1,217,977**	**$90,000**	**$6,455,630**		**$5,714,441**
					PV O&M	**$566,788**

Note: Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

1 Five-year review for a single property group = $10,000 and $20,000 for a multiple property group.

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
LOT BEHIND 326 FERRY BOULEVARD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	2	LS	$22,655	$45,309
	Subtotal				**$45,309**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	30	LF	$35.79	$1,074
2.3	Install PVC Well Screens (2" diameter)	20	LF	$19.69	$394
2.4	Install PVC Well Casing (2" diameter)	10	LF	$14.79	$148
2.5	Install Filter Pack	24	LF	$15.52	$372
2.6	Install Bentonite Seal	2	EA	$57.23	$114
2.7	Install Annular Seal	4	LF	$69.04	$276
2.8	PVC Well Plugs	2	EA	$27.86	$56
2.9	Flush-Mount Protective Cover with Locking Cap	2	EA	$451.55	$903
2.10	Surface Pad, Concrete 2' x 2'	2	EA	$154.79	$310
2.11	Well Development (2 HR/WELL)	4	EA	$228.23	$913
2.12	IDW Transportation/Disposal (drums)	2	EA	$508.52	$1,017
	Subtotal				**$8,330**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	1,176	LF	$27.57	$32,422
3.2	Signage	12	EA	$73.95	$887
	Subtotal				**$33,310**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	6	MONTH	$4,531	$27,185
	Subtotal				**$56,636**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	2	ACRE	$3,968.29	$7,937
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	1,176	LF	$8.97	$10,544
	Subtotal				**$39,152**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	5,778	CY	$2.12	$12,270
6.2	Haul RW to Stockpile Area[4]	6,933	CY	$4.00	$27,737
6.3	Perimeter Air Sampling	130	EA	$243.76	$31,691
6.4	Equipment Decontamination	289	HR	$54.56	$15,763
6.5	Stockpile Management	6,933	CY	$1.44	$9,964
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$97,424**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[5]	6,933	CY	$2.44	$16,932
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	289	HR	$54.56	$15,763
7.4	Out-of-Town Transportation of Waste[6]	10,400	TON	$170.00	$1,768,000
7.5	Out-of-Town Disposal of RW (no treatment)[6, 7]	9,360	TON	$107.10	$1,002,456
7.6	Out-of-Town Disposal of RW (treatment)[6, 7]	1,040	TON	$192.00	$199,680
	Subtotal				**$3,002,831**

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
LOT BEHIND 326 FERRY BOULEVARD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	39,000	SF	$1.29	$50,310
8.8	Furnish, Place, and Spread Topsoil (6")[9]	794	CY	$34.65	$27,527
8.9	Hydroseeding with Mulch and Fertilizer	39	MSF	$43.97	$1,715
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405.12	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	5,561	CY	$11.83	$65,787
8.14	Install Nonwoven Geotextile Fabric	1,556	SY	$2.21	$3,438
	Subtotal				**$148,777**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$3,431,768**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$205,906
10.2	Engineering and Design (12%)				$411,812
10.3	Construction management (8%)				$274,541
10.4	Location Adjustment (9%)				$308,859
10.5	Contingency (15%)				$514,765
TOTAL OTHER COSTS					**$1,715,884**
TOTAL CAPITAL COST FOR ALTERNATIVE 10					**$5,147,653**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area for characterization to determine final disposition includes a bulking factor of 1.2.
[5] Volume includes all RW intended for disposal.
[6] A conversion factor of 1.5 was used to convert CY to TON.
[7] Volume of RW for Out-of-Town disposal assumes that 10% would be hazardous requiring treatment prior to disposal.
[8] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[10] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

G-5

326 FERRY BOULEVARD

COST ESTIMATE BACKUP SHEETS

PRESENT VALUE ANALYSIS
ALTERNATIVE 1 - NO ACTION
326 FERRY BLVD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$10,000	$10,000	7.0%	$7,130
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$10,000	$10,000	7.0%	$5,083
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$10,000	$10,000	7.0%	$3,624
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$10,000	$10,000	7.0%	$2,584
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$10,000	$10,000	7.0%	$1,842
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$10,000	$10,000	7.0%	$1,314
TOTAL	**$0**	**$0**	**$60,000**	**$60,000**		**$21,578**
					PV O&M	**$21,578**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
326 FERRY BLVD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review [1]	Total	Discount Rate[2]	Present Value
0	$43,993	$0	$0	$43,993	7.0%	$43,993
1	$0	$59,876	$0	$59,876	7.0%	$55,959
2	$0	$59,876	$0	$59,876	7.0%	$52,298
3	$0	$32,933	$0	$32,933	7.0%	$26,883
4	$0	$32,933	$0	$32,933	7.0%	$25,125
5	$0	$32,933	$10,000	$42,933	7.0%	$30,611
6	$0	$32,933	$0	$32,933	7.0%	$21,945
7	$0	$32,933	$0	$32,933	7.0%	$20,509
8	$0	$32,933	$0	$32,933	7.0%	$19,167
9	$0	$32,933	$0	$32,933	7.0%	$17,914
10	$0	$32,933	$10,000	$42,933	7.0%	$21,825
11	$0	$32,933	$0	$32,933	7.0%	$15,646
12	$0	$32,933	$0	$32,933	7.0%	$14,623
13	$0	$32,933	$0	$32,933	7.0%	$13,666
14	$0	$32,933	$0	$32,933	7.0%	$12,772
15	$0	$32,933	$10,000	$42,933	7.0%	$15,561
16	$0	$32,933	$0	$32,933	7.0%	$11,156
17	$0	$32,933	$0	$32,933	7.0%	$10,426
18	$0	$32,933	$0	$32,933	7.0%	$9,744
19	$0	$32,933	$0	$32,933	7.0%	$9,106
20	$0	$32,933	$10,000	$42,933	7.0%	$11,095
21	$0	$32,933	$0	$32,933	7.0%	$7,954
22	$0	$32,933	$0	$32,933	7.0%	$7,433
23	$0	$32,933	$0	$32,933	7.0%	$6,947
24	$0	$32,933	$0	$32,933	7.0%	$6,493
25	$0	$32,933	$10,000	$42,933	7.0%	$7,910
26	$0	$32,933	$0	$32,933	7.0%	$5,671
27	$0	$32,933	$0	$32,933	7.0%	$5,300
28	$0	$32,933	$0	$32,933	7.0%	$4,953
29	$0	$32,933	$0	$32,933	7.0%	$4,629
30	$0	$32,933	$10,000	$42,933	7.0%	$5,640
TOTAL	**$43,993**	**$1,041,885**	**$60,000**	**$1,145,878**		**$522,956**
					PV O&M	**$478,962**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
326 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage					
3.1	Chain Link Fence	360	LF	$27.57	$9,925
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$10,221**
TOTAL DIRECT COSTS					**$43,993**
TOTAL CAPITAL COST FOR ALTERNATIVE 2					**$43,993**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 326 Ferry Boulevard Property.
PVC = polyvinyl chloride
IDW = investigation derived waste
LS = lump sum
EA = each
LF = linear foot

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
326 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,072.51	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110.00	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90.00	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697.13	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110.00	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200.00	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	135	SF	$1.81	$245	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	12	LF	$27.57	$331	see cost assumptions
OM 2.6	Sign Replacement[5]	16	EA	$73.95	$1,183	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	2	EA	$321.75	$644	see cost assumptions
	Subtotal				**$17,852**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$59,876**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$32,933**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 326 Ferry Boulevard Property.

[2] Assume all Raymark waste is located below paved surfaces at this property group.

[3] Estimated 5% of asphalt surfaces will require repair annually (need for repair to be established during 5-Year Reviews).

[4] Estimated that 100% of fencing would require replacement over the period of O&M (need for repair to be established during 5-Year Reviews).

[5] Estimated that signage would require replacement 4 times over the period of O&M (need for repair to be established during 5-Year Reviews).

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
326 FERRY BLVD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$319,275	$0	$0	$319,275	7.0%	$319,275
1	$0	$58,249	$0	$58,249	7.0%	$54,438
2	$0	$58,249	$0	$58,249	7.0%	$50,877
3	$0	$31,306	$0	$31,306	7.0%	$25,555
4	$0	$31,306	$0	$31,306	7.0%	$23,883
5	$0	$31,306	$10,000	$41,306	7.0%	$29,451
6	$0	$31,306	$0	$31,306	7.0%	$20,860
7	$0	$31,306	$0	$31,306	7.0%	$19,496
8	$0	$31,306	$0	$31,306	7.0%	$18,220
9	$0	$31,306	$0	$31,306	7.0%	$17,028
10	$0	$31,306	$10,000	$41,306	7.0%	$20,998
11	$0	$31,306	$0	$31,306	7.0%	$14,873
12	$0	$31,306	$0	$31,306	7.0%	$13,900
13	$0	$31,306	$0	$31,306	7.0%	$12,991
14	$0	$31,306	$0	$31,306	7.0%	$12,141
15	$0	$31,306	$10,000	$41,306	7.0%	$14,971
16	$0	$31,306	$0	$31,306	7.0%	$10,604
17	$0	$31,306	$0	$31,306	7.0%	$9,911
18	$0	$31,306	$0	$31,306	7.0%	$9,262
19	$0	$31,306	$0	$31,306	7.0%	$8,656
20	$0	$31,306	$10,000	$41,306	7.0%	$10,674
21	$0	$31,306	$0	$31,306	7.0%	$7,561
22	$0	$31,306	$0	$31,306	7.0%	$7,066
23	$0	$31,306	$0	$31,306	7.0%	$6,604
24	$0	$31,306	$0	$31,306	7.0%	$6,172
25	$0	$31,306	$10,000	$41,306	7.0%	$7,611
26	$0	$31,306	$0	$31,306	7.0%	$5,391
27	$0	$31,306	$0	$31,306	7.0%	$5,038
28	$0	$31,306	$0	$31,306	7.0%	$4,708
29	$0	$31,306	$0	$31,306	7.0%	$4,400
30	$0	$31,306	$10,000	$41,306	7.0%	$5,426
TOTAL	**$319,275**	**$993,064**	**$60,000**	**$1,372,339**		**$778,043**
					PV O&M	**$458,768**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
326 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	360	LF	$27.57	$9,925
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$10,221**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	2	MONTH	$4,531	$9,062
	Subtotal				**$38,513**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	360	LF	$8.97	$3,228
	Subtotal				**$23,899**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil[3]	463	CY	$2.12	$983
6.2	Haul RW/Soil to Stockpile Area[4]	556	CY	$4.00	$2,222
6.3	Perimeter Air Sampling	10	EA	$243.76	$2,539
6.4	Equipment Decontamination	23	HR	$54.56	$1,263
6.5	Stockpile Management	556	CY	$1.44	$798
6.6	Stockpile Characterization[5]	2	EA	$1,535.00	$3,070
	Subtotal				**$10,876**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	300	CY	$2.44	$733
7.2	Transport RW to in-town consolidation[7]	270	CY	$5.52	$1,491
7.3	Equipment Decontamination	23	HR	$54.56	$1,263
7.4	Out-of-Town Transportation of RW[7, 8]	45	TON	$170.00	$7,650
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	45	TON	$192.00	$8,640
	Subtotal				**$19,777**

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
326 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[9]	230	CY	$2.40	$553
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[9]	102	CY	$27.00	$2,750
8.3	Install Geosynthetic Clay Liner (bottom layer)	5,000	SF	$2.86	$14,312
8.4	Install 60 mil HDPE liner	5,000	SF	$2.84	$14,209
8.5	Install Geosynthetic Drainage Layer	5,000	SF	$0.65	$3,270
8.6	Furnish, Spread, and Compact Soil Layer (24")[9]	2	CY	$11.83	$28
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	5,000	SF	$1.29	$6,450
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	100	ECY	$9.35	$935
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2,700	SF	$2.27	$6,129
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	556	SY	$2.21	$1,228
	Subtotal				**$75,792**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$212,850**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$12,771
10.2	Engineering and Design (12%)				$25,542
10.3	Construction management (8%)				$17,028
10.4	Location Adjustment (9%)				$19,157
10.5	Contingency (15%)				$31,928
TOTAL OTHER COSTS					**$106,425**
TOTAL CAPITAL COST FOR ALTERNATIVE 3					**$319,275**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 326 Ferry Boulevard Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 2.5-ft below ground surface and additional non-RW soil required to faciliate cap construction.
[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less additionally excavated soil).
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates for the 24-inch protective barrier.
[10] No floodplains or wetlands would be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
326 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	250	SF	$1.81	$453	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.5	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.6	Contractor mobilizations	1	EA	$321.75	$322	see cost assumptions
	Subtotal				**$16,225**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$58,249**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$31,306**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 326 Ferry Boulevard Property.

[2] Assume all Raymark waste is located below paved surfaces at this property group.

[3] Assumed 5% of asphalt surfaces will require repair annually.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
326 FERRY BLVD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$483,074	$0	0	$483,074	7.0%	$483,074
1	$0	$58,249	$0	$58,249	7.0%	$54,438
2	$0	$58,249	$0	$58,249	7.0%	$50,877
3	$0	$31,306	$0	$31,306	7.0%	$25,555
4	$0	$31,306	$0	$31,306	7.0%	$23,883
5	$0	$31,306	$10,000	$41,306	7.0%	$29,451
6	$0	$31,306	$0	$31,306	7.0%	$20,860
7	$0	$31,306	$0	$31,306	7.0%	$19,496
8	$0	$31,306	$0	$31,306	7.0%	$18,220
9	$0	$31,306	$0	$31,306	7.0%	$17,028
10	$0	$31,306	$10,000	$41,306	7.0%	$20,998
11	$0	$31,306	$0	$31,306	7.0%	$14,873
12	$0	$31,306	$0	$31,306	7.0%	$13,900
13	$0	$31,306	$0	$31,306	7.0%	$12,991
14	$0	$31,306	$0	$31,306	7.0%	$12,141
15	$0	$31,306	$10,000	$41,306	7.0%	$14,971
16	$0	$31,306	$0	$31,306	7.0%	$10,604
17	$0	$31,306	$0	$31,306	7.0%	$9,911
18	$0	$31,306	$0	$31,306	7.0%	$9,262
19	$0	$31,306	$0	$31,306	7.0%	$8,656
20	$0	$31,306	$10,000	$41,306	7.0%	$10,674
21	$0	$31,306	$0	$31,306	7.0%	$7,561
22	$0	$31,306	$0	$31,306	7.0%	$7,066
23	$0	$31,306	$0	$31,306	7.0%	$6,604
24	$0	$31,306	$0	$31,306	7.0%	$6,172
25	$0	$31,306	$10,000	$41,306	7.0%	$7,611
26	$0	$31,306	$0	$31,306	7.0%	$5,391
27	$0	$31,306	$0	$31,306	7.0%	$5,038
28	$0	$31,306	$0	$31,306	7.0%	$4,708
29	$0	$31,306	$0	$31,306	7.0%	$4,400
30	$0	$31,306	$10,000	$41,306	7.0%	$5,426
TOTAL	**$483,074**	**$993,064**	**$60,000**	**$1,536,138**		**$941,842**
					PV O&M	**$458,768**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
326 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	360	LF	$27.57	$9,925
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$10,221**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	2	MONTH	$4,531	$9,062
	Subtotal				**$38,513**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	360	LF	$8.97	$3,228
	Subtotal				**$23,899**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil[3]	463	CY	$2.12	$983
6.2	Haul RW/Soil to Stockpile Area[4]	556	CY	$4.00	$2,222
6.3	Perimeter Air Sampling	10	EA	$243.76	$2,539
6.4	Equipment Decontamination	23	HR	$54.56	$1,263
6.5	Stockpile Management	556	CY	$1.44	$798
6.6	Stockpile Characterization[5]	1	EA	$1,535.00	$1,535
	Subtotal				**$9,341**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	300	CY	$2.44	$733
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	23	HR	$54.56	$1,263
7.4	Out-of-Town Transportation of RW[7]	450	TON	$170.00	$76,500
7.5	Out-of-Town Disposal of RW (no treatment)[7, 8]	405	TON	$107.10	$43,376
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	45	TON	$192.00	$8,640
	Subtotal				**$130,511**

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
326 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[9]	230	CY	$2.40	$553
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[9]	102	CY	$27.00	$2,750
8.3	Install Geosynthetic Clay Liner (bottom layer)	5,000	SF	$2.86	$14,312
8.4	Install 60 mil HDPE liner	5,000	SF	$2.84	$14,209
8.5	Install Geosynthetic Drainage Layer	5,000	SF	$0.65	$3,270
8.6	Furnish, Spread, and Compact Soil Layer (24")[9]	2	CY	$11.83	$28
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	5,000	SF	$1.29	$6,450
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	100	CY	$9.35	$935
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2,700	SF	$2.27	$6,129
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	556	SY	$2.21	$1,228
	Subtotal				**$75,792**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$322,049**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$19,323
10.2	Engineering and Design (12%)				$38,646
10.3	Construction management (8%)				$25,764
10.4	Location Adjustment (9%)				$28,984
10.5	Contingency (15%)				$48,307
TOTAL OTHER COSTS					**$161,025**
TOTAL CAPITAL COST FOR ALTERNATIVE 4					**$483,074**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 326 Ferry Boulevard Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 2.5-ft below ground surface and additional non-RW soil required to faciliate cap construction.
[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500).
[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less additionally excavated soil).
[7] A conversion factor of 1.5 was used to convert CY to TON.
[8] Volume of RW for disposal assumes that 10% would be hazardous requiring treatment prior to disposal.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates for the 24-inch protective barrier.
[10] No floodplains or wetlands would be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

PRESENT VALUE ANALYSIS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
326 FERRY BLVD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$307,216	$0	$0	$307,216	7.0%	$307,216
1	$0	$46,149	$0	$46,149	7.0%	$43,130
2	$0	$46,149	$0	$46,149	7.0%	$40,308
3	$0	$10,225	$0	$10,225	7.0%	$8,347
4	$0	$10,225	$0	$10,225	7.0%	$7,801
5	$0	$10,225	$10,000	$20,225	7.0%	$14,420
6	$0	$10,225	$0	$10,225	7.0%	$6,813
7	$0	$10,225	$0	$10,225	7.0%	$6,368
8	$0	$10,225	$0	$10,225	7.0%	$5,951
9	$0	$10,225	$0	$10,225	7.0%	$5,562
10	$0	$10,225	$10,000	$20,225	7.0%	$10,281
11	$0	$10,225	$0	$10,225	7.0%	$4,858
12	$0	$10,225	$0	$10,225	7.0%	$4,540
13	$0	$10,225	$0	$10,225	7.0%	$4,243
14	$0	$10,225	$0	$10,225	7.0%	$3,965
15	$0	$10,225	$10,000	$20,225	7.0%	$7,330
16	$0	$10,225	$0	$10,225	7.0%	$3,464
17	$0	$10,225	$0	$10,225	7.0%	$3,237
18	$0	$10,225	$0	$10,225	7.0%	$3,025
19	$0	$10,225	$0	$10,225	7.0%	$2,827
20	$0	$10,225	$10,000	$20,225	7.0%	$5,226
21	$0	$10,225	$0	$10,225	7.0%	$2,469
22	$0	$10,225	$0	$10,225	7.0%	$2,308
23	$0	$10,225	$0	$10,225	7.0%	$2,157
24	$0	$10,225	$0	$10,225	7.0%	$2,016
25	$0	$10,225	$10,000	$20,225	7.0%	$3,726
26	$0	$10,225	$0	$10,225	7.0%	$1,761
27	$0	$10,225	$0	$10,225	7.0%	$1,645
28	$0	$10,225	$0	$10,225	7.0%	$1,538
29	$0	$10,225	$0	$10,225	7.0%	$1,437
30	$0	$10,225	$10,000	$20,225	7.0%	$2,657
TOTAL	**$307,216**	**$378,595**	**$60,000**	**$745,811**		**$520,627**
					PV O&M	**$213,411**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
326 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	360	LF	$27.57	$9,925
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$10,221**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	3	MONTH	$4,531	$13,593
	Subtotal				**$43,044**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	360	LF	$8.97	$3,228
	Subtotal				**$23,899**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[3]	607	CY	$2.12	$1,290
6.2	Haul RW/Soil to Stockpile Area[4]	729	CY	$4.00	$2,916
6.3	Perimeter Air Sampling	14	EA	$243.76	$3,332
6.4	Equipment Decontamination	30	HR	$54.56	$1,657
6.5	Stockpile Management	729	CY	$1.44	$1,048
6.6	Stockpile Characterization[5]	2	EA	$1,535.00	$3,070
	Subtotal				**$13,312**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks [6]	600	CY	$2.44	$1,465
7.2	Transport RW to in-town consolidation[7]	540	CY	$5.52	$2,983
7.3	Equipment Decontamination	30	HR	$54.56	$1,657
7.4	Out-of-Town Transportation of RW[7, 8]	90	TON	$170.00	$15,300
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	90	TON	$192.00	$17,280
	Subtotal				**$38,685**

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
326 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[9]	116	CY	$2.40	$279
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[10]	2,700	SF	$1.29	$3,483
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	100	ECY	$9.35	$935
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2,700	SF	$2.27	$6,129
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	377	CY	$11.83	$4,462
8.14	Install Nonwoven Geotextile Fabric	300	SY	$2.21	$663
	Subtotal				**$41,878**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$204,811**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$12,289
10.2	Engineering and Design (12%)				$24,577
10.3	Construction management (8%)				$16,385
10.4	Location Adjustment (9%)				$18,433
10.5	Contingency (15%)				$30,722
TOTAL OTHER COSTS					**$102,405**
TOTAL CAPITAL COST FOR ALTERNATIVE 5					**$307,216**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 326 Ferry Boulevard Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to excavated to a depth of 5-ft below ground surface and additional soil that would be required to be removed to facilitate compliance with safety standards for benching/sloping.
[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.
[10] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[11] No floodplains or wetlands would be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
326 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	10	HR	$110.00	$1,100	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	250	SF	$1.81	$453	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	1	EA	$321.75	$322	see cost assumptions
	Subtotal				**$4,125**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$46,149**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$10,225**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 326 Ferry Boulevard Property.

[2] Assume all Raymark waste is located below paved surfaces at this property group.

[3] Assumed 5% of asphalt surfaces will require repair annually.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring with annual inspection/repairs of ground surface and annual deed inspection, with one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual inspection and repairs to ground surface and annual deed inspection, but may not require additional groundwater sampling pending analytical data and concurrence from the State following the first 2 years of data collection, therefore additional groundwater sampling is not included.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
326 FERRY BLVD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$637,116	$0	$0	$637,116	7.0%	$637,116
1	$0	$46,149	$0	$46,149	7.0%	$43,130
2	$0	$46,149	$0	$46,149	7.0%	$40,308
3	$0	$10,225	$0	$10,225	7.0%	$8,347
4	$0	$10,225	$0	$10,225	7.0%	$7,801
5	$0	$10,225	$10,000	$20,225	7.0%	$14,420
6	$0	$10,225	$0	$10,225	7.0%	$6,813
7	$0	$10,225	$0	$10,225	7.0%	$6,368
8	$0	$10,225	$0	$10,225	7.0%	$5,951
9	$0	$10,225	$0	$10,225	7.0%	$5,562
10	$0	$10,225	$10,000	$20,225	7.0%	$10,281
11	$0	$10,225	$0	$10,225	7.0%	$4,858
12	$0	$10,225	$0	$10,225	7.0%	$4,540
13	$0	$10,225	$0	$10,225	7.0%	$4,243
14	$0	$10,225	$0	$10,225	7.0%	$3,965
15	$0	$10,225	$10,000	$20,225	7.0%	$7,330
16	$0	$10,225	$0	$10,225	7.0%	$3,464
17	$0	$10,225	$0	$10,225	7.0%	$3,237
18	$0	$10,225	$0	$10,225	7.0%	$3,025
19	$0	$10,225	$0	$10,225	7.0%	$2,827
20	$0	$10,225	$10,000	$20,225	7.0%	$5,226
21	$0	$10,225	$0	$10,225	7.0%	$2,469
22	$0	$10,225	$0	$10,225	7.0%	$2,308
23	$0	$10,225	$0	$10,225	7.0%	$2,157
24	$0	$10,225	$0	$10,225	7.0%	$2,016
25	$0	$10,225	$10,000	$20,225	7.0%	$3,726
26	$0	$10,225	$0	$10,225	7.0%	$1,761
27	$0	$10,225	$0	$10,225	7.0%	$1,645
28	$0	$10,225	$0	$10,225	7.0%	$1,538
29	$0	$10,225	$0	$10,225	7.0%	$1,437
30	$0	$10,225	$10,000	$20,225	7.0%	$2,657
TOTAL	**$637,116**	**$378,595**	**$60,000**	**$1,075,711**		**$850,527**
					PV O&M	**$213,411**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
326 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	360	LF	$27.57	$9,925
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$10,221**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	3	MONTH	$4,531	$13,593
	Subtotal				**$43,044**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	360	LF	$8.97	$3,228
	Subtotal				**$23,899**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[3]	607	CY	$2.12	$1,290
6.2	Haul RW/Soil to Stockpile Area[4]	729	CY	$4.00	$2,916
6.3	Perimeter Air Sampling	14	EA	$243.76	$3,332
6.4	Equipment Decontamination	30	HR	$54.56	$1,657
6.5	Stockpile Management	729	CY	$1.44	$1,048
6.6	Stockpile Characterization[5]	1	EA	$1,535.00	$1,535
	Subtotal				**$11,777**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	600	CY	$2.44	$1,465
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	30	HR	$54.56	$1,657
7.4	Out-of-Town Transportation of RW[7]	900	TON	$170.00	$153,000
7.5	Out-of-Town Disposal of RW (no treatment)[7, 8]	810	TON	$107.10	$86,751
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	90	TON	$192.00	$17,280
	Subtotal				**$260,153**

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
326 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[9]	116	CY	$2.40	$279
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[10]	2700	SF	$1.29	$3,483
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	100	ECY	$9.35	$935
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2700	SF	$2.27	$6,129
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	377	CY	$11.83	$4,462
8.14	Install Nonwoven Geotextile Fabric	300	SY	$2.21	$663
	Subtotal				**$41,878**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$424,744**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$25,485
10.2	Engineering and Design (12%)				$50,969
10.3	Construction management (8%)				$33,980
10.4	Location Adjustment (9%)				$38,227
10.5	Contingency (15%)				$63,712
TOTAL OTHER COSTS					**$212,372**
TOTAL CAPITAL COST FOR ALTERNATIVE 6					**$637,116**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 326 Ferry Boulevard Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to excavated to a depth of 5-ft below ground surface and additional soil that would be required to be removed to facilitate compliance with safety standards for benching/sloping.
[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).
[7] A conversion factor of 1.5 was used to convert CY to TON.
[8] Volume of RW for disposal assumes that 10% would be hazardous requiring treatment prior to disposal.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.
[10] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[11] No floodplains or wetlands would be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

PRESENT VALUE ANALYSIS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
326 FERRY BLVD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$246,509	$0	0	$246,509	7.0%	$246,509
1	$0	$58,041	$0	$58,041	7.0%	$54,244
2	$0	$58,041	$0	$58,041	7.0%	$50,695
3	$0	$31,097	$0	$31,097	7.0%	$25,385
4	$0	$31,097	$0	$31,097	7.0%	$23,724
5	$0	$31,097	$10,000	$41,097	7.0%	$29,302
6	$0	$31,097	$0	$31,097	7.0%	$20,722
7	$0	$31,097	$0	$31,097	7.0%	$19,366
8	$0	$31,097	$0	$31,097	7.0%	$18,099
9	$0	$31,097	$0	$31,097	7.0%	$16,915
10	$0	$31,097	$10,000	$41,097	7.0%	$20,892
11	$0	$31,097	$0	$31,097	7.0%	$14,774
12	$0	$31,097	$0	$31,097	7.0%	$13,808
13	$0	$31,097	$0	$31,097	7.0%	$12,904
14	$0	$31,097	$0	$31,097	7.0%	$12,060
15	$0	$31,097	$10,000	$41,097	7.0%	$14,896
16	$0	$31,097	$0	$31,097	7.0%	$10,534
17	$0	$31,097	$0	$31,097	7.0%	$9,845
18	$0	$31,097	$0	$31,097	7.0%	$9,201
19	$0	$31,097	$0	$31,097	7.0%	$8,599
20	$0	$31,097	$10,000	$41,097	7.0%	$10,620
21	$0	$31,097	$0	$31,097	7.0%	$7,510
22	$0	$31,097	$0	$31,097	7.0%	$7,019
23	$0	$31,097	$0	$31,097	7.0%	$6,560
24	$0	$31,097	$0	$31,097	7.0%	$6,131
25	$0	$31,097	$10,000	$41,097	7.0%	$7,572
26	$0	$31,097	$0	$31,097	7.0%	$5,355
27	$0	$31,097	$0	$31,097	7.0%	$5,005
28	$0	$31,097	$0	$31,097	7.0%	$4,677
29	$0	$31,097	$0	$31,097	7.0%	$4,371
30	$0	$31,097	$10,000	$41,097	7.0%	$5,399
TOTAL	**$246,509**	**$986,811**	**$60,000**	**$1,293,319**		**$702,690**
					PV O&M	**$456,182**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
326 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0	**Fencing and Signage[2]**				
3.1	Chain Link Fence	360	LF	$27.57	$9,925
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$10,221**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	2	MONTH	$4,531	$9,062
	Subtotal				**$38,513**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	360	LF	$8.97	$3,228
	Subtotal				**$23,899**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
6.1	Excavate and Load RW[3]	200	CY	$2.12	$425
6.2	Haul RW to Stockpile Area[4]	240	CY	$4.00	$960
6.3	Perimeter Air Sampling	5	EA	$243.76	$1,097
6.4	Equipment Decontamination	10	HR	$54.56	$546
6.5	Stockpile Management	240	CY	$1.44	$345
6.6	Stockpile Characterization[5]	1	EA	$1,535.00	$1,535
	Subtotal				**$4,907**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks [6]	240	CY	$2.44	$586
7.2	Transport RW to in-town consolidation[7]	216	CY	$5.52	$1,193
7.3	Equipment Decontamination	10	HR	$54.56	$546
7.4	Out-of-Town Transportation of RW[7, 8]	36	TON	$170.00	$6,120
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	36	TON	$192.00	$6,912
	Subtotal				**$15,357**

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
326 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[9]	2,700	SF	$1.29	$3,483
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	100	ECY	$9.35	$935
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2,700	SF	$2.27	$6,129
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	45	CY	$11.83	$532
8.14	Install Nonwoven Geotextile Fabric	300	SY	$2.21	$663
	Subtotal				**$37,670**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$164,339**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$9,860
10.2	Engineering and Design (12%)				$19,721
10.3	Construction management (8%)				$13,147
10.4	Location Adjustment (9%)				$14,791
10.5	Contingency (15%)				$24,651
TOTAL OTHER COSTS					**$82,170**
TOTAL CAPITAL COST FOR ALTERNATIVE 7					**$246,509**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 326 Ferry Boulevard Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 2-ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor).
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement.
[11] No floodplains or wetlands would be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
326 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	135	SF	$1.81	$245	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	1	EA	$321.75	$322	see cost assumptions
	Subtotal				**$16,016**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$58,041**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$31,097**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 326 Ferry Boulevard Property.

[2] Assume all Raymark waste is located below paved surfaces at this property group.

[3] Assumed 5% of asphalt surfaces will require repair annually.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
326 FERRY BLVD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$377,087	$0	0	$377,087	7.0%	$377,087
1	$0	$58,041	$0	$58,041	7.0%	$54,244
2	$0	$58,041	$0	$58,041	7.0%	$50,695
3	$0	$31,097	$0	$31,097	7.0%	$25,385
4	$0	$31,097	$0	$31,097	7.0%	$23,724
5	$0	$31,097	$10,000	$41,097	7.0%	$29,302
6	$0	$31,097	$0	$31,097	7.0%	$20,722
7	$0	$31,097	$0	$31,097	7.0%	$19,366
8	$0	$31,097	$0	$31,097	7.0%	$18,099
9	$0	$31,097	$0	$31,097	7.0%	$16,915
10	$0	$31,097	$10,000	$41,097	7.0%	$20,892
11	$0	$31,097	$0	$31,097	7.0%	$14,774
12	$0	$31,097	$0	$31,097	7.0%	$13,808
13	$0	$31,097	$0	$31,097	7.0%	$12,904
14	$0	$31,097	$0	$31,097	7.0%	$12,060
15	$0	$31,097	$10,000	$41,097	7.0%	$14,896
16	$0	$31,097	$0	$31,097	7.0%	$10,534
17	$0	$31,097	$0	$31,097	7.0%	$9,845
18	$0	$31,097	$0	$31,097	7.0%	$9,201
19	$0	$31,097	$0	$31,097	7.0%	$8,599
20	$0	$31,097	$10,000	$41,097	7.0%	$10,620
21	$0	$31,097	$0	$31,097	7.0%	$7,510
22	$0	$31,097	$0	$31,097	7.0%	$7,019
23	$0	$31,097	$0	$31,097	7.0%	$6,560
24	$0	$31,097	$0	$31,097	7.0%	$6,131
25	$0	$31,097	$10,000	$41,097	7.0%	$7,572
26	$0	$31,097	$0	$31,097	7.0%	$5,355
27	$0	$31,097	$0	$31,097	7.0%	$5,005
28	$0	$31,097	$0	$31,097	7.0%	$4,677
29	$0	$31,097	$0	$31,097	7.0%	$4,371
30	$0	$31,097	$10,000	$41,097	7.0%	$5,399
TOTAL	**$377,087**	**$986,811**	**$60,000**	**$1,423,898**		**$833,269**
					PV O&M	**$456,182**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
326 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0	**Fencing and Signage[2]**				
3.1	Chain Link Fence	360	LF	$27.57	$9,925
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$10,221**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	2	MONTH	$4,531	$9,062
	Subtotal				**$38,513**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	360	LF	$8.97	$3,228
	Subtotal				**$23,899**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
6.1	Excavate and Load RW[3]	200	CY	$2.12	$425
6.2	Haul RW to Stockpile Area[4]	240	CY	$4.00	$960
6.3	Perimeter Air Sampling	5	EA	$243.76	$1,097
6.4	Equipment Decontamination	10	HR	$54.56	$546
6.5	Stockpile Management	240	CY	$1.44	$345
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$3,372**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks[5]	240	CY	$2.44	$586
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	10	HR	$54.56	$546
7.4	Out-of-Town Transportation of RW[6]	360	TON	$170.00	$61,200
7.5	Out-of-Town Disposal of RW (no treatment)[6, 7]	324	TON	$107.10	$34,700
7.6	Out-of-Town Disposal of RW (treatment)[6, 7]	36	TON	$192.00	$6,912
	Subtotal				**$103,944**

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
326 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	2,700	SF	$1.29	$3,483
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	100	ECY	$9.35	$935
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2,700	SF	$2.27	$6,129
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	45	CY	$11.83	$532
8.14	Install Nonwoven Geotextile Fabric	300	SY	$2.21	$663
	Subtotal				**$37,670**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$251,391**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$15,083
10.2	Engineering and Design (12%)				$30,167
10.3	Construction management (8%)				$20,111
10.4	Location Adjustment (9%)				$22,625
10.5	Contingency (15%)				$37,709
TOTAL OTHER COSTS					**$125,696**
TOTAL CAPITAL COST FOR ALTERNATIVE 8					**$377,087**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 326 Ferry Boulevard Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 2-ft below ground surface.
[4] Volume for hauling RW to the stockpile area for characterization includes a bulking factor of 1.2.
[5] Volume includes all RW intended for disposal.
[6] A conversion factor of 1.5 was used to convert CY to TON.
[7] Volume of RW for Out-of-Town disposal assumes that 10% would be hazardous requiring treatment prior to disposal.
[8] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement.
[10] No floodplains or wetlands would be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

PRESENT VALUE ANALYSIS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
326 FERRY BLVD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$285,303	$0	0	$285,303	7.0%	$285,303
1	$0	$58,041	$0	$58,041	7.0%	$54,244
2	$0	$58,041	$0	$58,041	7.0%	$50,695
3	$0	$31,097	$0	$31,097	7.0%	$25,385
4	$0	$31,097	$0	$31,097	7.0%	$23,724
5	$0	$31,097	$10,000	$41,097	7.0%	$29,302
6	$0	$31,097	$0	$31,097	7.0%	$20,722
7	$0	$31,097	$0	$31,097	7.0%	$19,366
8	$0	$31,097	$0	$31,097	7.0%	$18,099
9	$0	$31,097	$0	$31,097	7.0%	$16,915
10	$0	$31,097	$10,000	$41,097	7.0%	$20,892
11	$0	$31,097	$0	$31,097	7.0%	$14,774
12	$0	$31,097	$0	$31,097	7.0%	$13,808
13	$0	$31,097	$0	$31,097	7.0%	$12,904
14	$0	$31,097	$0	$31,097	7.0%	$12,060
15	$0	$31,097	$10,000	$41,097	7.0%	$14,896
16	$0	$31,097	$0	$31,097	7.0%	$10,534
17	$0	$31,097	$0	$31,097	7.0%	$9,845
18	$0	$31,097	$0	$31,097	7.0%	$9,201
19	$0	$31,097	$0	$31,097	7.0%	$8,599
20	$0	$31,097	$10,000	$41,097	7.0%	$10,620
21	$0	$31,097	$0	$31,097	7.0%	$7,510
22	$0	$31,097	$0	$31,097	7.0%	$7,019
23	$0	$31,097	$0	$31,097	7.0%	$6,560
24	$0	$31,097	$0	$31,097	7.0%	$6,131
25	$0	$31,097	$10,000	$41,097	7.0%	$7,572
26	$0	$31,097	$0	$31,097	7.0%	$5,355
27	$0	$31,097	$0	$31,097	7.0%	$5,005
28	$0	$31,097	$0	$31,097	7.0%	$4,677
29	$0	$31,097	$0	$31,097	7.0%	$4,371
30	$0	$31,097	$10,000	$41,097	7.0%	$5,399
TOTAL	**$285,303**	**$986,811**	**$60,000**	**$1,332,113**		**$741,484**
					PV O&M	**$456,182**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
326 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	360	LF	$27.57	$9,925
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$10,221**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	3	MONTH	$4,531	$13,593
	Subtotal				**$43,044**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	360	LF	$8.97	$3,228
	Subtotal				**$23,899**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	400	CY	$2.12	$849
6.2	Haul RW to Stockpile Area[4]	480	CY	$4.00	$1,920
6.3	Perimeter Air Sampling	9	EA	$243.76	$2,194
6.4	Equipment Decontamination	20	HR	$54.56	$1,091
6.5	Stockpile Management	480	CY	$1.44	$690
6.6	Stockpile Characterization[5]	1	EA	$1,535.00	$1,535
	Subtotal				**$8,280**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks [6]	480	CY	$2.44	$1,172
7.2	Transport RW to in-town consolidation[7]	432	CY	$5.52	$2,386
7.3	Equipment Decontamination	20	HR	$54.56	$1,091
7.4	Out-of-Town Transportation of RW[7, 8]	72	TON	$170.00	$12,240
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	72	TON	$192.00	$13,824
	Subtotal				**$30,714**

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
326 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[9]	2,700	SF	$1.29	$3,483
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	100	CY	$9.35	$935
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2700	SF	$2.27	$6,129
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	265	CY	$11.83	$3,135
8.14	Install Nonwoven Geotextile Fabric	300	SY	$2.21	$663
	Subtotal				**$40,273**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$190,202**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$11,412
10.2	Engineering and Design (12%)				$22,824
10.3	Construction management (8%)				$15,216
10.4	Location Adjustment (9%)				$17,118
10.5	Contingency (15%)				$28,530
TOTAL OTHER COSTS					**$95,101**
TOTAL CAPITAL COST FOR ALTERNATIVE 9					**$285,303**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 326 Ferry Boulevard Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4-ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor).
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement.
[11] No floodplains or wetlands would be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

PRESENT VALUE ANALYSIS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
326 FERRY BLVD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$548,762	$0	0	$548,762	7.0%	$548,762
1	$0	$58,041	$0	$58,041	7.0%	$54,244
2	$0	$58,041	$0	$58,041	7.0%	$50,695
3	$0	$31,097	$0	$31,097	7.0%	$25,385
4	$0	$31,097	$0	$31,097	7.0%	$23,724
5	$0	$31,097	$10,000	$41,097	7.0%	$29,302
6	$0	$31,097	$0	$31,097	7.0%	$20,722
7	$0	$31,097	$0	$31,097	7.0%	$19,366
8	$0	$31,097	$0	$31,097	7.0%	$18,099
9	$0	$31,097	$0	$31,097	7.0%	$16,915
10	$0	$31,097	$10,000	$41,097	7.0%	$20,892
11	$0	$31,097	$0	$31,097	7.0%	$14,774
12	$0	$31,097	$0	$31,097	7.0%	$13,808
13	$0	$31,097	$0	$31,097	7.0%	$12,904
14	$0	$31,097	$0	$31,097	7.0%	$12,060
15	$0	$31,097	$10,000	$41,097	7.0%	$14,896
16	$0	$31,097	$0	$31,097	7.0%	$10,534
17	$0	$31,097	$0	$31,097	7.0%	$9,845
18	$0	$31,097	$0	$31,097	7.0%	$9,201
19	$0	$31,097	$0	$31,097	7.0%	$8,599
20	$0	$31,097	$10,000	$41,097	7.0%	$10,620
21	$0	$31,097	$0	$31,097	7.0%	$7,510
22	$0	$31,097	$0	$31,097	7.0%	$7,019
23	$0	$31,097	$0	$31,097	7.0%	$6,560
24	$0	$31,097	$0	$31,097	7.0%	$6,131
25	$0	$31,097	$10,000	$41,097	7.0%	$7,572
26	$0	$31,097	$0	$31,097	7.0%	$5,355
27	$0	$31,097	$0	$31,097	7.0%	$5,005
28	$0	$31,097	$0	$31,097	7.0%	$4,677
29	$0	$31,097	$0	$31,097	7.0%	$4,371
30	$0	$31,097	$10,000	$41,097	7.0%	$5,399
TOTAL	**$548,762**	**$986,811**	**$60,000**	**$1,595,573**		**$1,004,944**
					PV O&M	**$456,182**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
326 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0	**Fencing and Signage[2]**				
3.1	Chain Link Fence	360	LF	$27.57	$9,925
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$10,221**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	3	MONTH	$4,531	$13,593
	Subtotal				**$43,044**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	360	LF	$8.97	$3,228
	Subtotal				**$23,899**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
6.1	Excavate and Load RW[3]	400	CY	$2.12	$849
6.2	Haul RW to Stockpile Area[4]	480	CY	$4.00	$1,920
6.3	Perimeter Air Sampling	9	EA	$243.76	$2,194
6.4	Equipment Decontamination	20	HR	$54.56	$1,091
6.5	Stockpile Management	480	CY	$1.44	$690
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$6,745**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks[5]	480	CY	$2.44	$1,172
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	20	HR	$54.56	$1,091
7.4	Out-of-Town Transportation of RW[6]	720	TON	$170.00	$122,400
7.5	Out-of-Town Disposal of RW (no treatment)[6, 7]	648	TON	$107.10	$69,401
7.6	Out-of-Town Disposal of RW (treatment)[6, 7]	72	TON	$192.00	$13,824
	Subtotal				**$207,888**

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
326 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	2,700	SF	$1.29	$3,483
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	100	ECY	$9.35	$935
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2,700	SF	$2.27	$6,129
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	265	CY	$11.83	$3,135
8.14	Install Nonwoven Geotextile Fabric	300	SY	$2.21	$663
	Subtotal				**$40,273**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$365,841**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$21,950
10.2	Engineering and Design (12%)				$43,901
10.3	Construction management (8%)				$29,267
10.4	Location Adjustment (9%)				$32,926
10.5	Contingency (15%)				$54,876
TOTAL OTHER COSTS					**$182,921**
TOTAL CAPITAL COST FOR ALTERNATIVE 10					**$548,762**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 326 Ferry Boulevard Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4-ft below ground surface.
[4] Volume for hauling RW to the stockpile area for characterization includes a bulking factor of 1.2.
[5] Volume includes all RW intended for disposal.
[6] A conversion factor of 1.5 was used to convert CY to TON.
[7] Volume of RW for Out-of-Town disposal assumes that 10% would be hazardous requiring treatment prior to disposal.
[8] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement.
[10] No floodplains or wetlands would be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

G-6

576 AND 600 EAST BROADWAY PROPERTIES

COST ESTIMATE BACKUP SHEETS

PRESENT VALUE ANALYSIS
ALTERNATIVE 1 - NO ACTION
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$15,000	$15,000	7.0%	$10,695
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$15,000	$15,000	7.0%	$7,625
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$15,000	$15,000	7.0%	$5,437
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$15,000	$15,000	7.0%	$3,876
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$15,000	$15,000	7.0%	$2,764
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$15,000	$15,000	7.0%	$1,971
TOTAL	**$0**	**$0**	**$90,000**	**$90,000**		**$32,367**
					PV O&M	**$32,367**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review [1]	Total	Discount Rate[2]	Present Value
0	$156,957	$0	$0	$156,957	7.0%	$156,957
1	$0	$79,880	$0	$79,880	7.0%	$74,655
2	$0	$79,880	$0	$79,880	7.0%	$69,771
3	$0	$46,234	$0	$46,234	7.0%	$37,741
4	$0	$46,234	$0	$46,234	7.0%	$35,272
5	$0	$46,234	$15,000	$61,234	7.0%	$43,659
6	$0	$46,234	$0	$46,234	7.0%	$30,808
7	$0	$46,234	$0	$46,234	7.0%	$28,792
8	$0	$46,234	$0	$46,234	7.0%	$26,909
9	$0	$46,234	$0	$46,234	7.0%	$25,148
10	$0	$46,234	$15,000	$61,234	7.0%	$31,128
11	$0	$46,234	$0	$46,234	7.0%	$21,966
12	$0	$46,234	$0	$46,234	7.0%	$20,529
13	$0	$46,234	$0	$46,234	7.0%	$19,186
14	$0	$46,234	$0	$46,234	7.0%	$17,931
15	$0	$46,234	$15,000	$61,234	7.0%	$22,194
16	$0	$46,234	$0	$46,234	7.0%	$15,661
17	$0	$46,234	$0	$46,234	7.0%	$14,637
18	$0	$46,234	$0	$46,234	7.0%	$13,679
19	$0	$46,234	$0	$46,234	7.0%	$12,784
20	$0	$46,234	$15,000	$61,234	7.0%	$15,824
21	$0	$46,234	$0	$46,234	7.0%	$11,166
22	$0	$46,234	$0	$46,234	7.0%	$10,436
23	$0	$46,234	$0	$46,234	7.0%	$9,753
24	$0	$46,234	$0	$46,234	7.0%	$9,115
25	$0	$46,234	$15,000	$61,234	7.0%	$11,282
26	$0	$46,234	$0	$46,234	7.0%	$7,961
27	$0	$46,234	$0	$46,234	7.0%	$7,441
28	$0	$46,234	$0	$46,234	7.0%	$6,954
29	$0	$46,234	$0	$46,234	7.0%	$6,499
30	$0	$46,234	$15,000	$61,234	7.0%	$8,044
TOTAL	**$156,957**	**$1,454,325**	**$90,000**	**$1,701,283**		**$823,882**
					PV O&M	**$666,925**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT
PAGE 1 OF 2

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	2	LS	$22,655	$45,309
	Subtotal				**$45,309**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	15	LF	$35.79	$537
2.3	Install PVC Well Screens (2" diameter)	10	LF	$19.69	$197
2.4	Install PVC Well Casing (2" diameter)	5	LF	$14.79	$74
2.5	Install Filter Pack	12	LF	$15.52	$186
2.6	Install Bentonite Seal	1	EA	$57.23	$57
2.7	Install Annular Seal	2	LF	$69.04	$138
2.8	PVC Well Plugs	1	EA	$27.86	$28
2.9	Flush-Mount Protective Cover with Locking Cap	1	EA	$451.55	$452
2.10	Surface Pad, Concrete 2' x 2'	1	EA	$154.79	$155
2.11	Well Development (2 HR/WELL)	2	EA	$228.23	$456
2.12	IDW Transportation/Disposal (drums)	1	EA	$508.52	$509
	Subtotal				**$5,541**
3.0 Fencing and Signage					
3.1	Chain Link Fence	1,900	LF	$27.57	$52,383
3.2	Signage	19	EA	$73.95	$1,405
	Subtotal				**$53,788**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of Waste	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0 Construction of Low-Permeability Cap					
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.3	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.4	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.5	Place, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[5]	0	SF	$1.29	$0
8.6	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.7	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.8	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.9	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.10	Site Cleanup	0	HR	$405	$0
8.11	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0 Flood Storage Mitigation/Stormwater Management					
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$104,638**
10.0 OTHER COSTS					
10.1	Project Management (6%)				$6,278
10.2	Engineering and Design (12%)				$12,557
10.3	Construction management (8%)				$8,371
10.4	Location Adjustment (9%)				$9,417
10.5	Contingency (15%)				$15,696
TOTAL OTHER COSTS					**$52,319**
TOTAL CAPITAL COST FOR ALTERNATIVE 2					**$156,957**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for 576 and 600 East Broadway Properties.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
CY = cubic yard
ECY = embankment cubic yard (compacted)
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
SY = square yard

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - Field Operations Leader	20	HR	$110	$2,200	see cost assumptions
OM.1.3	Sampling Labor - Sampler	10	HR	$90	$900	see cost assumptions
OM.1.4	Analytical Costs	6	EA	$697	$4,183	see cost assumptions
OM.1.5	Data Validation	6	HR	$110	$660	see cost assumptions
OM.1.6	Report Preparation (annual)	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$11,215**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	see cost assumptions
OM.2.3	Revegetation[2]	0.59	MSF	$56.31	$33	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	235	SF	$1.81	$426	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	63	LF	$27.57	$1,746	see cost assumptions
OM 2.6	Sign Replacement[5]	76	EA	$73.95	$5,620	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	2	EA	$321.75	$644	see cost assumptions
	Subtotal				**$23,919**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	2	EA	$5,000	$10,000	see cost assumptions
	Subtotal				**$11,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$79,880**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$46,234**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for 576 and 600 East Broadway Properties.

[2] Estimated that 1% of vegetated surfaces would require repair annually (need for repair to be established during 5-Year Reviews).

[3] Estimated 5% of asphalt surfaces will require repair annually (need for repair to be established during 5-Year Reviews).

[4] Estimated that 100% of fencing would require replacement over the period of O&M (need for repair to be established during 5-Year Reviews).

[5] Estimated that signage would require replacement 4 times over the period of O&M (need for repair to be established during 5-Year Reviews).

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear feet
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$2,735,437	$0	$0	$2,735,437	7.0%	$2,735,437
1	$0	$75,612	$0	$75,612	7.0%	$70,665
2	$0	$75,612	$0	$75,612	7.0%	$66,043
3	$0	$41,966	$0	$41,966	7.0%	$34,257
4	$0	$41,966	$0	$41,966	7.0%	$32,016
5	$0	$41,966	$15,000	$56,966	7.0%	$40,616
6	$0	$41,966	$0	$41,966	7.0%	$27,964
7	$0	$41,966	$0	$41,966	7.0%	$26,134
8	$0	$41,966	$0	$41,966	7.0%	$24,425
9	$0	$41,966	$0	$41,966	7.0%	$22,827
10	$0	$41,966	$15,000	$56,966	7.0%	$28,959
11	$0	$41,966	$0	$41,966	7.0%	$19,938
12	$0	$41,966	$0	$41,966	7.0%	$18,633
13	$0	$41,966	$0	$41,966	7.0%	$17,414
14	$0	$41,966	$0	$41,966	7.0%	$16,275
15	$0	$41,966	$15,000	$56,966	7.0%	$20,647
16	$0	$41,966	$0	$41,966	7.0%	$14,215
17	$0	$41,966	$0	$41,966	7.0%	$13,285
18	$0	$41,966	$0	$41,966	7.0%	$12,416
19	$0	$41,966	$0	$41,966	7.0%	$11,604
20	$0	$41,966	$15,000	$56,966	7.0%	$14,721
21	$0	$41,966	$0	$41,966	7.0%	$10,135
22	$0	$41,966	$0	$41,966	7.0%	$9,472
23	$0	$41,966	$0	$41,966	7.0%	$8,853
24	$0	$41,966	$0	$41,966	7.0%	$8,273
25	$0	$41,966	$15,000	$56,966	7.0%	$10,496
26	$0	$41,966	$0	$41,966	7.0%	$7,226
27	$0	$41,966	$0	$41,966	7.0%	$6,754
28	$0	$41,966	$0	$41,966	7.0%	$6,312
29	$0	$41,966	$0	$41,966	7.0%	$5,899
30	$0	$41,966	$15,000	$56,966	7.0%	$7,483
TOTAL	**$2,735,437**	**$1,326,276**	**$90,000**	**$4,151,713**		**$3,349,396**
					PV O&M	**$613,959**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	2	LS	$22,655	$45,309
	Subtotal				**$45,309**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	15	LF	$35.79	$537
2.3	Install PVC Well Screens (2" diameter)	10	LF	$19.69	$197
2.4	Install PVC Well Casing (2" diameter)	5	LF	$14.79	$74
2.5	Install Filter Pack	12	LF	$15.52	$186
2.6	Install Bentonite Seal	1	EA	$57.23	$57
2.7	Install Annular Seal	2	LF	$69.04	$138
2.8	PVC Well Plugs	1	EA	$27.86	$28
2.9	Flush-Mount Protective Cover with Locking Cap	1	EA	$451.55	$452
2.10	Surface Pad, Concrete 2' x 2'	1	EA	$154.79	$155
2.11	Well Development (2 HR/WELL)	2	EA	$228.23	$456
2.12	IDW Transportation/Disposal (drums)	1	EA	$508.52	$509
	Subtotal				**$5,541**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	1,900	LF	$27.57	$52,383
3.2	Signage	19	EA	$73.95	$1,405
	Subtotal				**$53,788**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	14	MONTH	$4,531	$63,433
	Subtotal				**$92,884**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	1	ACRE	$3,968.29	$3,968
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	1,900	LF	$8.97	$17,036
	Subtotal				**$41,675**
6.0 Excavation of Raymark Waste/Soil					
6.1	Excavate and Load RW[3]	5,333	CY	$2.12	$11,326
6.2	Haul RW to Stockpile Area[4]	6,400	CY	$4.00	$25,603
6.3	Perimeter Air Sampling	120	EA	$243.76	$29,251
6.4	Equipment Decontamination	222	HR	$54.56	$12,125
6.5	Stockpile Management	6,400	CY	$1.44	$9,198
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$87,503**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks	0	CY	$2.44	$0.00
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0.00
7.3	Equipment Decontamination	0	HR	$54.56	$0.00
7.4	Out-of-Town Transportation of Waste	0	TON	$170.00	$0.00
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0.00
7.6	Out-of-Town Disposal of Waste (treatment)	0	TON	$192.00	$0.00
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[5]	5,760	CY	$2.40	$13,838
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[5]	2,689	CY	$27.00	$72,587
8.3	Install Geosynthetic Clay Liner (bottom layer)	132,000	SF	$2.86	$377,845
8.4	Install 60 mil HDPE liner	132,000	SF	$2.84	$375,129
8.5	Install Geosynthetic Drainage Layer	132,000	SF	$0.65	$86,327
8.6	Furnish, Spread, and Compact Soil Layer (24")[5]	10,756	CY	$11.83	$127,236
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[6]	168,000	SF	$1.29	$216,720
8.8	Furnish, Place, and Spread Topsoil (6")[5, 7]	3,326	CY	$34.65	$115,261
8.9	Hydroseeding with Mulch and Fertilizer[8]	163	MSF	$43.97	$7,181
8.10	Place, Spread, and Compact Asphalt Base Course (12")	174	ECY	$9.35	$1,628
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	4,700	SF	$2.27	$10,669
8.12	Site Cleanup	64	HR	$405	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	4,881	CY	$11.83	$57,736
8.14	Install Nonwoven Geotextile Fabric	4,000	SY	$2.21	$8,840
	Subtotal				**$1,496,925**
9.0	**Flood Storage Mitigation/Stormwater Management[9]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$1,823,625**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$109,417
10.2	Engineering and Design (12%)				$218,835
10.3	Construction management (8%)				$145,890
10.4	Location Adjustment (9%)				$164,126
10.5	Contingency (15%)				$273,544
TOTAL OTHER COSTS					**$911,812**
TOTAL CAPITAL COST FOR ALTERNATIVE 3					**$2,735,437**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for 576 and 600 East Broadway Properties.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW/Soil includes a bulking factor of 1.2.
[5] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement;
Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[6] Delineation ("warning") layer is included for both the RCRA cap area (132,000 SF) and the excavation footprint above waste left in-place.
[7] Area estimated for topsoil includes low-permeability cap surface area and RW excavation footprint excluding surface area currently coved by asphalt.
[8] Area estimated for hydroseeding includes low-permeability cap surface area and RW excavation footprint excluding surface area currently coved by asphalt.
[9] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
CY = cubic yard
ECY = embankment cubic yard (compacted)
LF = linear foot
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - Field Operations Leader	20	HR	$110	$2,200	see cost assumptions
OM.1.3	Sampling Labor - Sampler	10	HR	$90	$900	see cost assumptions
OM.1.4	Analytical Costs	6	EA	$697	$4,183	see cost assumptions
OM.1.5	Data Validation	6	HR	$110	$660	see cost assumptions
OM.1.6	Report Preparation (annual)	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$11,215**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	327	MSF	$7.34	$2,396	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	1.63	MSF	$56.31	$92	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	235	SF	$1.81	$426	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LS	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	4	EA	$321.75	$1,287	see cost assumptions
	Subtotal				**$19,651**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	2	EA	$5,000.00	$10,000	see cost assumptions
	Subtotal				**$11,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$75,612**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$41,966**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for 576 and 600 East Broadway Properties.

[2] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[3] Assumed 5% of asphalt surfaces will require repair annually.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear feet
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review	Total	Discount Rate	Present Value
0	$0	$0	0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Notes:

This Alternative is not applicable to this property group - see Section 4.6 of the FS.

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.10	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0	**Fencing and Signage**				
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.95	$0
	Subtotal				**$0**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction**				
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of Waste	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.3	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.4	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.5	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[5]	0	SF	$1.29	$0
8.6	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.7	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.8	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.9	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.10	Site Cleanup	0	HR	$405	$0
8.11	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 4					**$0**

Notes:
This Alternative is not applicable to this property group - see Section 4.6 of the FS.

PRESENT VALUE ANALYSIS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$3,059,326	$0	$0	$3,059,326	7.0%	$3,059,326
1	$0	$60,414	$0	$60,414	7.0%	$56,462
2	$0	$60,414	$0	$60,414	7.0%	$52,768
3	$0	$15,553	$0	$15,553	7.0%	$12,696
4	$0	$15,553	$0	$15,553	7.0%	$11,865
5	$0	$15,553	$15,000	$30,553	7.0%	$21,784
6	$0	$15,553	$0	$15,553	7.0%	$10,364
7	$0	$15,553	$0	$15,553	7.0%	$9,686
8	$0	$15,553	$0	$15,553	7.0%	$9,052
9	$0	$15,553	$0	$15,553	7.0%	$8,460
10	$0	$15,553	$15,000	$30,553	7.0%	$15,532
11	$0	$15,553	$0	$15,553	7.0%	$7,389
12	$0	$15,553	$0	$15,553	7.0%	$6,906
13	$0	$15,553	$0	$15,553	7.0%	$6,454
14	$0	$15,553	$0	$15,553	7.0%	$6,032
15	$0	$15,553	$15,000	$30,553	7.0%	$11,074
16	$0	$15,553	$0	$15,553	7.0%	$5,268
17	$0	$15,553	$0	$15,553	7.0%	$4,924
18	$0	$15,553	$0	$15,553	7.0%	$4,602
19	$0	$15,553	$0	$15,553	7.0%	$4,300
20	$0	$15,553	$15,000	$30,553	7.0%	$7,895
21	$0	$15,553	$0	$15,553	7.0%	$3,756
22	$0	$15,553	$0	$15,553	7.0%	$3,510
23	$0	$15,553	$0	$15,553	7.0%	$3,281
24	$0	$15,553	$0	$15,553	7.0%	$3,066
25	$0	$15,553	$15,000	$30,553	7.0%	$5,629
26	$0	$15,553	$0	$15,553	7.0%	$2,678
27	$0	$15,553	$0	$15,553	7.0%	$2,503
28	$0	$15,553	$0	$15,553	7.0%	$2,339
29	$0	$15,553	$0	$15,553	7.0%	$2,186
30	$0	$15,553	$15,000	$30,553	7.0%	$4,014
TOTAL	**$3,059,326**	**$556,308**	**$90,000**	**$3,705,634**		**$3,365,799**
					PV O&M	**$306,473**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	2	LS	$22,655	$45,309
	Subtotal				**$45,309**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	15	LF	$35.79	$537
2.3	Install PVC Well Screens (2" diameter)	10	LF	$19.69	$197
2.4	Install PVC Well Casing (2" diameter)	5	LF	$14.79	$74
2.5	Install Filter Pack	12	LF	$15.52	$186
2.6	Install Bentonite Seal	1	EA	$57.23	$57
2.7	Install Annular Seal	2	LF	$69.04	$138
2.8	PVC Well Plugs	1	EA	$27.86	$28
2.9	Flush-Mount Protective Cover with Locking Cap	1	EA	$451.55	$452
2.10	Surface Pad, Concrete 2' x 2'	1	EA	$154.79	$155
2.11	Well Development (2 HR/WELL)	2	EA	$228.23	$456
2.12	IDW Transportation/Disposal (drums)	1	EA	$508.52	$509
	Subtotal				**$5,541**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	1,900	LF	$27.57	$52,383
3.2	Signage	19	EA	$73.95	$1,405
	Subtotal				**$53,788**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	10	MONTH	$4,531	$45,309
	Subtotal				**$74,760**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	1	ACRE	$3,968.29	$3,968
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	1,900	LF	$8.97	$17,036
	Subtotal				**$41,675**
6.0 Excavation of Raymark Waste/Soil					
6.1	Excavate and Load RW/Soil[3]	17,067	CY	$2.12	$36,242
6.2	Haul RW/Soil to Stockpile Area[4]	20,480	CY	$4.00	$81,930
6.3	Perimeter Air Sampling	384	EA	$243.76	$93,604
6.4	Equipment Decontamination	853	HR	$54.56	$46,562
6.5	Stockpile Management	20,480	CY	$1.44	$29,433
6.6	Stockpile Characterization[5]	41	EA	$1,535.00	$62,935
	Subtotal				**$350,706**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	17,067	CY	$2.44	$41,679
7.2	Transport RW to in-town consolidation[7]	15,360	CY	$5.52	$84,840
7.3	Equipment Decontamination	711	HR	$54.56	$38,801
7.4	Out-of-Town Transportation of Waste[7, 8]	2,560	TON	$170.00	$435,200
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)[7, 8]	2,560	TON	$192.00	$491,520
	Subtotal				**$1,092,040**

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[9]	3,072	CY	$2.40	$7,380
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[10]	64,000	SF	$1.29	$82,560
8.8	Furnish, Place, and Spread Topsoil (6")[9]	1,990	CY	$34.65	$68,959
8.9	Hydroseeding with Mulch and Fertilizer	98	MSF	$43.97	$4,296
8.10	Place, Spread, and Compact Asphalt Base Course (12")	174	ECY	$9.35	$1,628
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	4,700	SF	$2.27	$10,669
8.12	Site Cleanup	64	HR	$405	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	13,407	CY	$11.83	$158,596
8.14	Install Nonwoven Geotextile Fabric	7,111	SY	$2.21	$15,716
	Subtotal				**$375,732**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$2,039,551**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$122,373
10.2	Engineering and Design (12%)				$244,746
10.3	Construction management (8%)				$163,164
10.4	Location Adjustment (9%)				$183,560
10.5	Contingency (15%)				$305,933
TOTAL OTHER COSTS					**$1,019,775**
TOTAL CAPITAL COST FOR ALTERNATIVE 5					**$3,059,326**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for 576 and 600 East Broadway Properties.

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW and additional soil (to be excavated for safety benching/sloping) to be excavated to a depth of 6 ft below ground surface.

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benchin

[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[8] A conversion factor of 1.5 was used to convert CY to TON.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[10] Delineation ("warning") layer included for excavation area where waste is left-in-place.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - Field Operations Leader	20	HR	$110	$2,200	see cost assumptions
OM.1.3	Sampling Labor - Sampler	10	HR	$90	$900	see cost assumptions
OM.1.4	Analytical Costs	6	EA	$697	$4,183	see cost assumptions
OM.1.5	Data Validation	6	HR	$110	$660	see cost assumptions
OM.1.6	Report Preparation (annual)	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$11,215**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	10	HR	$110.00	$1,100	see cost assumptions
OM.2.2	Mowing (twice per year)[2]	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[3]	0.59	MSF	$56.31	$33	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[4]	235	SF	$1.81	$426	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[5]	0	LS	$73.95	$0	see cost assumptions
OM 2.6	Sign Replacement[6]	0	EA	$2,250.00	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	2	EA	$321.75	$644	see cost assumptions
	Subtotal				**$4,453**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	2	EA	$5,000.00	$10,000	see cost assumptions
	Subtotal				**$11,100**	
ANNUAL O&M COST (YEARS 1-2)[7]					**$60,414**	
ANNUAL O&M COST (YEARS 3-30)[8]					**$15,553**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for 576 and 600 East Broadway Properties.

[2] Mowing would not be required for excavation of Raymark waste to the seasonal high groundwater table.

[3] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[4] Assumed 5% of asphalt surfaces will require repair annually.

[5] Assume fencing will not be required following remedial action.

[6] Assume signage will not be required following remedial action.

[7] O&M for Years 1 and 2 include quarterly groundwater monitoring with annual inspection/repairs of ground surface and annual deed inspection, with one annual report for all O&M activities.

[8] O&M for Years 3 - 30 include annual inspection and repairs to ground surface and annual deed inspection, but may not require additional groundwater sampling pending analytical data and concurrence from the State following the first 2 years of data collection, therefore additional groundwater sampling is not included.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear feet
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$12,430,357	$0	$0	$12,430,357	7.0%	$12,430,357
1	$0	$60,414	$0	$60,414	7.0%	$56,462
2	$0	$60,414	$0	$60,414	7.0%	$52,768
3	$0	$15,553	$0	$15,553	7.0%	$12,696
4	$0	$15,553	$0	$15,553	7.0%	$11,865
5	$0	$15,553	$15,000	$30,553	7.0%	$21,784
6	$0	$15,553	$0	$15,553	7.0%	$10,364
7	$0	$15,553	$0	$15,553	7.0%	$9,686
8	$0	$15,553	$0	$15,553	7.0%	$9,052
9	$0	$15,553	$0	$15,553	7.0%	$8,460
10	$0	$15,553	$15,000	$30,553	7.0%	$15,532
11	$0	$15,553	$0	$15,553	7.0%	$7,389
12	$0	$15,553	$0	$15,553	7.0%	$6,906
13	$0	$15,553	$0	$15,553	7.0%	$6,454
14	$0	$15,553	$0	$15,553	7.0%	$6,032
15	$0	$15,553	$15,000	$30,553	7.0%	$11,074
16	$0	$15,553	$0	$15,553	7.0%	$5,268
17	$0	$15,553	$0	$15,553	7.0%	$4,924
18	$0	$15,553	$0	$15,553	7.0%	$4,602
19	$0	$15,553	$0	$15,553	7.0%	$4,300
20	$0	$15,553	$15,000	$30,553	7.0%	$7,895
21	$0	$15,553	$0	$15,553	7.0%	$3,756
22	$0	$15,553	$0	$15,553	7.0%	$3,510
23	$0	$15,553	$0	$15,553	7.0%	$3,281
24	$0	$15,553	$0	$15,553	7.0%	$3,066
25	$0	$15,553	$15,000	$30,553	7.0%	$5,629
26	$0	$15,553	$0	$15,553	7.0%	$2,678
27	$0	$15,553	$0	$15,553	7.0%	$2,503
28	$0	$15,553	$0	$15,553	7.0%	$2,339
29	$0	$15,553	$0	$15,553	7.0%	$2,186
30	$0	$15,553	$15,000	$30,553	7.0%	$4,014
TOTAL	**$12,430,357**	**$556,308**	**$90,000**	**$13,076,665**		**$12,736,830**
					PV O&M	**$306,473**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	2	LS	$22,655	$45,309
	Subtotal				**$45,309**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	15	LF	$35.79	$537
2.3	Install PVC Well Screens (2" diameter)	10	LF	$19.69	$197
2.4	Install PVC Well Casing (2" diameter)	5	LF	$14.79	$74
2.5	Install Filter Pack	12	LF	$15.52	$186
2.6	Install Bentonite Seal	1	EA	$57.23	$57
2.7	Install Annular Seal	2	LF	$69.04	$138
2.8	PVC Well Plugs	1	EA	$27.86	$28
2.9	Flush-Mount Protective Cover with Locking Cap	1	EA	$451.55	$452
2.10	Surface Pad, Concrete 2' x 2'	1	EA	$154.79	$155
2.11	Well Development (2 HR/WELL)	2	EA	$228.23	$456
2.12	IDW Transportation/Disposal (drums)	1	EA	$508.52	$509
	Subtotal				**$5,541**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	1,900	LF	$27.57	$52,383
3.2	Signage	19	EA	$73.95	$1,405
	Subtotal				**$53,788**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	10	MONTH	$4,531	$45,309
	Subtotal				**$74,760**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	1	ACRE	$3,968.29	$3,968
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	1,900	LF	$8.97	$17,036
	Subtotal				**$41,675**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[3]	17,067	CY	$2.12	$36,242
6.2	Haul RW/Soil to Stockpile Area[4]	20,480	CY	$4.00	$81,930
6.3	Perimeter Air Sampling	384	EA	$243.76	$93,604
6.4	Equipment Decontamination	853	HR	$54.56	$46,562
6.5	Stockpile Management	20,480	CY	$1.44	$29,433
6.6	Stockpile Characterization[5]	7	EA	$1,535.00	$10,745
	Subtotal				**$298,516**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	17,067	CY	$2.44	$41,679
7.2	Transport RW to In-Town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	711	HR	$54.56	$38,801
7.4	Out-of-Town Transportation of Waste[7]	25,600	TON	$170.00	$4,352,000
7.5	Out-of-Town Disposal of Waste (no treatment)[7, 8]	23,040	TON	$107.10	$2,467,584
7.6	Out-of-Town Disposal of Waste (treatment)[7, 8]	2,560	TON	$192.00	$491,520
	Subtotal				**$7,391,584**

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[9]	3072	CY	$2.40	$7,380
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[10]	64000	SF	$1.29	$82,560
8.8	Furnish, Place, and Spread Topsoil (6")[9]	1990	CY	$34.65	$68,959
8.9	Hydroseeding with Mulch and Fertilizer	98	MSF	$43.97	$4,296
8.10	Place, Spread, and Compact Asphalt Base Course (12")	174	ECY	$9.35	$1,628
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	4,700	SF	$2.27	$10,669
8.12	Site Cleanup	64	HR	$405	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	13,407	CY	$11.83	$158,596
8.14	Install Nonwoven Geotextile Fabric	7,111	SY	$2.21	$15,716
	Subtotal				**$375,732**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$8,286,905**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$497,214
10.2	Engineering and Design (12%)				$994,429
10.3	Construction management (8%)				$662,952
10.4	Location Adjustment (9%)				$745,821
10.5	Contingency (15%)				$1,243,036
TOTAL OTHER COSTS					**$4,143,452**
TOTAL CAPITAL COST FOR ALTERNATIVE 6					**$12,430,357**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for 576 and 600 East Broadway Properties.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW and additional soil (to be excavated for safety benching/sloping) to be excavated to a depth of 6 ft below ground surface.
[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).
[7] A conversion factor of 1.5 was used to convert CY to TON.
[8] Volume of RW for Out-of-Town disposal excludes 10% assumed to be hazardous requiring treatment prior to disposal .
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.
[10] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
ECY = embankment cubic yard (compacted)
CY = cubic yard
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$2,074,496	$0	0	$2,074,496	7.0%	$2,074,496
1	$0	$74,028	$0	$74,028	7.0%	$69,185
2	$0	$74,028	$0	$74,028	7.0%	$64,659
3	$0	$40,382	$0	$40,382	7.0%	$32,963
4	$0	$40,382	$0	$40,382	7.0%	$30,807
5	$0	$40,382	$15,000	$55,382	7.0%	$39,486
6	$0	$40,382	$0	$40,382	7.0%	$26,908
7	$0	$40,382	$0	$40,382	7.0%	$25,148
8	$0	$40,382	$0	$40,382	7.0%	$23,503
9	$0	$40,382	$0	$40,382	7.0%	$21,965
10	$0	$40,382	$15,000	$55,382	7.0%	$28,153
11	$0	$40,382	$0	$40,382	7.0%	$19,185
12	$0	$40,382	$0	$40,382	7.0%	$17,930
13	$0	$40,382	$0	$40,382	7.0%	$16,757
14	$0	$40,382	$0	$40,382	7.0%	$15,661
15	$0	$40,382	$15,000	$55,382	7.0%	$20,073
16	$0	$40,382	$0	$40,382	7.0%	$13,679
17	$0	$40,382	$0	$40,382	7.0%	$12,784
18	$0	$40,382	$0	$40,382	7.0%	$11,947
19	$0	$40,382	$0	$40,382	7.0%	$11,166
20	$0	$40,382	$15,000	$55,382	7.0%	$14,312
21	$0	$40,382	$0	$40,382	7.0%	$9,753
22	$0	$40,382	$0	$40,382	7.0%	$9,115
23	$0	$40,382	$0	$40,382	7.0%	$8,518
24	$0	$40,382	$0	$40,382	7.0%	$7,961
25	$0	$40,382	$15,000	$55,382	7.0%	$10,204
26	$0	$40,382	$0	$40,382	7.0%	$6,954
27	$0	$40,382	$0	$40,382	7.0%	$6,499
28	$0	$40,382	$0	$40,382	7.0%	$6,073
29	$0	$40,382	$0	$40,382	7.0%	$5,676
30	$0	$40,382	$15,000	$55,382	7.0%	$7,275
TOTAL	**$2,074,496**	**$1,278,743**	**$90,000**	**$3,443,239**		**$2,668,794**
					PV O&M	**$594,298**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	2	LS	$22,655	$45,309
	Subtotal				**$45,309**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	15	LF	$35.79	$537
2.3	Install PVC Well Screens (2" diameter)	10	LF	$19.69	$197
2.4	Install PVC Well Casing (2" diameter)	5	LF	$14.79	$74
2.5	Install Filter Pack	12	LF	$15.52	$186
2.6	Install Bentonite Seal	1	EA	$57.23	$57
2.7	Install Annular Seal	2	LF	$69.04	$138
2.8	PVC Well Plugs	1	EA	$27.86	$28
2.9	Flush-Mount Protective Cover with Locking Cap	1	EA	$451.55	$452
2.10	Surface Pad, Concrete 2' x 2'	1	EA	$154.79	$155
2.11	Well Development (2 HR/WELL)	2	EA	$228.23	$456
2.12	IDW Transportation/Disposal (drums)	1	EA	$508.52	$509
	Subtotal				**$5,541**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	1,900	LF	$27.57	$52,383
3.2	Signage	19	EA	$73.95	$1,405
	Subtotal				**$53,788**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	8	MONTH	$4,531	$36,247
	Subtotal				**$65,698**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	1	ACRE	$3,968.29	$3,968
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	1,900	LF	$8.97	$17,036
	Subtotal				**$41,675**
6.0 Excavation of Raymark Waste/Soil					
6.1	Excavate and Load RW[3]	9,133	CY	$2.12	$19,395
6.2	Haul RW/Soil to Stockpile Area[4]	10,960	CY	$4.00	$43,845
6.3	Perimeter Air Sampling	206	EA	$243.76	$50,093
6.4	Equipment Decontamination	457	HR	$54.56	$24,918
6.5	Stockpile Management	10,960	CY	$1.44	$15,751
6.6	Stockpile Characterization[5]	22	EA	$1,535.00	$33,770
	Subtotal				**$187,772**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	10,960	CY	$2.44	$26,766
7.2	Transport RW to in-town consolidation[7]	9,864	CY	$5.52	$54,483
7.3	Equipment Decontamination	457	HR	$54.56	$24,918
7.4	Out-of-Town Transportation of Waste[7, 8]	1,644	TON	$170.00	$279,480
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)[7, 8]	1,644	TON	$192.00	$315,648
	Subtotal				**$701,294**

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Place, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[9]	64,000	SF	$1.29	$82,560
8.8	Furnish, Place, and Spread Topsoil (6")[10]	1,208	CY	$34.65	$41,855
8.9	Hydroseeding with Mulch and Fertilizer	59	MSF	$43.97	$2,608
8.10	Place, Spread, and Compact Asphalt Base Course (12")	174	ECY	$9.35	$1,628
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	4,700	SF	$2.27	$10,669
8.12	Site Cleanup	64	HR	$405	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	8,534	CY	$11.83	$100,956
8.14	Install Nonwoven Geotextile Fabric	7,111	SY	$2.21	$15,716
	Subtotal				**$281,919**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$1,382,997**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$82,980
10.2	Engineering and Design (12%)				$165,960
10.3	Construction management (8%)				$110,640
10.4	Location Adjustment (9%)				$124,470
10.5	Contingency (15%)				$207,450
TOTAL OTHER COSTS					**$691,499**
TOTAL CAPITAL COST FOR ALTERNATIVE 7					**$2,074,496**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for 576 and 600 East Broadway Properties.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 2 or 4 ft below ground surface.
[4] Volume for hauling RW includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor) .
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement;
Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
ECY = embankment cubic yard (compacted)
CY = cubic yard
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEE WITH OUT-OF-TOWN DISPOSAL
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - Field Operations Leader	20	HR	$110	$2,200	see cost assumptions
OM.1.3	Sampling Labor - Sampler	10	HR	$90	$900	see cost assumptions
OM.1.4	Analytical Costs	6	EA	$697	$4,183	see cost assumptions
OM.1.5	Data Validation	6	HR	$110	$660	see cost assumptions
OM.1.6	Report Preparation (annual)	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$11,215**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	119	MSF	$7.34	$870	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.59	MSF	$56.31	$33	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	235	SF	$1.81	$426	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LS	$321.75	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$1,100.00	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	4	EA	$321.75	$1,287	see cost assumptions
	Subtotal				**$18,066**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	2	EA	$5,000.00	$10,000	see cost assumptions
	Subtotal				**$11,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$74,028**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$40,382**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for 576 and 600 East Broadway Properties.

[2] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[3] Assumed 5% of asphalt surfaces will require repair annually.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear feet
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$8,092,074	$0	0	$8,092,074	7.0%	$8,092,074
1	$0	$74,028	$0	$74,028	7.0%	$69,185
2	$0	$74,028	$0	$74,028	7.0%	$64,659
3	$0	$40,382	$0	$40,382	7.0%	$32,963
4	$0	$40,382	$0	$40,382	7.0%	$30,807
5	$0	$40,382	$15,000	$55,382	7.0%	$39,486
6	$0	$40,382	$0	$40,382	7.0%	$26,908
7	$0	$40,382	$0	$40,382	7.0%	$25,148
8	$0	$40,382	$0	$40,382	7.0%	$23,503
9	$0	$40,382	$0	$40,382	7.0%	$21,965
10	$0	$40,382	$15,000	$55,382	7.0%	$28,153
11	$0	$40,382	$0	$40,382	7.0%	$19,185
12	$0	$40,382	$0	$40,382	7.0%	$17,930
13	$0	$40,382	$0	$40,382	7.0%	$16,757
14	$0	$40,382	$0	$40,382	7.0%	$15,661
15	$0	$40,382	$15,000	$55,382	7.0%	$20,073
16	$0	$40,382	$0	$40,382	7.0%	$13,679
17	$0	$40,382	$0	$40,382	7.0%	$12,784
18	$0	$40,382	$0	$40,382	7.0%	$11,947
19	$0	$40,382	$0	$40,382	7.0%	$11,166
20	$0	$40,382	$15,000	$55,382	7.0%	$14,312
21	$0	$40,382	$0	$40,382	7.0%	$9,753
22	$0	$40,382	$0	$40,382	7.0%	$9,115
23	$0	$40,382	$0	$40,382	7.0%	$8,518
24	$0	$40,382	$0	$40,382	7.0%	$7,961
25	$0	$40,382	$15,000	$55,382	7.0%	$10,204
26	$0	$40,382	$0	$40,382	7.0%	$6,954
27	$0	$40,382	$0	$40,382	7.0%	$6,499
28	$0	$40,382	$0	$40,382	7.0%	$6,073
29	$0	$40,382	$0	$40,382	7.0%	$5,676
30	$0	$40,382	$15,000	$55,382	7.0%	$7,275
TOTAL	**$8,092,074**	**$1,278,743**	**$90,000**	**$9,460,817**		**$8,686,372**
					PV O&M	**$594,298**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	2	LS	$22,655	$45,309
	Subtotal				**$45,309**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	15	LF	$35.79	$537
2.3	Install PVC Well Screens (2" diameter)	10	LF	$19.69	$197
2.4	Install PVC Well Casing (2" diameter)	5	LF	$14.79	$74
2.5	Install Filter Pack	12	LF	$15.52	$186
2.6	Install Bentonite Seal	1	EA	$57.23	$57
2.7	Install Annular Seal	2	LF	$69.04	$138
2.8	PVC Well Plugs	1	EA	$27.86	$28
2.9	Flush-Mount Protective Cover with Locking Cap	1	EA	$451.55	$452
2.10	Surface Pad, Concrete 2' x 2'	1	EA	$154.79	$155
2.11	Well Development (2 HR/WELL)	2	EA	$228.23	$456
2.12	IDW Transportation/Disposal (drums)	1	EA	$508.52	$509
	Subtotal				**$5,541**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	1,900	LF	$27.57	$52,383
3.2	Signage	19	EA	$73.95	$1,405
	Subtotal				**$53,788**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	8	MONTH	$4,531	$36,247
	Subtotal				**$65,698**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	1	ACRE	$3,968.29	$3,968
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	1,900	LF	$8.97	$17,036
	Subtotal				**$41,675**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	9,133	CY	$2.12	$19,395
6.2	Haul RW/Soil to Stockpile Area[4]	10,960	CY	$4.00	$43,845
6.3	Perimeter Air Sampling	206	EA	$243.76	$50,093
6.4	Equipment Decontamination	457	HR	$54.56	$24,918
6.5	Stockpile Management	10,960	CY	$1.44	$15,751
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$154,002**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[5]	10,960	CY	$2.44	$26,766
7.2	Transport RW to In-Town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	457	HR	$54.56	$24,918
7.4	Out-of-Town Transportation of Waste[6]	16,440	TON	$170.00	$2,794,800
7.5	Out-of-Town Disposal of Waste (no treatment)[6, 7]	14,796	TON	$107.10	$1,584,652
7.6	Out-of-Town Disposal of Waste (treatment)[6, 7]	1,644	TON	$192.00	$315,648
	Subtotal				**$4,746,783**

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	64,000	SF	$1.29	$82,560
8.8	Furnish, Place, and Spread Topsoil (6")[9]	1,208	CY	$34.65	$41,855
8.9	Hydroseeding with Mulch and Fertilizer	59	MSF	$43.97	$2,608
8.10	Place, Spread, and Compact Asphalt Base Course (12")	174	ECY	$9.35	$1,628
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	4,700	SF	$2.27	$10,669
8.12	Site Cleanup	64	HR	$405	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	8,534	CY	$11.83	$100,956
8.14	Install Nonwoven Geotextile Fabric	7,111	SY	$2.21	$15,716
	Subtotal				**$281,919**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$5,394,716**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$323,683
10.2	Engineering and Design (12%)				$647,366
10.3	Construction management (8%)				$431,577
10.4	Location Adjustment (9%)				$485,524
10.5	Contingency (15%)				$809,207
TOTAL OTHER COSTS					**$2,697,358**
TOTAL CAPITAL COST FOR ALTERNATIVE 8					**$8,092,074**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for 576 and 600 East Broadway Properties.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 2 or 4 ft below ground surface.
[4] Volume for hauling RW includes a bulking factor of 1.2.
[5] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor).
[6] A conversion factor of 1.5 was used to convert CY to TON.
[7] Volume of RW for Out-of-Town disposal excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement;
Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[10] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
ECY = embankment cubic yard (compacted)
CY = cubic yard
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$2,132,498	$0	0	$2,132,498	7.0%	$2,132,498
1	$0	$74,028	$0	$74,028	7.0%	$69,185
2	$0	$74,028	$0	$74,028	7.0%	$64,659
3	$0	$40,382	$0	$40,382	7.0%	$32,963
4	$0	$40,382	$0	$40,382	7.0%	$30,807
5	$0	$40,382	$15,000	$55,382	7.0%	$39,486
6	$0	$40,382	$0	$40,382	7.0%	$26,908
7	$0	$40,382	$0	$40,382	7.0%	$25,148
8	$0	$40,382	$0	$40,382	7.0%	$23,503
9	$0	$40,382	$0	$40,382	7.0%	$21,965
10	$0	$40,382	$15,000	$55,382	7.0%	$28,153
11	$0	$40,382	$0	$40,382	7.0%	$19,185
12	$0	$40,382	$0	$40,382	7.0%	$17,930
13	$0	$40,382	$0	$40,382	7.0%	$16,757
14	$0	$40,382	$0	$40,382	7.0%	$15,661
15	$0	$40,382	$15,000	$55,382	7.0%	$20,073
16	$0	$40,382	$0	$40,382	7.0%	$13,679
17	$0	$40,382	$0	$40,382	7.0%	$12,784
18	$0	$40,382	$0	$40,382	7.0%	$11,947
19	$0	$40,382	$0	$40,382	7.0%	$11,166
20	$0	$40,382	$15,000	$55,382	7.0%	$14,312
21	$0	$40,382	$0	$40,382	7.0%	$9,753
22	$0	$40,382	$0	$40,382	7.0%	$9,115
23	$0	$40,382	$0	$40,382	7.0%	$8,518
24	$0	$40,382	$0	$40,382	7.0%	$7,961
25	$0	$40,382	$15,000	$55,382	7.0%	$10,204
26	$0	$40,382	$0	$40,382	7.0%	$6,954
27	$0	$40,382	$0	$40,382	7.0%	$6,499
28	$0	$40,382	$0	$40,382	7.0%	$6,073
29	$0	$40,382	$0	$40,382	7.0%	$5,676
30	$0	$40,382	$15,000	$55,382	7.0%	$7,275
TOTAL	**$2,132,498**	**$1,278,743**	**$90,000**	**$3,501,241**		**$2,726,796**
					PV O&M	**$594,298**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	2	LS	$22,655	$45,309
	Subtotal				**$45,309**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	15	LF	$35.79	$537
2.3	Install PVC Well Screens (2" diameter)	10	LF	$19.69	$197
2.4	Install PVC Well Casing (2" diameter)	5	LF	$14.79	$74
2.5	Install Filter Pack	12	LF	$15.52	$186
2.6	Install Bentonite Seal	1	EA	$57.23	$57
2.7	Install Annular Seal	2	LF	$69.04	$138
2.8	PVC Well Plugs	1	EA	$27.86	$28
2.9	Flush-Mount Protective Cover with Locking Cap	1	EA	$451.55	$452
2.10	Surface Pad, Concrete 2' x 2'	1	EA	$154.79	$155
2.11	Well Development (2 HR/WELL)	2	EA	$228.23	$456
2.12	IDW Transportation/Disposal (drums)	1	EA	$508.52	$509
	Subtotal				**$5,541**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	1,900	LF	$27.57	$52,383
3.2	Signage	19	EA	$73.95	$1,405
	Subtotal				**$53,788**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	8	MONTH	$4,531	$36,247
	Subtotal				**$65,698**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	1	ACRE	$3,968.29	$3,968
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	1,900	LF	$8.97	$17,036
	Subtotal				**$41,675**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	9,481	CY	$2.12	$20,135
6.2	Haul RW/Soil to Stockpile Area[4]	11,378	CY	$4.00	$45,516
6.3	Perimeter Air Sampling	213	EA	$243.76	$52,002
6.4	Equipment Decontamination	474	HR	$54.56	$25,868
6.5	Stockpile Management	11,378	CY	$1.44	$16,352
6.6	Stockpile Characterization[5]	23	EA	$1,535.00	$35,305
	Subtotal				**$195,178**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	11,378	CY	$2.44	$27,786
7.2	Transport RW to in-town consolidation[7]	10,240	CY	$5.52	$56,560
7.3	Equipment Decontamination	474	HR	$54.56	$25,868
7.4	Out-of-Town Transportation of Waste[7, 8]	1,707	TON	$170.00	$290,133
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)[7, 8]	1,707	TON	$192.00	$327,680
	Subtotal				**$728,027**

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Place, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[9]	64000	SF	$1.29	$82,560
8.8	Furnish, Place, and Spread Topsoil (6")[10]	1208	CY	$34.65	$41,855
8.9	Hydroseeding with Mulch and Fertilizer	59	MSF	$43.97	$2,608
8.10	Place, Spread, and Compact Asphalt Base Course (12")	174	ECY	$9.35	$1,628
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	4700	SF	$2.27	$10,669
8.12	Site Cleanup	64	HR	$405	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	8917	CY	$11.83	$105,487
8.14	Install Nonwoven Geotextile Fabric	7111	SY	$2.21	$15,716
	Subtotal				**$286,450**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$1,421,665**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$85,300
10.2	Engineering and Design (12%)				$170,600
10.3	Construction management (8%)				$113,733
10.4	Location Adjustment (9%)				$127,950
10.5	Contingency (15%)				$213,250
TOTAL OTHER COSTS					**$710,833**
TOTAL CAPITAL COST FOR ALTERNATIVE 9					**$2,132,498**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for 576 and 600 East Broadway Properties.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor) .
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement;
Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
ECY = embankment cubic yard (compacted)
CY = cubic yard
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$8,379,084	$0	0	$8,379,084	7.0%	$8,379,084
1	$0	$74,028	$0	$74,028	7.0%	$69,185
2	$0	$74,028	$0	$74,028	7.0%	$64,659
3	$0	$40,382	$0	$40,382	7.0%	$32,963
4	$0	$40,382	$0	$40,382	7.0%	$30,807
5	$0	$40,382	$15,000	$55,382	7.0%	$39,486
6	$0	$40,382	$0	$40,382	7.0%	$26,908
7	$0	$40,382	$0	$40,382	7.0%	$25,148
8	$0	$40,382	$0	$40,382	7.0%	$23,503
9	$0	$40,382	$0	$40,382	7.0%	$21,965
10	$0	$40,382	$15,000	$55,382	7.0%	$28,153
11	$0	$40,382	$0	$40,382	7.0%	$19,185
12	$0	$40,382	$0	$40,382	7.0%	$17,930
13	$0	$40,382	$0	$40,382	7.0%	$16,757
14	$0	$40,382	$0	$40,382	7.0%	$15,661
15	$0	$40,382	$15,000	$55,382	7.0%	$20,073
16	$0	$40,382	$0	$40,382	7.0%	$13,679
17	$0	$40,382	$0	$40,382	7.0%	$12,784
18	$0	$40,382	$0	$40,382	7.0%	$11,947
19	$0	$40,382	$0	$40,382	7.0%	$11,166
20	$0	$40,382	$15,000	$55,382	7.0%	$14,312
21	$0	$40,382	$0	$40,382	7.0%	$9,753
22	$0	$40,382	$0	$40,382	7.0%	$9,115
23	$0	$40,382	$0	$40,382	7.0%	$8,518
24	$0	$40,382	$0	$40,382	7.0%	$7,961
25	$0	$40,382	$15,000	$55,382	7.0%	$10,204
26	$0	$40,382	$0	$40,382	7.0%	$6,954
27	$0	$40,382	$0	$40,382	7.0%	$6,499
28	$0	$40,382	$0	$40,382	7.0%	$6,073
29	$0	$40,382	$0	$40,382	7.0%	$5,676
30	$0	$40,382	$15,000	$55,382	7.0%	$7,275
TOTAL	**$8,379,084**	**$1,278,743**	**$90,000**	**$9,747,827**		**$8,973,382**
					PV O&M	**$594,298**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	2	LS	$22,655	$45,309
	Subtotal				**$45,309**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	15	LF	$35.79	$537
2.3	Install PVC Well Screens (2" diameter)	10	LF	$19.69	$197
2.4	Install PVC Well Casing (2" diameter)	5	LF	$14.79	$74
2.5	Install Filter Pack	12	LF	$15.52	$186
2.6	Install Bentonite Seal	1	EA	$57.23	$57
2.7	Install Annular Seal	2	LF	$69.04	$138
2.8	PVC Well Plugs	1	EA	$27.86	$28
2.9	Flush-Mount Protective Cover with Locking Cap	1	EA	$451.55	$452
2.10	Surface Pad, Concrete 2' x 2'	1	EA	$154.79	$155
2.11	Well Development (2 HR/WELL)	2	EA	$228.23	$456
2.12	IDW Transportation/Disposal (drums)	1	EA	$508.52	$509
	Subtotal				**$5,541**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	1,900	LF	$27.57	$52,383
3.2	Signage	19	EA	$73.95	$1,405
	Subtotal				**$53,788**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	8	MONTH	$4,531	$36,247
	Subtotal				**$65,698**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	1	ACRE	$3,968.29	$3,968
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	1,900	LF	$8.97	$17,036
	Subtotal				**$41,675**
6.0 Excavation of Raymark Waste					
6.1	Excavate and Load RW[3]	9,481	CY	$2.12	$20,135
6.2	Haul RW/Soil to Stockpile Area[4]	11,378	CY	$4.00	$45,516
6.3	Perimeter Air Sampling	213	EA	$243.76	$52,002
6.4	Equipment Decontamination	474	HR	$54.56	$25,868
6.5	Stockpile Management	11,378	CY	$1.44	$16,352
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$159,873**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[5]	11,378	CY	$2.44	$27,786
7.2	Transport RW to In-Town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	474	HR	$54.56	$25,868
7.4	Out-of-Town Transportation of Waste[6]	17,067	TON	$170.00	$2,901,333
7.5	Out-of-Town Disposal of Waste (no treatment)[6, 7]	15,360	TON	$107.10	$1,645,056
7.6	Out-of-Town Disposal of Waste (treatment)[6, 7]	1,707	TON	$192.00	$327,680
	Subtotal				**$4,927,723**

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	64,000	SF	$1.29	$82,560
8.8	Furnish, Place, and Spread Topsoil (6")[9]	1,208	CY	$34.65	$41,855
8.9	Hydroseeding with Mulch and Fertilizer	59	MSF	$43.97	$2,608
8.10	Place, Spread, and Compact Asphalt Base Course (12")	174	ECY	$9.35	$1,628
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	4,700	SF	$2.27	$10,669
8.12	Site Cleanup	64	HR	$405	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	8,917	CY	$11.83	$105,487
8.14	Install Nonwoven Geotextile Fabric	7,111	SY	$2.21	$15,716
	Subtotal				**$286,450**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$5,586,056**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$335,163
10.2	Engineering and Design (12%)				$670,327
10.3	Construction management (8%)				$446,885
10.4	Location Adjustment (9%)				$502,745
10.5	Contingency (15%)				$837,908
TOTAL OTHER COSTS					**$2,793,028**
TOTAL CAPITAL COST FOR ALTERNATIVE 10					**$8,379,084**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for 576 and 600 East Broadway Properties.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 2 or 4 ft below ground surface.
[4] Volume for hauling RW includes a bulking factor of 1.2.
[5] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor).
[6] A conversion factor of 1.5 was used to convert CY to TON.
[7] Volume of RW for Out-of-Town disposal excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement;
Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[10] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
SY = square yard
ECY = embankment cubic yard (compacted)
CY = cubic yard
Actual volumes may vary during implementation based upon the final extent of excavation.

G-7

VACANT DOT LOT ABUTTING I-95

COST ESTIMATE BACKUP SHEETS

PRESENT VALUE ANALYSIS
ALTERNATIVE 1 - NO ACTION
VACANT LOT ABUTTING I95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$10,000	$10,000	7.0%	$7,130
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$10,000	$10,000	7.0%	$5,083
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$10,000	$10,000	7.0%	$3,624
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$10,000	$10,000	7.0%	$2,584
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$10,000	$10,000	7.0%	$1,842
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$10,000	$10,000	7.0%	$1,314
TOTAL	**$0**	**$0**	**$60,000**	**$60,000**		**$21,578**
					PV O&M	**$21,578**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
VACANT LOT ABUTTING I95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review [1]	Total	Discount Rate[2]	Present Value
0	$67,542	$0	$0	$67,542	7.0%	$67,542
1	$0	$95,886	$0	$95,886	7.0%	$89,613
2	$0	$95,886	$0	$95,886	7.0%	$83,750
3	$0	$43,254	$0	$43,254	7.0%	$35,308
4	$0	$43,254	$0	$43,254	7.0%	$32,998
5	$0	$43,254	$10,000	$53,254	7.0%	$37,970
6	$0	$43,254	$0	$43,254	7.0%	$28,822
7	$0	$43,254	$0	$43,254	7.0%	$26,937
8	$0	$43,254	$0	$43,254	7.0%	$25,174
9	$0	$43,254	$0	$43,254	7.0%	$23,527
10	$0	$43,254	$10,000	$53,254	7.0%	$27,072
11	$0	$43,254	$0	$43,254	7.0%	$20,550
12	$0	$43,254	$0	$43,254	7.0%	$19,205
13	$0	$43,254	$0	$43,254	7.0%	$17,949
14	$0	$43,254	$0	$43,254	7.0%	$16,775
15	$0	$43,254	$10,000	$53,254	7.0%	$19,302
16	$0	$43,254	$0	$43,254	7.0%	$14,652
17	$0	$43,254	$0	$43,254	7.0%	$13,693
18	$0	$43,254	$0	$43,254	7.0%	$12,797
19	$0	$43,254	$0	$43,254	7.0%	$11,960
20	$0	$43,254	$10,000	$53,254	7.0%	$13,762
21	$0	$43,254	$0	$43,254	7.0%	$10,446
22	$0	$43,254	$0	$43,254	7.0%	$9,763
23	$0	$43,254	$0	$43,254	7.0%	$9,124
24	$0	$43,254	$0	$43,254	7.0%	$8,527
25	$0	$43,254	$10,000	$53,254	7.0%	$9,812
26	$0	$43,254	$0	$43,254	7.0%	$7,448
27	$0	$43,254	$0	$43,254	7.0%	$6,961
28	$0	$43,254	$0	$43,254	7.0%	$6,506
29	$0	$43,254	$0	$43,254	7.0%	$6,080
30	$0	$43,254	$10,000	$53,254	7.0%	$6,996
TOTAL	**$67,542**	**$1,402,891**	**$60,000**	**$1,530,433**		**$721,023**
					PV O&M	**$653,481**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
VACANT LOT ABUTTING I-95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	105	LF	$35.79	$3,758
2.3	Install PVC Well Screens (2" diameter)	70	LF	$19.69	$1,378
2.4	Install PVC Well Casing (2" diameter)	35	LF	$14.79	$518
2.5	Install Filter Pack	84	LF	$15.52	$1,304
2.6	Install Bentonite Seal	7	EA	$57.23	$401
2.7	Install Annular Seal	14	LF	$69.04	$967
2.8	PVC Well Plugs	7	EA	$27.86	$195
2.9	Flush-Mount Protective Cover with Locking Cap	7	EA	$451.55	$3,161
2.10	Surface Pad, Concrete 2' x 2'	7	EA	$154.79	$1,084
2.11	Well Development (2 HR/WELL)	14	EA	$228.23	$3,195
2.12	IDW Transportation/Disposal (drums)	7	EA	$508.52	$3,560
	Subtotal				**$22,272**
3.0 Fencing and Signage					
3.1	Chain Link Fence	799	LF	$27.57	$22,024
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,616**
TOTAL DIRECT COSTS					**$67,542**
TOTAL CAPITAL COST FOR ALTERNATIVE 2					**$67,542**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Vacant Lot Abutting I-95 Property.
PVC = polyvinyl chloride
IDW = investigation derived waste
LS = lump sum
EA = each
LF = linear foot

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
VACANT LOT ABUTTING I95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	40	HR	$110	$4,400	see cost assumptions
OM.1.3	Sampling Labor - Sampler	20	HR	$90	$1,800	see cost assumptions
OM.1.4	Analytical Costs	10	EA	$697	$6,971	see cost assumptions
OM.1.5	Data Validation	10	HR	$110	$1,100	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$17,544**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.05	MSF	$56.31	$3	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	228	SF	$1.81	$414	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	27	LF	$27.57	$734	see cost assumptions
OM 2.6	Sign Replacement[5]	32	EA	$73.95	$2,366	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	2	EA	$321.75	$644	see cost assumptions
	Subtotal				**$19,610**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$95,886**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$43,254**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Vacant Lot Abutting I95 Property.

[2] Assumed that 1% of vegetated surfaces would require repair annually (need for repair to be established during 5-Year Reviews)..

[3] Estimated 5% of asphalt surfaces will require repair annually (need for repair to be established during 5-Year Reviews).

[4] Estimated that 100% of fencing would require replacement over the period of O&M (need for repair to be established during 5-Year Reviews).

[5] Estimated that signage would require replacement 4 times over the period of O&M (need for repair to be established during 5-Year Reviews).

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
VACANT LOT ABUTTING I95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$872,908	$0	$0	$872,908	7.0%	$872,908
1	$0	$94,578	$0	$94,578	7.0%	$88,390
2	$0	$94,578	$0	$94,578	7.0%	$82,608
3	$0	$41,946	$0	$41,946	7.0%	$34,241
4	$0	$41,946	$0	$41,946	7.0%	$32,000
5	$0	$41,946	$10,000	$51,946	7.0%	$37,037
6	$0	$41,946	$0	$41,946	7.0%	$27,950
7	$0	$41,946	$0	$41,946	7.0%	$26,122
8	$0	$41,946	$0	$41,946	7.0%	$24,413
9	$0	$41,946	$0	$41,946	7.0%	$22,816
10	$0	$41,946	$10,000	$51,946	7.0%	$26,407
11	$0	$41,946	$0	$41,946	7.0%	$19,928
12	$0	$41,946	$0	$41,946	7.0%	$18,625
13	$0	$41,946	$0	$41,946	7.0%	$17,406
14	$0	$41,946	$0	$41,946	7.0%	$16,267
15	$0	$41,946	$10,000	$51,946	7.0%	$18,828
16	$0	$41,946	$0	$41,946	7.0%	$14,209
17	$0	$41,946	$0	$41,946	7.0%	$13,279
18	$0	$41,946	$0	$41,946	7.0%	$12,410
19	$0	$41,946	$0	$41,946	7.0%	$11,598
20	$0	$41,946	$10,000	$51,946	7.0%	$13,424
21	$0	$41,946	$0	$41,946	7.0%	$10,131
22	$0	$41,946	$0	$41,946	7.0%	$9,468
23	$0	$41,946	$0	$41,946	7.0%	$8,848
24	$0	$41,946	$0	$41,946	7.0%	$8,270
25	$0	$41,946	$10,000	$51,946	7.0%	$9,571
26	$0	$41,946	$0	$41,946	7.0%	$7,223
27	$0	$41,946	$0	$41,946	7.0%	$6,750
28	$0	$41,946	$0	$41,946	7.0%	$6,309
29	$0	$41,946	$0	$41,946	7.0%	$5,896
30	$0	$41,946	$10,000	$51,946	7.0%	$6,824
TOTAL	**$872,908**	**$1,363,646**	**$60,000**	**$2,296,553**		**$1,510,155**
					PV O&M	**$637,248**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
VACANT LOT ABUTTING I-95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	105	LF	$35.79	$3,758
2.3	Install PVC Well Screens (2" diameter)	70	LF	$19.69	$1,378
2.4	Install PVC Well Casing (2" diameter)	35	LF	$14.79	$518
2.5	Install Filter Pack	84	LF	$15.52	$1,304
2.6	Install Bentonite Seal	7	EA	$57.23	$401
2.7	Install Annular Seal	14	LF	$69.04	$967
2.8	PVC Well Plugs	7	EA	$27.86	$195
2.9	Flush-Mount Protective Cover with Locking Cap	7	EA	$451.55	$3,161
2.10	Surface Pad, Concrete 2' x 2'	7	EA	$154.79	$1,084
2.11	Well Development (2 HR/WELL)	14	EA	$228.23	$3,195
2.12	IDW Transportation/Disposal (drums)	7	EA	$508.52	$3,560
	Subtotal				**$22,272**
3.0	**Fencing and Signage[2]**				
3.1	Chain Link Fence	799	LF	$27.57	$22,024
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,616**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	2	MONTH	$4,531	$9,062
	Subtotal				**$38,513**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	2	ACRE	$3,968.29	$7,937
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	799	LF	$8.97	$7,163
	Subtotal				**$35,770**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction**				
6.1	Excavate and Load RW/Soil[3]	2,915	CY	$2.12	$6,191
6.2	Haul RW/Soil to Stockpile Area[4]	3,499	CY	$4.00	$13,996
6.3	Perimeter Air Sampling	66	EA	$243.76	$15,991
6.4	Equipment Decontamination	146	HR	$54.56	$7,954
6.5	Stockpile Management	3,499	CY	$1.44	$5,028
6.6	Stockpile Characterization[5]	7	EA	$1,535.00	$10,745
	Subtotal				**$59,905**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks[6]	1,116	CY	$2.44	$2,726
7.2	Transport RW to in-town consolidation[7]	1,005	CY	$5.52	$5,549
7.3	Equipment Decontamination	146	HR	$54.56	$7,954
7.4	Out-of-Town Transportation of Waste[7, 8]	167	TON	$170.00	$28,465
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)[7, 8]	167	TON	$192.00	$32,148
	Subtotal				**$76,842**

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
VACANT LOT ABUTTING I-95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
8.1	Deliver,Place and Compact RW/Soil Excavated Material[9]	1,507	CY	$2.40	$3,621
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[9]	550	CY	$27.00	$14,847
8.3	Install Geosynthetic Clay Liner (bottom layer)	27,000	SF	$2.86	$77,286
8.4	Install 60 mil HDPE liner	27,000	SF	$2.84	$76,731
8.5	Install Geosynthetic Drainage Layer	27,000	SF	$0.65	$17,658
8.6	Furnish, Spread, and Compact Soil Layer (24")[9]	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	27,000	SF	$1.29	$34,830
8.8	Furnish, Place, and Spread Topsoil (6")[9]	275	CY	$34.65	$9,529
8.9	Hydroseeding with Mulch and Fertilizer	22	MSF	$43.97	$986
8.10	Place, Spread, and Compact Asphalt Base Course (12")	500	ECY	$9.35	$4,675
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	13,500	SF	$2.27	$30,645
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	3,000	SY	$2.21	$6,630
	Subtotal				**$303,366**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$581,938**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$34,916
10.2	Engineering and Design (12%)				$69,833
10.3	Construction management (8%)				$46,555
10.4	Location Adjustment (9%)				$52,374
10.5	Contingency (15%)				$87,291
TOTAL OTHER COSTS					**$290,969**
TOTAL CAPITAL COST FOR ALTERNATIVE 3					**$872,908**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Vacant Lot Abutting I95 Property.

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to excavated to a depth of 2.5- or 3-ft below ground surface and additional soil that requires excavation to faciliate cap construction.

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less additionally excavated soil).

[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[8] A conversion factor of 1.5 was used to convert CY to TON.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates for the 24-inch protective layer with an additional 637 CY available for re-use within OU6.

[10] Impacts to floodplains will be evaluated during Remedial Design and will require compensation via backfill material selection to ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
VACANT LOT ABUTTING I95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	40	HR	$110	$4,400	see cost assumptions
OM.1.3	Sampling Labor - Sampler	20	HR	$90	$1,800	see cost assumptions
OM.1.4	Analytical Costs	10	EA	$697	$6,971	see cost assumptions
OM.1.5	Data Validation	10	HR	$110	$1,100	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$17,544**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	45	MSF	$7.34	$329	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.22	MSF	$56.31	$13	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	675	SF	$1.81	$1,223	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.5	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.6	Contractor mobilizations	4	EA	$321.75	$1,287	see cost assumptions
	Subtotal				**$18,302**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$94,578**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$41,946**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Vacant Lot Abutting I95 Property.

[2] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[3] Assumed 5% of asphalt surfaces will require repair annually.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
VACANT LOT ABUTTING I95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$1,484,044	$0	0	$1,484,044	7.0%	$1,484,044
1	$0	$94,578	$0	$94,578	7.0%	$88,390
2	$0	$94,578	$0	$94,578	7.0%	$82,608
3	$0	$41,946	$0	$41,946	7.0%	$34,241
4	$0	$41,946	$0	$41,946	7.0%	$32,000
5	$0	$41,946	$10,000	$51,946	7.0%	$37,037
6	$0	$41,946	$0	$41,946	7.0%	$27,950
7	$0	$41,946	$0	$41,946	7.0%	$26,122
8	$0	$41,946	$0	$41,946	7.0%	$24,413
9	$0	$41,946	$0	$41,946	7.0%	$22,816
10	$0	$41,946	$10,000	$51,946	7.0%	$26,407
11	$0	$41,946	$0	$41,946	7.0%	$19,928
12	$0	$41,946	$0	$41,946	7.0%	$18,625
13	$0	$41,946	$0	$41,946	7.0%	$17,406
14	$0	$41,946	$0	$41,946	7.0%	$16,267
15	$0	$41,946	$10,000	$51,946	7.0%	$18,828
16	$0	$41,946	$0	$41,946	7.0%	$14,209
17	$0	$41,946	$0	$41,946	7.0%	$13,279
18	$0	$41,946	$0	$41,946	7.0%	$12,410
19	$0	$41,946	$0	$41,946	7.0%	$11,598
20	$0	$41,946	$10,000	$51,946	7.0%	$13,424
21	$0	$41,946	$0	$41,946	7.0%	$10,131
22	$0	$41,946	$0	$41,946	7.0%	$9,468
23	$0	$41,946	$0	$41,946	7.0%	$8,848
24	$0	$41,946	$0	$41,946	7.0%	$8,270
25	$0	$41,946	$10,000	$51,946	7.0%	$9,571
26	$0	$41,946	$0	$41,946	7.0%	$7,223
27	$0	$41,946	$0	$41,946	7.0%	$6,750
28	$0	$41,946	$0	$41,946	7.0%	$6,309
29	$0	$41,946	$0	$41,946	7.0%	$5,896
30	$0	$41,946	$10,000	$51,946	7.0%	$6,824
TOTAL	**$1,484,044**	**$1,363,646**	**$60,000**	**$2,907,690**		**$2,121,292**
					PV O&M	**$637,248**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
VACANT LOT ABUTTING I-95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	105	LF	$35.79	$3,758
2.3	Install PVC Well Screens (2" diameter)	70	LF	$19.69	$1,378
2.4	Install PVC Well Casing (2" diameter)	35	LF	$14.79	$518
2.5	Install Filter Pack	84	LF	$15.52	$1,304
2.6	Install Bentonite Seal	7	EA	$57.23	$401
2.7	Install Annular Seal	14	LF	$69.04	$967
2.8	PVC Well Plugs	7	EA	$27.86	$195
2.9	Flush-Mount Protective Cover with Locking Cap	7	EA	$451.55	$3,161
2.10	Surface Pad, Concrete 2' x 2'	7	EA	$154.79	$1,084
2.11	Well Development (2 HR/WELL)	14	EA	$228.23	$3,195
2.12	IDW Transportation/Disposal (drums)	7	EA	$508.52	$3,560
	Subtotal				**$22,272**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	799	LF	$27.57	$22,024
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,616**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	2	MONTH	$4,531	$9,062
	Subtotal				**$38,513**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	2	ACRE	$3,968.29	$7,937
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	799	LF	$8.97	$7,163
	Subtotal				**$35,770**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil[3]	2,915	CY	$2.12	$6,191
6.2	Haul RW/Soil to Stockpile Area[4]	3,499	CY	$4.00	$13,996
6.3	Perimeter Air Sampling	66	EA	$243.76	$15,991
6.4	Equipment Decontamination	146	HR	$54.56	$7,954
6.5	Stockpile Management	3,499	CY	$1.44	$5,028
6.6	Stockpile Characterization[5]	4	EA	$1,535.00	$6,140
	Subtotal				**$55,300**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load Raymark Waste into Trucks[6]	1,116	CY	$2.44	$2,726
7.2	Transport Raymark Waste to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	146	HR	$54.56	$7,954
7.4	Out-of-Town Transportation of Waste[7]	1,674	TON	$170.00	$284,648
7.5	Out-of-Town Disposal of Waste (no treatment)[7, 8]	1,507	TON	$107.10	$161,395
7.6	Out-of-Town Treatment of Raymark Waste[7, 8]	167	TON	$192.00	$32,148
	Subtotal				**$488,872**

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
VACANT LOT ABUTTING I-95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
8.1	Deliver,Place and Compact RW/Soil Excavated Material[9]	1,507	CY	$2.40	$3,621
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[9]	550	CY	$27.00	$14,847
8.3	Install Geosynthetic Clay Liner (bottom layer)	27,000	SF	$2.86	$77,286
8.4	Install 60 mil HDPE liner	27,000	SF	$2.84	$76,731
8.5	Install Geosynthetic Drainage Layer	27,000	SF	$0.65	$17,658
8.6	Furnish, Spread, and Compact Soil Layer (24")[9]	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	27,000	SF	$1.29	$34,830
8.8	Furnish, Place, and Spread Topsoil (6")[9]	275	CY	$34.65	$9,529
8.9	Hydroseeding with Mulch and Fertilizer	22	MSF	$43.97	$986
8.10	Place, Spread, and Compact Asphalt Base Course (12")	500	ECY	$9.35	$4,675
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	13,500	SF	$2.27	$30,645
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	3,000	SY	$2.21	$6,630
	Subtotal				**$303,366**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$989,363**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$59,362
10.2	Engineering and Design (12%)				$118,724
10.3	Construction management (8%)				$79,149
10.4	Location Adjustment (9%)				$89,043
10.5	Contingency (15%)				$148,404
TOTAL OTHER COSTS					**$494,681**
TOTAL CAPITAL COST FOR ALTERNATIVE 4					**$1,484,044**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Vacant Lot Abutting I95 Property.

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to excavated to a depth of 2.5- or 3-ft below ground surface and additional soil that requires excavation to faciliate cap construction.

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500).

[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less additionally excavated soil).

[7] A conversion factor of 1.5 was used to convert CY to TON.

[8] Volume of RW for disposal assumes 10% would be hazardous requiring treatment prior to disposal.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates for the 24-inch protective layer with an additional 637 CY available for re-use within OU6.

[10] Impacts to floodplains will be evaluated during Remedial Design and will require compensation via backfill material selection to ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
VACANT LOT ABUTTING I95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$726,174	$0	$0	$726,174	7.0%	$726,174
1	$0	$70,175	$0	$70,175	7.0%	$65,584
2	$0	$70,175	$0	$70,175	7.0%	$61,294
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$726,174**	**$140,351**	**$0**	**$866,525**		**$853,053**
					PV O&M	**$126,878**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
VACANT LOT ABUTTING I-95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	105	LF	$35.79	$3,758
2.3	Install PVC Well Screens (2" diameter)	70	LF	$19.69	$1,378
2.4	Install PVC Well Casing (2" diameter)	35	LF	$14.79	$518
2.5	Install Filter Pack	84	LF	$15.52	$1,304
2.6	Install Bentonite Seal	7	EA	$57.23	$401
2.7	Install Annular Seal	14	LF	$69.04	$967
2.8	PVC Well Plugs	7	EA	$27.86	$195
2.9	Flush-Mount Protective Cover with Locking Cap	7	EA	$451.55	$3,161
2.10	Surface Pad, Concrete 2' x 2'	7	EA	$154.79	$1,084
2.11	Well Development (2 HR/WELL)	14	EA	$228.23	$3,195
2.12	IDW Transportation/Disposal (drums)	7	EA	$508.52	$3,560
	Subtotal				**$22,272**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	799	LF	$27.57	$22,024
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,616**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	4	MONTH	$4,531	$18,124
	Subtotal				**$47,574**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	2	ACRE	$3,968.29	$7,937
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	799	LF	$8.97	$7,163
	Subtotal				**$35,770**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[4]	3,326	CY	$2.12	$7,064
6.2	Haul RW/Soil to Stockpile Area[5]	3,992	CY	$4.00	$15,968
6.3	Perimeter Air Sampling	75	EA	$243.76	$18,245
6.4	Equipment Decontamination	166	HR	$54.56	$9,075
6.5	Stockpile Management	3,992	CY	$1.44	$5,737
6.6	Stockpile Characterization[6]	8	EA	$1,535.00	$12,280
	Subtotal				**$68,369**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	3,247	CY	$2.44	$7,930
7.2	Transport RW to in-town consolidation[8]	2,923	CY	$5.52	$16,143
7.3	Equipment Decontamination	166	HR	$54.56	$9,075
7.4	Out-of-Town Transportation of RW[8, 9]	487	TON	$170.00	$82,806
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[8, 9]	487	TON	$192.00	$93,522
	Subtotal				**$209,476**

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
VACANT LOT ABUTTING I-95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	670	CY	$2.40	$1,609
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	178	CY	$34.65	$6,179
8.9	Hydroseeding with Mulch and Fertilizer	9	MSF	$43.97	$385
8.10	Place, Spread, and Compact Asphalt Base Course (12")	169	ECY	$9.35	$1,581
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	4,566	SF	$2.27	$10,365
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	2,515	CY	$11.83	$29,750
8.14	Install Nonwoven Geotextile Fabric	1,015	SY	$2.21	$2,243
	Subtotal				**$78,039**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$484,116**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$29,047
10.2	Engineering and Design (12%)				$58,094
10.3	Construction management (8%)				$38,729
10.4	Location Adjustment (9%)				$43,570
10.5	Contingency (15%)				$72,617
TOTAL OTHER COSTS					**$242,058**
TOTAL CAPITAL COST FOR ALTERNATIVE 5					**$726,174**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Vacant Lot Abutting I95 Property.
[2] Excavation to water table at this property will achieve complete excavation of RW and will not require transactional fees due to deed management.
[3] Assume fencing and signage to be temporary and required during construction activities for site security only.
[4] Represents in situ estimate of RW to excavated to a depth of 8-ft below ground surface and additional soil that would be required to be removed to facilitate compliance with safety standards for benching/sloping.
[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.
[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).
[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).
[8] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[9] A conversion factor of 1.5 was used to convert CY to TON.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use on-site pending analytical results for PHCs and was deducted from backfill estimates.
[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
VACANT LOT ABUTTING I95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0	**Groundwater Monitoring (per event)**					
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	40	HR	$110	$4,400	see cost assumptions
OM.1.3	Sampling Labor - Sampler	20	HR	$90	$1,800	see cost assumptions
OM.1.4	Analytical Costs	10	EA	$697	$6,971	see cost assumptions
OM.1.5	Data Validation	10	HR	$110	$1,100	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$17,544**	
OM.2.0	**Ground Surface Inspections, Maintenance, and Repairs (per year)[2]**					
OM.2.1	Inspection	0	HR	$110.00	$0	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation	0	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	0	LS	$2,250.00	$0	see cost assumptions
OM.2.8	Contractor mobilizations	0	EA	$321.75	$0	see cost assumptions
	Subtotal				**$0**	
OM.3.0	**Deed Restrictions[2]**					
OM.3.1	Inspection (annual)	0	LS	$1,100.00	$0	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	0	EA	$5,000.00	$0	see cost assumptions
	Subtotal				**$0**	
ANNUAL O&M COST (YEARS 1-2)[3]					**$70,175**	
ANNUAL O&M COST (YEARS 3-30)[4]					**$0**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Vacant Lot Abutting I95 Property.

[2] Assume deed restrictions and O&M for ground surfaces would not be required following complete excavation of Raymark waste.

[3] O&M for Years 1 and 2 include quarterly groundwater monitoring with annual reporting.

[4] O&M for Years 3 - 30 will not be required pending analytical data and concurrence from the State following the first 2 years of groundwater data collection.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
VACANT LOT ABUTTING I95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$2,510,289	$0	$0	$2,510,289	7.0%	$2,510,289
1	$0	$70,175	$0	$70,175	7.0%	$65,584
2	$0	$70,175	$0	$70,175	7.0%	$61,294
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$2,510,289**	**$140,351**	**$0**	**$2,650,639**		**$2,637,167**
					PV O&M	**$126,878**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
VACANT LOT ABUTTING I-95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	105	LF	$35.79	$3,758
2.3	Install PVC Well Screens (2" diameter)	70	LF	$19.69	$1,378
2.4	Install PVC Well Casing (2" diameter)	35	LF	$14.79	$518
2.5	Install Filter Pack	84	LF	$15.52	$1,304
2.6	Install Bentonite Seal	7	EA	$57.23	$401
2.7	Install Annular Seal	14	LF	$69.04	$967
2.8	PVC Well Plugs	7	EA	$27.86	$195
2.9	Flush-Mount Protective Cover with Locking Cap	7	EA	$451.55	$3,161
2.10	Surface Pad, Concrete 2' x 2'	7	EA	$154.79	$1,084
2.11	Well Development (2 HR/WELL)	14	EA	$228.23	$3,195
2.12	IDW Transportation/Disposal (drums)	7	EA	$508.52	$3,560
	Subtotal				**$22,272**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	799	LF	$27.57	$22,024
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,616**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	4	MONTH	$4,531	$18,124
	Subtotal				**$47,574**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	2	ACRE	$3,968.29	$7,937
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	799	LF	$8.97	$7,163
	Subtotal				**$35,770**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[4]	3,326	CY	$2.12	$7,064
6.2	Haul RW/Soil to Stockpile Area[5]	3,992	CY	$4.00	$15,968
6.3	Perimeter Air Sampling	75	EA	$243.76	$18,245
6.4	Equipment Decontamination	166	HR	$54.56	$9,075
6.5	Stockpile Management	3,992	CY	$1.44	$5,737
6.6	Stockpile Characterization[6]	2	EA	$1,535.00	$3,070
	Subtotal				**$59,159**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	3,247	CY	$2.44	$7,930
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	166	HR	$54.56	$9,075
7.4	Out-of-Town Transportation of RW[8]	4,871	TON	$170.00	$828,059
7.5	Out-of-Town Disposal of RW (no treatment)[8, 9]	4,384	TON	$107.10	$469,509
7.6	Out-of-Town Disposal of RW (treatment)[8, 9]	487	TON	$192.00	$93,522
	Subtotal				**$1,408,095**

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
VACANT LOT ABUTTING I-95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	670	CY	$2.40	$1,609
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	178	CY	$34.65	$6,179
8.9	Hydroseeding with Mulch and Fertilizer	9	MSF	$43.97	$385
8.10	Place, Spread, and Compact Asphalt Base Course (12")	169	ECY	$9.35	$1,581
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	4566	SF	$2.27	$10,365
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	2515	CY	$11.83	$29,750
8.14	Install Nonwoven Geotextile Fabric	1015	SY	$2.21	$2,243
	Subtotal				**$78,039**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$1,673,526**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$100,412
10.2	Engineering and Design (12%)				$200,823
10.3	Construction management (8%)				$133,882
10.4	Location Adjustment (9%)				$150,617
10.5	Contingency (15%)				$251,029
TOTAL OTHER COSTS					**$836,763**
TOTAL CAPITAL COST FOR ALTERNATIVE 6					**$2,510,289**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Vacant Lot Abutting I95 Property.

[2] Excavation to water table at this property will achieve complete excavation of RW and will not require transactional fees due to deed management.

[3] Assume fencing and signage to be temporary and required during construction activities for site security only.

[4] Represents in situ estimate of RW to excavated to a depth of 8-ft below ground surface and additional soil that would be required to be removed to facilitate compliance with safety standards for benching/sloping.

[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[8] A conversion factor of 1.5 was used to convert CY to TON.

[9] Volume of RW for disposal assumes 10% would be hazardous requiring treatment prior to disposal.

[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
VACANT LOT ABUTTING I95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$471,652	$0	0	$471,652	7.0%	$471,652
1	$0	$80,989	$0	$80,989	7.0%	$75,691
2	$0	$80,989	$0	$80,989	7.0%	$70,739
3	$0	$19,586	$0	$19,586	7.0%	$15,988
4	$0	$19,586	$0	$19,586	7.0%	$14,942
5	$0	$19,586	$10,000	$29,586	7.0%	$21,094
6	$0	$19,586	$0	$19,586	7.0%	$13,051
7	$0	$19,586	$0	$19,586	7.0%	$12,197
8	$0	$19,586	$0	$19,586	7.0%	$11,399
9	$0	$19,586	$0	$19,586	7.0%	$10,653
10	$0	$19,586	$10,000	$29,586	7.0%	$15,040
11	$0	$19,586	$0	$19,586	7.0%	$9,305
12	$0	$19,586	$0	$19,586	7.0%	$8,696
13	$0	$19,586	$0	$19,586	7.0%	$8,127
14	$0	$19,586	$0	$19,586	7.0%	$7,596
15	$0	$19,586	$10,000	$29,586	7.0%	$10,723
16	$0	$19,586	$0	$19,586	7.0%	$6,634
17	$0	$19,586	$0	$19,586	7.0%	$6,200
18	$0	$19,586	$0	$19,586	7.0%	$5,795
19	$0	$19,586	$0	$19,586	7.0%	$5,416
20	$0	$19,586	$10,000	$29,586	7.0%	$7,645
21	$0	$19,586	$0	$19,586	7.0%	$4,730
22	$0	$19,586	$0	$19,586	7.0%	$4,421
23	$0	$19,586	$0	$19,586	7.0%	$4,132
24	$0	$19,586	$0	$19,586	7.0%	$3,861
25	$0	$19,586	$10,000	$29,586	7.0%	$5,451
26	$0	$19,586	$0	$19,586	7.0%	$3,373
27	$0	$19,586	$0	$19,586	7.0%	$3,152
28	$0	$19,586	$0	$19,586	7.0%	$2,946
29	$0	$19,586	$0	$19,586	7.0%	$2,753
30	$0	$19,586	$10,000	$29,586	7.0%	$3,887
TOTAL	**$471,652**	**$710,377**	**$60,000**	**$1,242,029**		**$847,288**
					PV O&M	**$375,636**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
VACANT LOT ABUTTING I-95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	105	LF	$35.79	$3,758
2.3	Install PVC Well Screens (2" diameter)	70	LF	$19.69	$1,378
2.4	Install PVC Well Casing (2" diameter)	35	LF	$14.79	$518
2.5	Install Filter Pack	84	LF	$15.52	$1,304
2.6	Install Bentonite Seal	7	EA	$57.23	$401
2.7	Install Annular Seal	14	LF	$69.04	$967
2.8	PVC Well Plugs	7	EA	$27.86	$195
2.9	Flush-Mount Protective Cover with Locking Cap	7	EA	$451.55	$3,161
2.10	Surface Pad, Concrete 2' x 2'	7	EA	$154.79	$1,084
2.11	Well Development (2 HR/WELL)	14	EA	$228.23	$3,195
2.12	IDW Transportation/Disposal (drums)	7	EA	$508.52	$3,560
	Subtotal				**$22,272**
3.0	**Fencing and Signage[2]**				
3.1	Chain Link Fence	799	LF	$27.57	$22,024
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,616**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	4	MONTH	$4,531	$18,124
	Subtotal				**$47,574**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	2	ACRE	$3,968.29	$7,937
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	799	LF	$8.97	$7,163
	Subtotal				**$35,770**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
6.1	Excavate and Load RW[3]	1,015	CY	$2.12	$2,155
6.2	Haul RW to Stockpile Area[4]	1,218	CY	$4.00	$4,872
6.3	Perimeter Air Sampling	23	EA	$243.76	$5,566
6.4	Equipment Decontamination	51	HR	$54.56	$2,769
6.5	Stockpile Management	1,218	CY	$1.44	$1,750
6.6	Stockpile Characterization[5]	3	EA	$1,535.00	$4,605
	Subtotal				**$21,717**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks[6]	1,218	CY	$2.44	$2,974
7.2	Transport RW to in-town consolidation[7]	1,096	CY	$5.52	$6,054
7.3	Equipment Decontamination	51	HR	$54.56	$2,769
7.4	Out-of-Town Transportation of Waste[7, 8]	183	TON	$170.00	$31,053
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	183	TON	$192.00	$35,072
	Subtotal				**$77,922**

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
VACANT LOT ABUTTING I-95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[9]	9,133	SF	$1.29	$11,782
8.8	Furnish, Place, and Spread Topsoil (6")[10]	92	CY	$34.65	$3,200
8.9	Hydroseeding with Mulch and Fertilizer	5	MSF	$43.97	$199
8.10	Place, Spread, and Compact Asphalt Base Course (12")	169	ECY	$9.35	$1,581
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	4,566	SF	$2.27	$10,365
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	728	CY	$11.83	$8,612
8.14	Install Nonwoven Geotextile Fabric	1,015	SY	$2.21	$2,243
	Subtotal				**$63,910**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$314,435**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$18,866
10.2	Engineering and Design (12%)				$37,732
10.3	Construction management (8%)				$25,155
10.4	Location Adjustment (9%)				$28,299
10.5	Contingency (15%)				$47,165
TOTAL OTHER COSTS					**$157,217**
TOTAL CAPITAL COST FOR ALTERNATIVE 7					**$471,652**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Vacant Lot Abutting I95 Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 2 or 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal.
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement;
Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
VACANT LOT ABUTTING I95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	40	HR	$110	$4,400	see cost assumptions
OM.1.3	Sampling Labor - Sampler	20	HR	$90	$1,800	see cost assumptions
OM.1.4	Analytical Costs	10	EA	$697	$6,971	see cost assumptions
OM.1.5	Data Validation	10	HR	$110	$1,100	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$17,544**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	10	HR	$110.00	$1,100	see cost assumptions
OM.2.2	Mowing (twice per year)	9	MSF	$7.34	$67	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.18	MSF	$56.31	$10	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	4	EA	$321.75	$1,287	see cost assumptions
	Subtotal				**$4,714**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$80,989**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$19,586**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Vacant Lot Abutting I95 Property.

[2] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[3] Assumed 5% of asphalt surfaces will require repair annually.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
VACANT LOT ABUTTING I95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$1,138,993	$0	0	$1,138,993	7.0%	$1,138,993
1	$0	$80,989	$0	$80,989	7.0%	$75,691
2	$0	$80,989	$0	$80,989	7.0%	$70,739
3	$0	$19,586	$0	$19,586	7.0%	$15,988
4	$0	$19,586	$0	$19,586	7.0%	$14,942
5	$0	$19,586	$10,000	$29,586	7.0%	$21,094
6	$0	$19,586	$0	$19,586	7.0%	$13,051
7	$0	$19,586	$0	$19,586	7.0%	$12,197
8	$0	$19,586	$0	$19,586	7.0%	$11,399
9	$0	$19,586	$0	$19,586	7.0%	$10,653
10	$0	$19,586	$10,000	$29,586	7.0%	$15,040
11	$0	$19,586	$0	$19,586	7.0%	$9,305
12	$0	$19,586	$0	$19,586	7.0%	$8,696
13	$0	$19,586	$0	$19,586	7.0%	$8,127
14	$0	$19,586	$0	$19,586	7.0%	$7,596
15	$0	$19,586	$10,000	$29,586	7.0%	$10,723
16	$0	$19,586	$0	$19,586	7.0%	$6,634
17	$0	$19,586	$0	$19,586	7.0%	$6,200
18	$0	$19,586	$0	$19,586	7.0%	$5,795
19	$0	$19,586	$0	$19,586	7.0%	$5,416
20	$0	$19,586	$10,000	$29,586	7.0%	$7,645
21	$0	$19,586	$0	$19,586	7.0%	$4,730
22	$0	$19,586	$0	$19,586	7.0%	$4,421
23	$0	$19,586	$0	$19,586	7.0%	$4,132
24	$0	$19,586	$0	$19,586	7.0%	$3,861
25	$0	$19,586	$10,000	$29,586	7.0%	$5,451
26	$0	$19,586	$0	$19,586	7.0%	$3,373
27	$0	$19,586	$0	$19,586	7.0%	$3,152
28	$0	$19,586	$0	$19,586	7.0%	$2,946
29	$0	$19,586	$0	$19,586	7.0%	$2,753
30	$0	$19,586	$10,000	$29,586	7.0%	$3,887
TOTAL	**$1,138,993**	**$710,377**	**$60,000**	**$1,909,369**		**$1,514,629**
					PV O&M	**$375,636**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
VACANT LOT ABUTTING I-95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	105	LF	$35.79	$3,758
2.3	Install PVC Well Screens (2" diameter)	70	LF	$19.69	$1,378
2.4	Install PVC Well Casing (2" diameter)	35	LF	$14.79	$518
2.5	Install Filter Pack	84	LF	$15.52	$1,304
2.6	Install Bentonite Seal	7	EA	$57.23	$401
2.7	Install Annular Seal	14	LF	$69.04	$967
2.8	PVC Well Plugs	7	EA	$27.86	$195
2.9	Flush-Mount Protective Cover with Locking Cap	7	EA	$451.55	$3,161
2.10	Surface Pad, Concrete 2' x 2'	7	EA	$154.79	$1,084
2.11	Well Development (2 HR/WELL)	14	EA	$228.23	$3,195
2.12	IDW Transportation/Disposal (drums)	7	EA	$508.52	$3,560
	Subtotal				**$22,272**
3.0	**Fencing and Signage[2]**				
3.1	Chain Link Fence	799	LF	$27.57	$22,024
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,616**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	4	MONTH	$4,531	$18,124
	Subtotal				**$47,574**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	2	ACRE	$3,968.29	$7,937
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	799	LF	$8.97	$7,163
	Subtotal				**$35,770**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
6.1	Excavate and Load RW[3]	1,015	CY	$2.12	$2,155
6.2	Haul RW to Stockpile Area[4]	1,218	CY	$4.00	$4,872
6.3	Perimeter Air Sampling	23	EA	$243.76	$5,566
6.4	Equipment Decontamination	51	HR	$54.56	$2,769
6.5	Stockpile Management	1,218	CY	$1.44	$1,750
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$17,112**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks[5]	1,218	CY	$2.44	$2,974
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	51	HR	$54.56	$2,769
7.4	Out-of-Town Transportation of Waste[6]	1,827	TON	$170.00	$310,533
7.5	Out-of-Town Disposal of RW (no treatment)[6, 7]	1,644	TON	$107.10	$176,072
7.6	Out-of-Town Disposal of RW (treatment)[6, 7]	183	TON	$192.00	$35,072
	Subtotal				**$527,420**

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
VACANT LOT ABUTTING I-95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	9,133	SF	$1.29	$11,782
8.8	Furnish, Place, and Spread Topsoil (6")[9]	92	CY	$34.65	$3,200
8.9	Hydroseeding with Mulch and Fertilizer	5	MSF	$43.97	$199
8.10	Place, Spread, and Compact Asphalt Base Course (12")	169	ECY	$9.35	$1,581
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	4,566	SF	$2.27	$10,365
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	728	CY	$11.83	$8,612
8.14	Install Nonwoven Geotextile Fabric	1,015	SY	$2.21	$2,243
	Subtotal				**$63,910**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$759,328**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$45,560
10.2	Engineering and Design (12%)				$91,119
10.3	Construction management (8%)				$60,746
10.4	Location Adjustment (9%)				$68,340
10.5	Contingency (15%)				$113,899
TOTAL OTHER COSTS					**$379,664**
TOTAL CAPITAL COST FOR ALTERNATIVE 8					**$1,138,993**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Vacant Lot Abutting I95 Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 2 or 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area for characterization includes a bulking factor of 1.2.
[5] Volume includes all RW intended for disposal.
[6] A conversion factor of 1.5 was used to convert CY to TON.
[7] Volume of RW for Out-of-Town disposal assumes that 10% would be hazardous requiring treatment prior to disposal.
[8] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement;
Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[10] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
VACANT LOT ABUTTING I95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$528,091	$0	0	$528,091	7.0%	$528,091
1	$0	$80,989	$0	$80,989	7.0%	$75,691
2	$0	$80,989	$0	$80,989	7.0%	$70,739
3	$0	$19,586	$0	$19,586	7.0%	$15,988
4	$0	$19,586	$0	$19,586	7.0%	$14,942
5	$0	$19,586	$10,000	$29,586	7.0%	$21,094
6	$0	$19,586	$0	$19,586	7.0%	$13,051
7	$0	$19,586	$0	$19,586	7.0%	$12,197
8	$0	$19,586	$0	$19,586	7.0%	$11,399
9	$0	$19,586	$0	$19,586	7.0%	$10,653
10	$0	$19,586	$10,000	$29,586	7.0%	$15,040
11	$0	$19,586	$0	$19,586	7.0%	$9,305
12	$0	$19,586	$0	$19,586	7.0%	$8,696
13	$0	$19,586	$0	$19,586	7.0%	$8,127
14	$0	$19,586	$0	$19,586	7.0%	$7,596
15	$0	$19,586	$10,000	$29,586	7.0%	$10,723
16	$0	$19,586	$0	$19,586	7.0%	$6,634
17	$0	$19,586	$0	$19,586	7.0%	$6,200
18	$0	$19,586	$0	$19,586	7.0%	$5,795
19	$0	$19,586	$0	$19,586	7.0%	$5,416
20	$0	$19,586	$10,000	$29,586	7.0%	$7,645
21	$0	$19,586	$0	$19,586	7.0%	$4,730
22	$0	$19,586	$0	$19,586	7.0%	$4,421
23	$0	$19,586	$0	$19,586	7.0%	$4,132
24	$0	$19,586	$0	$19,586	7.0%	$3,861
25	$0	$19,586	$10,000	$29,586	7.0%	$5,451
26	$0	$19,586	$0	$19,586	7.0%	$3,373
27	$0	$19,586	$0	$19,586	7.0%	$3,152
28	$0	$19,586	$0	$19,586	7.0%	$2,946
29	$0	$19,586	$0	$19,586	7.0%	$2,753
30	$0	$19,586	$10,000	$29,586	7.0%	$3,887
TOTAL	**$528,091**	**$710,377**	**$60,000**	**$1,298,468**		**$903,727**
					PV O&M	**$375,636**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
VACANT LOT ABUTTING I-95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	105	LF	$35.79	$3,758
2.3	Install PVC Well Screens (2" diameter)	70	LF	$19.69	$1,378
2.4	Install PVC Well Casing (2" diameter)	35	LF	$14.79	$518
2.5	Install Filter Pack	84	LF	$15.52	$1,304
2.6	Install Bentonite Seal	7	EA	$57.23	$401
2.7	Install Annular Seal	14	LF	$69.04	$967
2.8	PVC Well Plugs	7	EA	$27.86	$195
2.9	Flush-Mount Protective Cover with Locking Cap	7	EA	$451.55	$3,161
2.10	Surface Pad, Concrete 2' x 2'	7	EA	$154.79	$1,084
2.11	Well Development (2 HR/WELL)	14	EA	$228.23	$3,195
2.12	IDW Transportation/Disposal (drums)	7	EA	$508.52	$3,560
	Subtotal				**$22,272**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	799	LF	$27.57	$22,024
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,616**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	4	MONTH	$4,531	$18,124
	Subtotal				**$47,574**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	2	ACRE	$3,968.29	$7,937
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	799	LF	$8.97	$7,163
	Subtotal				**$35,770**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	1,353	CY	$2.12	$2,873
6.2	Haul RW to Stockpile Area[4]	1,624	CY	$4.00	$6,495
6.3	Perimeter Air Sampling	30	EA	$243.76	$7,421
6.4	Equipment Decontamination	68	HR	$54.56	$3,691
6.5	Stockpile Management	1,624	CY	$1.44	$2,333
6.6	Stockpile Characterization[5]	4	EA	$1,535.00	$6,140
	Subtotal				**$28,955**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	1,624	CY	$2.44	$3,965
7.2	Transport RW to in-town consolidation[7]	1,461	CY	$5.52	$8,071
7.3	Equipment Decontamination	68	HR	$54.56	$3,691
7.4	Out-of-Town Transportation of Waste[7, 8]	244	TON	$170.00	$41,403
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	244	TON	$192.00	$46,761
	Subtotal				**$103,892**

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
VACANT LOT ABUTTING I-95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[9]	9,133	SF	$1.29	$11,782
8.8	Furnish, Place, and Spread Topsoil (6")[10]	93	CY	$34.65	$3,224
8.9	Hydroseeding with Mulch and Fertilizer	5	MSF	$43.97	$201
8.10	Place, Spread, and Compact Asphalt Base Course (12")	169	ECY	$9.35	$1,581
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	4566	SF	$2.27	$10,365
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	1099	CY	$11.83	$13,005
8.14	Install Nonwoven Geotextile Fabric	1015	SY	$2.21	$2,243
	Subtotal				**$68,328**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$352,061**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$21,124
10.2	Engineering and Design (12%)				$42,247
10.3	Construction management (8%)				$28,165
10.4	Location Adjustment (9%)				$31,685
10.5	Contingency (15%)				$52,809
TOTAL OTHER COSTS					**$176,030**
TOTAL CAPITAL COST FOR ALTERNATIVE 9					**$528,091**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Vacant Lot Abutting I95 Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal.
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement;
Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
VACANT LOT ABUTTING I95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$1,417,846	$0	0	$1,417,846	7.0%	$1,417,846
1	$0	$80,989	$0	$80,989	7.0%	$75,691
2	$0	$80,989	$0	$80,989	7.0%	$70,739
3	$0	$19,586	$0	$19,586	7.0%	$15,988
4	$0	$19,586	$0	$19,586	7.0%	$14,942
5	$0	$19,586	$10,000	$29,586	7.0%	$21,094
6	$0	$19,586	$0	$19,586	7.0%	$13,051
7	$0	$19,586	$0	$19,586	7.0%	$12,197
8	$0	$19,586	$0	$19,586	7.0%	$11,399
9	$0	$19,586	$0	$19,586	7.0%	$10,653
10	$0	$19,586	$10,000	$29,586	7.0%	$15,040
11	$0	$19,586	$0	$19,586	7.0%	$9,305
12	$0	$19,586	$0	$19,586	7.0%	$8,696
13	$0	$19,586	$0	$19,586	7.0%	$8,127
14	$0	$19,586	$0	$19,586	7.0%	$7,596
15	$0	$19,586	$10,000	$29,586	7.0%	$10,723
16	$0	$19,586	$0	$19,586	7.0%	$6,634
17	$0	$19,586	$0	$19,586	7.0%	$6,200
18	$0	$19,586	$0	$19,586	7.0%	$5,795
19	$0	$19,586	$0	$19,586	7.0%	$5,416
20	$0	$19,586	$10,000	$29,586	7.0%	$7,645
21	$0	$19,586	$0	$19,586	7.0%	$4,730
22	$0	$19,586	$0	$19,586	7.0%	$4,421
23	$0	$19,586	$0	$19,586	7.0%	$4,132
24	$0	$19,586	$0	$19,586	7.0%	$3,861
25	$0	$19,586	$10,000	$29,586	7.0%	$5,451
26	$0	$19,586	$0	$19,586	7.0%	$3,373
27	$0	$19,586	$0	$19,586	7.0%	$3,152
28	$0	$19,586	$0	$19,586	7.0%	$2,946
29	$0	$19,586	$0	$19,586	7.0%	$2,753
30	$0	$19,586	$10,000	$29,586	7.0%	$3,887
TOTAL	**$1,417,846**	**$710,377**	**$60,000**	**$2,188,223**		**$1,793,482**
					PV O&M	**$375,636**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
VACANT LOT ABUTTING I-95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	105	LF	$35.79	$3,758
2.3	Install PVC Well Screens (2" diameter)	70	LF	$19.69	$1,378
2.4	Install PVC Well Casing (2" diameter)	35	LF	$14.79	$518
2.5	Install Filter Pack	84	LF	$15.52	$1,304
2.6	Install Bentonite Seal	7	EA	$57.23	$401
2.7	Install Annular Seal	14	LF	$69.04	$967
2.8	PVC Well Plugs	7	EA	$27.86	$195
2.9	Flush-Mount Protective Cover with Locking Cap	7	EA	$451.55	$3,161
2.10	Surface Pad, Concrete 2' x 2'	7	EA	$154.79	$1,084
2.11	Well Development (2 HR/WELL)	14	EA	$228.23	$3,195
2.12	IDW Transportation/Disposal (drums)	7	EA	$508.52	$3,560
	Subtotal				**$22,272**
3.0	**Fencing and Signage[2]**				
3.1	Chain Link Fence	799	LF	$27.57	$22,024
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,616**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	4	MONTH	$4,531	$18,124
	Subtotal				**$47,574**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	2	ACRE	$3,968.29	$7,937
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	799	LF	$8.97	$7,163
	Subtotal				**$35,770**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
6.1	Excavate and Load RW[3]	1,353	CY	$2.12	$2,873
6.2	Haul RW to Stockpile Area[4]	1,624	CY	$4.00	$6,495
6.3	Perimeter Air Sampling	30	EA	$243.76	$7,421
6.4	Equipment Decontamination	68	HR	$54.56	$3,691
6.5	Stockpile Management	1,624	CY	$1.44	$2,333
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$22,815**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks[5]	1,624	CY	$2.44	$3,965
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	68	HR	$54.56	$3,691
7.4	Out-of-Town Transportation of Waste[6]	2,435	TON	$170.00	$414,029
7.5	Out-of-Town Disposal of RW (no treatment)[6, 7]	2,192	TON	$107.10	$234,755
7.6	Out-of-Town Disposal of RW (treatment)[6, 7]	244	TON	$192.00	$46,761
	Subtotal				**$703,201**

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
VACANT LOT ABUTTING I-95
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	9,133	SF	$1.29	$11,782
8.8	Furnish, Place, and Spread Topsoil (6")[9]	93	CY	$34.65	$3,224
8.9	Hydroseeding with Mulch and Fertilizer	5	MSF	$43.97	$201
8.10	Place, Spread, and Compact Asphalt Base Course (12")	169	ECY	$9.35	$1,581
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	4,566	SF	$2.27	$10,365
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	1,099	CY	$11.83	$13,005
8.14	Install Nonwoven Geotextile Fabric	1,015	SY	$2.21	$2,243
	Subtotal				**$68,328**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$945,231**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$56,714
10.2	Engineering and Design (12%)				$113,428
10.3	Construction management (8%)				$75,618
10.4	Location Adjustment (9%)				$85,071
10.5	Contingency (15%)				$141,785
TOTAL OTHER COSTS					**$472,615**
TOTAL CAPITAL COST FOR ALTERNATIVE 10					**$1,417,846**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Vacant Lot Abutting I95 Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Volume includes all RW intended for disposal.
[6] A conversion factor of 1.5 was used to convert CY to TON.
[7] Volume of RW for Out-of-Town disposal assumes that 10% would be hazardous requiring treatment prior to disposal.
[8] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement;
Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[10] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

G-8

CT RIGHT-OF-WAY

COST ESTIMATE BACKUP SHEETS

PRESENT VALUE ANALYSIS
ALTERNATIVE 1 - NO ACTION
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$10,000	$10,000	7.0%	$7,130
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$10,000	$10,000	7.0%	$5,083
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$10,000	$10,000	7.0%	$3,624
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$10,000	$10,000	7.0%	$2,584
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$10,000	$10,000	7.0%	$1,842
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$10,000	$10,000	7.0%	$1,314
TOTAL	**$0**	**$0**	**$60,000**	**$60,000**		**$21,578**
					PV O&M	**$21,578**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review [1]	Total	Discount Rate[2]	Present Value
0	$64,811	$0	$0	$64,811	7.0%	$64,811
1	$0	$94,808	$0	$94,808	7.0%	$88,606
2	$0	$94,808	$0	$94,808	7.0%	$82,809
3	$0	$42,176	$0	$42,176	7.0%	$34,429
4	$0	$42,176	$0	$42,176	7.0%	$32,176
5	$0	$42,176	$10,000	$52,176	7.0%	$37,201
6	$0	$42,176	$0	$42,176	7.0%	$28,104
7	$0	$42,176	$0	$42,176	7.0%	$26,265
8	$0	$42,176	$0	$42,176	7.0%	$24,547
9	$0	$42,176	$0	$42,176	7.0%	$22,941
10	$0	$42,176	$10,000	$52,176	7.0%	$26,524
11	$0	$42,176	$0	$42,176	7.0%	$20,038
12	$0	$42,176	$0	$42,176	7.0%	$18,727
13	$0	$42,176	$0	$42,176	7.0%	$17,502
14	$0	$42,176	$0	$42,176	7.0%	$16,357
15	$0	$42,176	$10,000	$52,176	7.0%	$18,911
16	$0	$42,176	$0	$42,176	7.0%	$14,287
17	$0	$42,176	$0	$42,176	7.0%	$13,352
18	$0	$42,176	$0	$42,176	7.0%	$12,478
19	$0	$42,176	$0	$42,176	7.0%	$11,662
20	$0	$42,176	$10,000	$52,176	7.0%	$13,483
21	$0	$42,176	$0	$42,176	7.0%	$10,186
22	$0	$42,176	$0	$42,176	7.0%	$9,520
23	$0	$42,176	$0	$42,176	7.0%	$8,897
24	$0	$42,176	$0	$42,176	7.0%	$8,315
25	$0	$42,176	$10,000	$52,176	7.0%	$9,613
26	$0	$42,176	$0	$42,176	7.0%	$7,263
27	$0	$42,176	$0	$42,176	7.0%	$6,787
28	$0	$42,176	$0	$42,176	7.0%	$6,343
29	$0	$42,176	$0	$42,176	7.0%	$5,928
30	$0	$42,176	$10,000	$52,176	7.0%	$6,854
TOTAL	**$64,811**	**$1,370,556**	**$60,000**	**$1,495,366**		**$704,916**
					PV O&M	**$640,106**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	120	LF	$35.79	$4,294
2.3	Install PVC Well Screens (2" diameter)	80	LF	$19.69	$1,575
2.4	Install PVC Well Casing (2" diameter)	40	LF	$14.79	$592
2.5	Install Filter Pack	96	LF	$15.52	$1,490
2.6	Install Bentonite Seal	8	EA	$57.23	$458
2.7	Install Annular Seal	16	LF	$69.04	$1,105
2.8	PVC Well Plugs	8	EA	$27.86	$223
2.9	Flush-Mount Protective Cover with Locking Cap	8	EA	$451.55	$3,612
2.10	Surface Pad, Concrete 2' x 2'	8	EA	$154.79	$1,238
2.11	Well Development (2 HR/WELL)	16	EA	$228.23	$3,652
2.12	IDW Transportation/Disposal (drums)	8	EA	$508.52	$4,068
	Subtotal				**$25,060**
3.0 Fencing and Signage					
3.1	Chain Link Fence	604	LF	$27.57	$16,652
3.2	Signage	6	EA	$73.95	$444
	Subtotal				**$17,096**
TOTAL DIRECT COSTS					**$64,811**
TOTAL CAPITAL COST FOR ALTERNATIVE 2					**$64,811**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Connecticut ROW Property.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene

LS = lump sum
EA = each
LF = linear foot

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	40	HR	$110	$4,400	see cost assumptions
OM.1.3	Sampling Labor - Sampler	20	HR	$90	$1,800	see cost assumptions
OM.1.4	Analytical Costs	10	EA	$697	$6,971	see cost assumptions
OM.1.5	Data Validation	10	HR	$110	$1,100	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$17,544**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.33	MSF	$56.31	$19	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	50	SF	$1.81	$91	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	20	LF	$27.57	$555	see cost assumptions
OM 2.6	Sign Replacement[5]	24	EA	$73.95	$1,775	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	2	EA	$321.75	$644	see cost assumptions
	Subtotal				**$18,533**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$94,808**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$42,176**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Connecticut ROW Property.

[2] Assumed that 1% of vegetated surfaces would require repair annually (need for repair to be established during 5-Year Reviews).

[3] Estimated 5% of asphalt surfaces will require repair annually (need for repair to be established during 5-Year Reviews).

[4] Estimated that 100% of fencing would require replacement over the period of O&M (need for repair to be established during 5-Year Reviews).

[5] Estimated that signage would require replacement 4 times over the period of O&M (need for repair to be established during 5-Year Reviews).

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review [1]	Total	Discount Rate[2]	Present Value
0	$375,920	$0	$0	$375,920	7.0%	$375,920
1	$0	$86,629	$0	$86,629	7.0%	$80,962
2	$0	$86,629	$0	$86,629	7.0%	$75,665
3	$0	$40,598	$0	$40,598	7.0%	$33,140
4	$0	$40,598	$0	$40,598	7.0%	$30,972
5	$0	$40,598	$10,000	$50,598	7.0%	$36,076
6	$0	$40,598	$0	$40,598	7.0%	$27,052
7	$0	$40,598	$0	$40,598	7.0%	$25,282
8	$0	$40,598	$0	$40,598	7.0%	$23,628
9	$0	$40,598	$0	$40,598	7.0%	$22,083
10	$0	$40,598	$10,000	$50,598	7.0%	$25,721
11	$0	$40,598	$0	$40,598	7.0%	$19,288
12	$0	$40,598	$0	$40,598	7.0%	$18,026
13	$0	$40,598	$0	$40,598	7.0%	$16,847
14	$0	$40,598	$0	$40,598	7.0%	$15,745
15	$0	$40,598	$10,000	$50,598	7.0%	$18,339
16	$0	$40,598	$0	$40,598	7.0%	$13,752
17	$0	$40,598	$0	$40,598	7.0%	$12,852
18	$0	$40,598	$0	$40,598	7.0%	$12,011
19	$0	$40,598	$0	$40,598	7.0%	$11,226
20	$0	$40,598	$10,000	$50,598	7.0%	$13,075
21	$0	$40,598	$0	$40,598	7.0%	$9,805
22	$0	$40,598	$0	$40,598	7.0%	$9,163
23	$0	$40,598	$0	$40,598	7.0%	$8,564
24	$0	$40,598	$0	$40,598	7.0%	$8,004
25	$0	$40,598	$10,000	$50,598	7.0%	$9,323
26	$0	$40,598	$0	$40,598	7.0%	$6,991
27	$0	$40,598	$0	$40,598	7.0%	$6,533
28	$0	$40,598	$0	$40,598	7.0%	$6,106
29	$0	$40,598	$0	$40,598	7.0%	$5,707
30	$0	$40,598	$10,000	$50,598	7.0%	$6,647
TOTAL	**$375,920**	**$1,310,001**	**$60,000**	**$1,745,921**		**$984,505**
					PV O&M	**$608,585**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	120	LF	$35.79	$4,294
2.3	Install PVC Well Screens (2" diameter)	80	LF	$19.69	$1,575
2.4	Install PVC Well Casing (2" diameter)	40	LF	$14.79	$592
2.5	Install Filter Pack	96	LF	$15.52	$1,490
2.6	Install Bentonite Seal	8	EA	$57.23	$458
2.7	Install Annular Seal	16	LF	$69.04	$1,105
2.8	PVC Well Plugs	8	EA	$27.86	$223
2.9	Flush-Mount Protective Cover with Locking Cap	8	EA	$451.55	$3,612
2.10	Surface Pad, Concrete 2' x 2'	8	EA	$154.79	$1,238
2.11	Well Development (2 HR/WELL)	16	EA	$228.23	$3,652
2.12	IDW Transportation/Disposal (drums)	8	EA	$508.52	$4,068
	Subtotal				**$25,060**
3.0	**Fencing and Signage[2]**				
3.1	Chain Link Fence	604	LF	$27.57	$16,652
3.2	Signage	6	EA	$73.95	$444
	Subtotal				**$17,096**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	2	MONTH	$4,531	$9,062
	Subtotal				**$38,513**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	604	LF	$8.97	$5,416
	Subtotal				**$26,086**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction[3]**				
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0	**Transportation and Treatment/Disposal of Raymark Waste[3]**				
7.1	Load RW into Trucks	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of Waste	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[4]	189	CY	$27.00	$5,114
8.3	Install Geosynthetic Clay Liner (bottom layer)	9,300	SF	$2.86	$26,621
8.4	Install 60 mil HDPE liner	9,300	SF	$2.84	$26,430
8.5	Install Geosynthetic Drainage Layer	9,300	SF	$0.65	$6,082
8.6	Furnish, Spread, and Compact Soil Layer (24")[4]	737	CY	$11.83	$8,713
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	9,300	SF	$1.29	$11,997
8.8	Furnish, Place, and Spread Topsoil (6")[4]	146	CY	$34.65	$5,054
8.9	Hydroseeding with Mulch and Fertilizer	8	MSF	$43.97	$365
8.10	Place, Spread, and Compact Asphalt Base Course (12")	37	ECY	$9.35	$346
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	1,000	SF	$2.27	$2,270
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	1,033	SY	$2.21	$2,284
	Subtotal				**$121,204**
9.0	**Flood Storage Mitigation/Stormwater Management[5]**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$250,613**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$15,037
10.2	Engineering and Design (12%)				$30,074
10.3	Construction management (8%)				$20,049
10.4	Location Adjustment (9%)				$22,555
10.5	Contingency (15%)				$37,592
TOTAL OTHER COSTS					**$125,307**
TOTAL CAPITAL COST FOR ALTERNATIVE 3					**$375,920**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Connecticut ROW Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] No excavation prior to cap construction would be required at this property.
[4] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[5] Impacts to floodplains will be evaluated during Remedial Design and will require compensation via backfill material selection to ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	40	HR	$110	$4,400	see cost assumptions
OM.1.3	Sampling Labor - Sampler	20	HR	$90	$1,800	see cost assumptions
OM.1.4	Analytical Costs	10	EA	$697	$6,971	see cost assumptions
OM.1.5	Data Validation	10	HR	$110	$1,100	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$17,544**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	17	MSF	$7.34	$122	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.08	MSF	$56.31	$5	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	50	SF	$1.81	$91	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	4	EA	$321.75	$1,287	see cost assumptions
	Subtotal				**$16,954**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$86,629**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$40,598**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Connecticut ROW Property.

[2] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[3] Assumed 5% of asphalt surfaces will require repair annually.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review	Total	Discount Rate	Present Value
0	$0	$0	0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Notes:

This Alternative is not applicable to this property group - see Section 4.3 of the FS.

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.10	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0	**Fencing and Signage**				
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.95	$0
	Subtotal				**$0**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction**				
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization		EA	$1,535.00	$0
	Subtotal				**$0**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of Waste	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405.12	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 4					**$0**

Notes:
This Alternative is not applicable to this property group - see Section 4.8 of the FS.

PRESENT VALUE ANALYSIS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review [1]	Total	Discount Rate[2]	Present Value
0	$513,804	$0	$0	$513,804	7.0%	$513,804
1	$0	$70,175	$0	$70,175	7.0%	$65,584
2	$0	$70,175	$0	$70,175	7.0%	$61,294
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$513,804**	**$140,351**	**$0**	**$654,155**		**$640,682**
					PV O&M	**$126,878**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
CT RIGHT-OF-WAY PROPERTY
RAYMARK IDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	120	LF	$35.79	$4,294
2.3	Install PVC Well Screens (2" diameter)	80	LF	$19.69	$1,575
2.4	Install PVC Well Casing (2" diameter)	40	LF	$14.79	$592
2.5	Install Filter Pack	96	LF	$15.52	$1,490
2.6	Install Bentonite Seal	8	EA	$57.23	$458
2.7	Install Annular Seal	16	LF	$69.04	$1,105
2.8	PVC Well Plugs	8	EA	$27.86	$223
2.9	Flush-Mount Protective Cover with Locking Cap	8	EA	$451.55	$3,612
2.10	Surface Pad, Concrete 2' x 2'	8	EA	$154.79	$1,238
2.11	Well Development (2 HR/WELL)	16	EA	$228.23	$3,652
2.12	IDW Transportation/Disposal (drums)	8	EA	$508.52	$4,068
	Subtotal				**$25,060**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	604	LF	$27.57	$16,652
3.2	Signage	6	EA	$73.95	$444
	Subtotal				**$17,096**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	4	MONTH	$4,531	$18,124
	Subtotal				**$47,574**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	604	LF	$8.97	$5,416
	Subtotal				**$26,086**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[4]	2,286	CY	$2.12	$4,854
6.2	Haul RW/Soil to Stockpile Area[5]	2,743	CY	$4.00	$10,974
6.3	Perimeter Air Sampling	51	EA	$243.76	$12,538
6.4	Equipment Decontamination	114	HR	$54.56	$6,237
6.5	Stockpile Management	2,743	CY	$1.44	$3,942
6.6	Stockpile Characterization[6]	6	EA	$1,535.00	$9,210
	Subtotal				**$47,755**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	1,911	CY	$2.44	$4,667
7.2	Transport RW to in-town consolidation[8]	1,720	CY	$5.52	$9,500
7.3	Equipment Decontamination	114	HR	$54.56	$6,237
7.4	Out-of-Town Transportation of RW[8, 9]	287	TON	$170.00	$48,733
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[8, 9]	287	TON	$192.00	$55,040
	Subtotal				**$124,177**

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
CT RIGHT-OF-WAY PROPERTY
RAYMARK IDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	749	CY	$2.40	$1,799
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	131	CY	$34.65	$4,531
8.9	Hydroseeding with Mulch and Fertilizer	6	MSF	$43.97	$282
8.10	Place, Spread, and Compact Asphalt Base Course (12")	37	ECY	$9.35	$346
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	1,000	SF	$2.27	$2,270
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	1,570	CY	$11.83	$18,574
8.14	Install Nonwoven Geotextile Fabric	478	SY	$2.21	$1,056
	Subtotal				**$54,787**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$342,536**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$20,552
10.2	Engineering and Design (12%)				$41,104
10.3	Construction management (8%)				$27,403
10.4	Location Adjustment (9%)				$30,828
10.5	Contingency (15%)				$51,380
TOTAL OTHER COSTS					**$171,268**
TOTAL CAPITAL COST FOR ALTERNATIVE 5					**$513,804**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Connecticut ROW Property.

[2] Excavation to water table at this property will achieve complete excavation of RW and will not require transactional fees due to deed management.

[3] No excavation prior to cap construction would be required at this property.

[4] Represents in situ estimate of RW to excavated to a depth of 10-ft below ground surface and additional soil that would be required to be removed to facilitate compliance with safety standards for benching/sloping.

[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[8] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[9] A conversion factor of 1.5 was used to convert CY to TON.

[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use on-site pending analytical results for PHCs and was deducted from backfill estimates.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0	**Groundwater Monitoring (per event)**					
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	40	HR	$110	$4,400	see cost assumptions
OM.1.3	Sampling Labor - Sampler	20	HR	$90	$1,800	see cost assumptions
OM.1.4	Analytical Costs	10	EA	$697	$6,971	see cost assumptions
OM.1.5	Data Validation	10	HR	$110	$1,100	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$17,544**	
OM.2.0	**Ground Surface Inspections, Maintenance, and Repairs (per year)[2]**					
OM.2.1	Inspection	0	HR	$110.00	$0	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation	0	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	0	LS	$2,250.00	$0	see cost assumptions
OM.2.8	Contractor mobilizations	0	EA	$321.75	$0	see cost assumptions
	Subtotal				**$0**	
OM.3.0	**Deed Restrictions[2]**					
OM.3.1	Inspection (annual)	0	LS	$1,100.00	$0	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	0	EA	$5,000.00	$0	see cost assumptions
	Subtotal				**$0**	
ANNUAL O&M COST (YEARS 1-2)[4]					**$70,175**	
ANNUAL O&M COST (YEARS 3-30)[5]					**$0**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Connecticut ROW Property.

[2] Assume deed restrictions and O&M for ground surfaces would not be required following complete excavation of Raymark waste.

[3] O&M for Years 1 and 2 include quarterly groundwater monitoring with annual reporting.

[4] O&M for Years 3 - 30 will not be required pending analytical data and concurrence from the State following the first 2 years of groundwater data collection.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review [1]	Total	Discount Rate[2]	Present Value
0	$1,562,721	$0	$0	$1,562,721	7.0%	$1,562,721
1	$0	$70,175	$0	$70,175	7.0%	$65,584
2	$0	$70,175	$0	$70,175	7.0%	$61,294
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$1,562,721**	**$140,351**	**$0**	**$1,703,071**		**$1,689,599**
					PV O&M	**$126,878**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER ATABLE WITH OUT-OF-TOWN DISPOSAL
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	120	LF	$35.79	$4,294
2.3	Install PVC Well Screens (2" diameter)	80	LF	$19.69	$1,575
2.4	Install PVC Well Casing (2" diameter)	40	LF	$14.79	$592
2.5	Install Filter Pack	96	LF	$15.52	$1,490
2.6	Install Bentonite Seal	8	EA	$57.23	$458
2.7	Install Annular Seal	16	LF	$69.04	$1,105
2.8	PVC Well Plugs	8	EA	$27.86	$223
2.9	Flush-Mount Protective Cover with Locking Cap	8	EA	$451.55	$3,612
2.10	Surface Pad, Concrete 2' x 2'	8	EA	$154.79	$1,238
2.11	Well Development (2 HR/WELL)	16	EA	$228.23	$3,652
2.12	IDW Transportation/Disposal (drums)	8	EA	$508.52	$4,068
	Subtotal				**$25,060**
3.0	**Fencing and Signage[3]**				
3.1	Chain Link Fence	604	LF	$27.57	$16,652
3.2	Signage	6	EA	$73.95	$444
	Subtotal				**$17,096**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	4	MONTH	$4,531	$18,124
	Subtotal				**$47,574**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	604	LF	$8.97	$5,416
	Subtotal				**$26,086**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
6.1	Excavate and Load RW/Soil[4]	2,286	CY	$2.12	$4,854
6.2	Haul RW/Soil to Stockpile Area[5]	2,743	CY	$4.00	$10,974
6.3	Perimeter Air Sampling	51	EA	$243.76	$12,538
6.4	Equipment Decontamination	114	HR	$54.56	$6,237
6.5	Stockpile Management	2,743	CY	$1.44	$3,942
6.6	Stockpile Characterization[6]	2	EA	$1,535.00	$3,070
	Subtotal				**$41,615**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks[7]	1,911	CY	$2.44	$4,667
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	114	HR	$54.56	$6,237
7.4	Out-of-Town Transportation of RW[8]	2,867	TON	$170.00	$487,333
7.5	Out-of-Town Disposal of RW (no treatment)[8, 9]	2,580	TON	$107.10	$276,318
7.6	Out-of-Town Disposal of RW (treatment)[8, 9]	287	TON	$192.00	$55,040
	Subtotal				**$829,595**

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER ATABLE WITH OUT-OF-TOWN DISPOSAL
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	749	CY	$2.40	$1,799
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	131	CY	$34.65	$4,531
8.9	Hydroseeding with Mulch and Fertilizer	6	MSF	$43.97	$282
8.10	Place, Spread, and Compact Asphalt Base Course (12")	37	ECY	$9.35	$346
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	1000	SF	$2.27	$2,270
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	1570	CY	$11.83	$18,574
8.14	Install Nonwoven Geotextile Fabric	478	SY	$2.21	$1,056
	Subtotal				**$54,787**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$1,041,814**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$62,509
10.2	Engineering and Design (12%)				$125,018
10.3	Construction management (8%)				$83,345
10.4	Location Adjustment (9%)				$93,763
10.5	Contingency (15%)				$156,272
TOTAL OTHER COSTS					**$520,907**
TOTAL CAPITAL COST FOR ALTERNATIVE 6					**$1,562,721**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Connecticut ROW Property.

[2] Excavation to water table at this property will achieve complete excavation of RW and will not require transactional fees due to deed management.

[3] Assume fencing and signage to be temporary and required during construction activities for site security only.

[4] Represents in situ estimate of RW to excavated to a depth of 10-ft below ground surface and additional soil that would be required to be removed to facilitate compliance with safety standards for benching/sloping.

[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[8] A conversion factor of 1.5 was used to convert CY to TON.

[9] Volume of RW for disposal assumes 10% would be hazardous requiring treatment prior to disposal.

[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review [1]	Total	Discount Rate[2]	Present Value
0	$342,876	$0	0	$342,876	7.0%	$342,876
1	$0	$93,153	$0	$93,153	7.0%	$87,059
2	$0	$93,153	$0	$93,153	7.0%	$81,364
3	$0	$40,522	$0	$40,522	7.0%	$33,078
4	$0	$40,522	$0	$40,522	7.0%	$30,914
5	$0	$40,522	$10,000	$50,522	7.0%	$36,021
6	$0	$40,522	$0	$40,522	7.0%	$27,001
7	$0	$40,522	$0	$40,522	7.0%	$25,235
8	$0	$40,522	$0	$40,522	7.0%	$23,584
9	$0	$40,522	$0	$40,522	7.0%	$22,041
10	$0	$40,522	$10,000	$50,522	7.0%	$25,683
11	$0	$40,522	$0	$40,522	7.0%	$19,252
12	$0	$40,522	$0	$40,522	7.0%	$17,992
13	$0	$40,522	$0	$40,522	7.0%	$16,815
14	$0	$40,522	$0	$40,522	7.0%	$15,715
15	$0	$40,522	$10,000	$50,522	7.0%	$18,311
16	$0	$40,522	$0	$40,522	7.0%	$13,726
17	$0	$40,522	$0	$40,522	7.0%	$12,828
18	$0	$40,522	$0	$40,522	7.0%	$11,989
19	$0	$40,522	$0	$40,522	7.0%	$11,205
20	$0	$40,522	$10,000	$50,522	7.0%	$13,056
21	$0	$40,522	$0	$40,522	7.0%	$9,787
22	$0	$40,522	$0	$40,522	7.0%	$9,146
23	$0	$40,522	$0	$40,522	7.0%	$8,548
24	$0	$40,522	$0	$40,522	7.0%	$7,989
25	$0	$40,522	$10,000	$50,522	7.0%	$9,309
26	$0	$40,522	$0	$40,522	7.0%	$6,978
27	$0	$40,522	$0	$40,522	7.0%	$6,521
28	$0	$40,522	$0	$40,522	7.0%	$6,095
29	$0	$40,522	$0	$40,522	7.0%	$5,696
30	$0	$40,522	$10,000	$50,522	7.0%	$6,637
TOTAL	**$342,876**	**$1,320,916**	**$60,000**	**$1,723,791**		**$962,449**
					PV O&M	**$619,573**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	120	LF	$35.79	$4,294
2.3	Install PVC Well Screens (2" diameter)	80	LF	$19.69	$1,575
2.4	Install PVC Well Casing (2" diameter)	40	LF	$14.79	$592
2.5	Install Filter Pack	96	LF	$15.52	$1,490
2.6	Install Bentonite Seal	8	EA	$57.23	$458
2.7	Install Annular Seal	16	LF	$69.04	$1,105
2.8	PVC Well Plugs	8	EA	$27.86	$223
2.9	Flush-Mount Protective Cover with Locking Cap	8	EA	$451.55	$3,612
2.10	Surface Pad, Concrete 2' x 2'	8	EA	$154.79	$1,238
2.11	Well Development (2 HR/WELL)	16	EA	$228.23	$3,652
2.12	IDW Transportation/Disposal (drums)	8	EA	$508.52	$4,068
	Subtotal				**$25,060**
3.0	**Fencing and Signage[2]**				
3.1	Chain Link Fence	604	LF	$27.57	$16,652
3.2	Signage	6	EA	$73.95	$444
	Subtotal				**$17,096**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	2	MONTH	$4,531	$9,062
	Subtotal				**$38,513**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	604	LF	$8.97	$5,416
	Subtotal				**$26,086**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
6.1	Excavate and Load RW[3]	563	CY	$2.12	$1,195
6.2	Haul RW to Stockpile Area[4]	676	CY	$4.00	$2,703
6.3	Perimeter Air Sampling	13	EA	$243.76	$3,088
6.4	Equipment Decontamination	28	HR	$54.56	$1,536
6.5	Stockpile Management	676	CY	$1.44	$971
6.6	Stockpile Characterization[5]	2	EA	$1,535.00	$3,070
	Subtotal				**$12,563**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks[6]	676	CY	$2.44	$1,650
7.2	Transport RW to in-town consolidation[7]	608	CY	$5.52	$3,358
7.3	Equipment Decontamination	28	HR	$54.56	$1,536
7.4	Out-of-Town Transportation of Waste[7, 8]	101	TON	$170.00	$17,227
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	101	TON	$192.00	$19,456
	Subtotal				**$43,227**

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[9]	4,300	SF	$1.29	$5,547
8.8	Furnish, Place, and Spread Topsoil (6")[10]	67	CY	$34.65	$2,329
8.9	Hydroseeding with Mulch and Fertilizer	3	MSF	$43.97	$145
8.10	Place, Spread, and Compact Asphalt Base Course (12")	37	ECY	$9.35	$346
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	1,000	SF	$2.27	$2,270
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	487	CY	$11.83	$5,764
8.14	Install Nonwoven Geotextile Fabric	478	SY	$2.21	$1,056
	Subtotal				**$43,385**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$228,584**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$13,715
10.2	Engineering and Design (12%)				$27,430
10.3	Construction management (8%)				$18,287
10.4	Location Adjustment (9%)				$20,573
10.5	Contingency (15%)				$34,288
TOTAL OTHER COSTS					**$114,292**
TOTAL CAPITAL COST FOR ALTERNATIVE 7					**$342,876**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Connecticut ROW Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 2 or 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal.
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement;
Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	40	HR	$110	$4,400	see cost assumptions
OM.1.3	Sampling Labor - Sampler	20	HR	$90	$1,800	see cost assumptions
OM.1.4	Analytical Costs	10	EA	$697	$6,971	see cost assumptions
OM.1.5	Data Validation	10	HR	$110	$1,100	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$17,544**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	7	MSF	$7.34	$48	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.03	MSF	$56.31	$2	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	50	SF	$1.81	$91	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	4	EA	$321.75	$1,287	see cost assumptions
	Subtotal				**$16,878**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$93,153**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$40,522**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Connecticut ROW Property.

[2] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[3] Assumed 5% of asphalt surfaces will require repair annually.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review [1]	Total	Discount Rate[2]	Present Value
0	$712,306	$0	0	$712,306	7.0%	$712,306
1	$0	$93,153	$0	$93,153	7.0%	$87,059
2	$0	$93,153	$0	$93,153	7.0%	$81,364
3	$0	$40,522	$0	$40,522	7.0%	$33,078
4	$0	$40,522	$0	$40,522	7.0%	$30,914
5	$0	$40,522	$10,000	$50,522	7.0%	$36,021
6	$0	$40,522	$0	$40,522	7.0%	$27,001
7	$0	$40,522	$0	$40,522	7.0%	$25,235
8	$0	$40,522	$0	$40,522	7.0%	$23,584
9	$0	$40,522	$0	$40,522	7.0%	$22,041
10	$0	$40,522	$10,000	$50,522	7.0%	$25,683
11	$0	$40,522	$0	$40,522	7.0%	$19,252
12	$0	$40,522	$0	$40,522	7.0%	$17,992
13	$0	$40,522	$0	$40,522	7.0%	$16,815
14	$0	$40,522	$0	$40,522	7.0%	$15,715
15	$0	$40,522	$10,000	$50,522	7.0%	$18,311
16	$0	$40,522	$0	$40,522	7.0%	$13,726
17	$0	$40,522	$0	$40,522	7.0%	$12,828
18	$0	$40,522	$0	$40,522	7.0%	$11,989
19	$0	$40,522	$0	$40,522	7.0%	$11,205
20	$0	$40,522	$10,000	$50,522	7.0%	$13,056
21	$0	$40,522	$0	$40,522	7.0%	$9,787
22	$0	$40,522	$0	$40,522	7.0%	$9,146
23	$0	$40,522	$0	$40,522	7.0%	$8,548
24	$0	$40,522	$0	$40,522	7.0%	$7,989
25	$0	$40,522	$10,000	$50,522	7.0%	$9,309
26	$0	$40,522	$0	$40,522	7.0%	$6,978
27	$0	$40,522	$0	$40,522	7.0%	$6,521
28	$0	$40,522	$0	$40,522	7.0%	$6,095
29	$0	$40,522	$0	$40,522	7.0%	$5,696
30	$0	$40,522	$10,000	$50,522	7.0%	$6,637
TOTAL	**$712,306**	**$1,320,916**	**$60,000**	**$2,093,222**		**$1,331,879**
					PV O&M	**$619,573**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER W OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	120	LF	$35.79	$4,294
2.3	Install PVC Well Screens (2" diameter)	80	LF	$19.69	$1,575
2.4	Install PVC Well Casing (2" diameter)	40	LF	$14.79	$592
2.5	Install Filter Pack	96	LF	$15.52	$1,490
2.6	Install Bentonite Seal	8	EA	$57.23	$458
2.7	Install Annular Seal	16	LF	$69.04	$1,105
2.8	PVC Well Plugs	8	EA	$27.86	$223
2.9	Flush-Mount Protective Cover with Locking Cap	8	EA	$451.55	$3,612
2.10	Surface Pad, Concrete 2' x 2'	8	EA	$154.79	$1,238
2.11	Well Development (2 HR/WELL)	16	EA	$228.23	$3,652
2.12	IDW Transportation/Disposal (drums)	8	EA	$508.52	$4,068
	Subtotal				**$25,060**
3.0	**Fencing and Signage[2]**				
3.1	Chain Link Fence	604	LF	$27.57	$16,652
3.2	Signage	6	EA	$73.95	$444
	Subtotal				**$17,096**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	2	MONTH	$4,531	$9,062
	Subtotal				**$38,513**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	604	LF	$8.97	$5,416
	Subtotal				**$26,086**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
6.1	Excavate and Load RW[3]	563	CY	$2.12	$1,195
6.2	Haul RW to Stockpile Area[4]	676	CY	$4.00	$2,703
6.3	Perimeter Air Sampling	13	EA	$243.76	$3,088
6.4	Equipment Decontamination	28	HR	$54.56	$1,536
6.5	Stockpile Management	676	CY	$1.44	$971
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$9,493**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks[5]	676	CY	$2.44	$1,650
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	28	HR	$54.56	$1,536
7.4	Out-of-Town Transportation of Waste[6]	1,013	TON	$170.00	$172,267
7.5	Out-of-Town Disposal of RW (no treatment)[6, 7]	912	TON	$107.10	$97,675
7.6	Out-of-Town Disposal of RW (treatment)[6, 7]	101	TON	$192.00	$19,456
	Subtotal				**$292,584**

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER W OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	4,300	SF	$1.29	$5,547
8.8	Furnish, Place, and Spread Topsoil (6")[9]	67	CY	$34.65	$2,329
8.9	Hydroseeding with Mulch and Fertilizer	3	MSF	$43.97	$145
8.10	Place, Spread, and Compact Asphalt Base Course (12")	37	ECY	$9.35	$346
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	1,000	SF	$2.27	$2,270
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	487	CY	$11.83	$5,764
8.14	Install Nonwoven Geotextile Fabric	478	SY	$2.21	$1,056
	Subtotal				**$43,385**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$474,871**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$28,492
10.2	Engineering and Design (12%)				$56,984
10.3	Construction management (8%)				$37,990
10.4	Location Adjustment (9%)				$42,738
10.5	Contingency (15%)				$71,231
TOTAL OTHER COSTS					**$237,435**
TOTAL CAPITAL COST FOR ALTERNATIVE 8					**$712,306**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Connecticut ROW Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 2 or 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area for characterization includes a bulking factor of 1.2.
[5] Volume includes all RW intended for disposal.
[6] A conversion factor of 1.5 was used to convert CY to TON.
[7] Volume of RW for Out-of-Town disposal assumes that 10% would be hazardous requiring treatment prior to disposal.
[8] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement;
Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain
[10] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review [1]	Total	Discount Rate[2]	Present Value
0	$354,727	$0	0	$354,727	7.0%	$354,727
1	$0	$93,153	$0	$93,153	7.0%	$87,059
2	$0	$93,153	$0	$93,153	7.0%	$81,364
3	$0	$40,522	$0	$40,522	7.0%	$33,078
4	$0	$40,522	$0	$40,522	7.0%	$30,914
5	$0	$40,522	$10,000	$50,522	7.0%	$36,021
6	$0	$40,522	$0	$40,522	7.0%	$27,001
7	$0	$40,522	$0	$40,522	7.0%	$25,235
8	$0	$40,522	$0	$40,522	7.0%	$23,584
9	$0	$40,522	$0	$40,522	7.0%	$22,041
10	$0	$40,522	$10,000	$50,522	7.0%	$25,683
11	$0	$40,522	$0	$40,522	7.0%	$19,252
12	$0	$40,522	$0	$40,522	7.0%	$17,992
13	$0	$40,522	$0	$40,522	7.0%	$16,815
14	$0	$40,522	$0	$40,522	7.0%	$15,715
15	$0	$40,522	$10,000	$50,522	7.0%	$18,311
16	$0	$40,522	$0	$40,522	7.0%	$13,726
17	$0	$40,522	$0	$40,522	7.0%	$12,828
18	$0	$40,522	$0	$40,522	7.0%	$11,989
19	$0	$40,522	$0	$40,522	7.0%	$11,205
20	$0	$40,522	$10,000	$50,522	7.0%	$13,056
21	$0	$40,522	$0	$40,522	7.0%	$9,787
22	$0	$40,522	$0	$40,522	7.0%	$9,146
23	$0	$40,522	$0	$40,522	7.0%	$8,548
24	$0	$40,522	$0	$40,522	7.0%	$7,989
25	$0	$40,522	$10,000	$50,522	7.0%	$9,309
26	$0	$40,522	$0	$40,522	7.0%	$6,978
27	$0	$40,522	$0	$40,522	7.0%	$6,521
28	$0	$40,522	$0	$40,522	7.0%	$6,095
29	$0	$40,522	$0	$40,522	7.0%	$5,696
30	$0	$40,522	$10,000	$50,522	7.0%	$6,637
TOTAL	**$354,727**	**$1,320,916**	**$60,000**	**$1,735,642**		**$974,300**
					PV O&M	**$619,573**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	120	LF	$35.79	$4,294
2.3	Install PVC Well Screens (2" diameter)	80	LF	$19.69	$1,575
2.4	Install PVC Well Casing (2" diameter)	40	LF	$14.79	$592
2.5	Install Filter Pack	96	LF	$15.52	$1,490
2.6	Install Bentonite Seal	8	EA	$57.23	$458
2.7	Install Annular Seal	16	LF	$69.04	$1,105
2.8	PVC Well Plugs	8	EA	$27.86	$223
2.9	Flush-Mount Protective Cover with Locking Cap	8	EA	$451.55	$3,612
2.10	Surface Pad, Concrete 2' x 2'	8	EA	$154.79	$1,238
2.11	Well Development (2 HR/WELL)	16	EA	$228.23	$3,652
2.12	IDW Transportation/Disposal (drums)	8	EA	$508.52	$4,068
	Subtotal				**$25,060**
3.0	**Fencing and Signage[2]**				
3.1	Chain Link Fence	604	LF	$27.57	$16,652
3.2	Signage	6	EA	$73.95	$444
	Subtotal				**$17,096**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	2	MONTH	$4,531	$9,062
	Subtotal				**$38,513**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	604	LF	$8.97	$5,416
	Subtotal				**$26,086**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
6.1	Excavate and Load RW[3]	637	CY	$2.12	$1,353
6.2	Haul RW to Stockpile Area[4]	764	CY	$4.00	$3,058
6.3	Perimeter Air Sampling	14	EA	$243.76	$3,494
6.4	Equipment Decontamination	32	HR	$54.56	$1,738
6.5	Stockpile Management	764	CY	$1.44	$1,099
6.6	Stockpile Characterization[5]	2	EA	$1,535.00	$3,070
	Subtotal				**$13,812**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks[6]	764	CY	$2.44	$1,867
7.2	Transport RW to in-town consolidation[7]	688	CY	$5.52	$3,800
7.3	Equipment Decontamination	32	HR	$54.56	$1,738
7.4	Out-of-Town Transportation of Waste[7, 8]	115	TON	$170.00	$19,493
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	115	TON	$192.00	$22,016
	Subtotal				**$48,914**

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[9]	4,300	SF	$1.29	$5,547
8.8	Furnish, Place, and Spread Topsoil (6")[10]	67	CY	$34.65	$2,329
8.9	Hydroseeding with Mulch and Fertilizer	3	MSF	$43.97	$145
8.10	Place, Spread, and Compact Asphalt Base Course (12")	37	ECY	$9.35	$346
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	1000	SF	$2.27	$2,270
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	569	CY	$11.83	$6,728
8.14	Install Nonwoven Geotextile Fabric	478	SY	$2.21	$1,056
	Subtotal				**$44,349**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$236,484**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$14,189
10.2	Engineering and Design (12%)				$28,378
10.3	Construction management (8%)				$18,919
10.4	Location Adjustment (9%)				$21,284
10.5	Contingency (15%)				$35,473
TOTAL OTHER COSTS					**$118,242**
TOTAL CAPITAL COST FOR ALTERNATIVE 9					**$354,727**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Connecticut ROW Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal.
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement;
Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review [1]	Total	Discount Rate[2]	Present Value
0	$773,372	$0	0	$773,372	7.0%	$773,372
1	$0	$93,153	$0	$93,153	7.0%	$87,059
2	$0	$93,153	$0	$93,153	7.0%	$81,364
3	$0	$40,522	$0	$40,522	7.0%	$33,078
4	$0	$40,522	$0	$40,522	7.0%	$30,914
5	$0	$40,522	$10,000	$50,522	7.0%	$36,021
6	$0	$40,522	$0	$40,522	7.0%	$27,001
7	$0	$40,522	$0	$40,522	7.0%	$25,235
8	$0	$40,522	$0	$40,522	7.0%	$23,584
9	$0	$40,522	$0	$40,522	7.0%	$22,041
10	$0	$40,522	$10,000	$50,522	7.0%	$25,683
11	$0	$40,522	$0	$40,522	7.0%	$19,252
12	$0	$40,522	$0	$40,522	7.0%	$17,992
13	$0	$40,522	$0	$40,522	7.0%	$16,815
14	$0	$40,522	$0	$40,522	7.0%	$15,715
15	$0	$40,522	$10,000	$50,522	7.0%	$18,311
16	$0	$40,522	$0	$40,522	7.0%	$13,726
17	$0	$40,522	$0	$40,522	7.0%	$12,828
18	$0	$40,522	$0	$40,522	7.0%	$11,989
19	$0	$40,522	$0	$40,522	7.0%	$11,205
20	$0	$40,522	$10,000	$50,522	7.0%	$13,056
21	$0	$40,522	$0	$40,522	7.0%	$9,787
22	$0	$40,522	$0	$40,522	7.0%	$9,146
23	$0	$40,522	$0	$40,522	7.0%	$8,548
24	$0	$40,522	$0	$40,522	7.0%	$7,989
25	$0	$40,522	$10,000	$50,522	7.0%	$9,309
26	$0	$40,522	$0	$40,522	7.0%	$6,978
27	$0	$40,522	$0	$40,522	7.0%	$6,521
28	$0	$40,522	$0	$40,522	7.0%	$6,095
29	$0	$40,522	$0	$40,522	7.0%	$5,696
30	$0	$40,522	$10,000	$50,522	7.0%	$6,637
TOTAL	**$773,372**	**$1,320,916**	**$60,000**	**$2,154,288**		**$1,392,945**
					PV O&M	**$619,573**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	120	LF	$35.79	$4,294
2.3	Install PVC Well Screens (2" diameter)	80	LF	$19.69	$1,575
2.4	Install PVC Well Casing (2" diameter)	40	LF	$14.79	$592
2.5	Install Filter Pack	96	LF	$15.52	$1,490
2.6	Install Bentonite Seal	8	EA	$57.23	$458
2.7	Install Annular Seal	16	LF	$69.04	$1,105
2.8	PVC Well Plugs	8	EA	$27.86	$223
2.9	Flush-Mount Protective Cover with Locking Cap	8	EA	$451.55	$3,612
2.10	Surface Pad, Concrete 2' x 2'	8	EA	$154.79	$1,238
2.11	Well Development (2 HR/WELL)	16	EA	$228.23	$3,652
2.12	IDW Transportation/Disposal (drums)	8	EA	$508.52	$4,068
	Subtotal				**$25,060**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	604	LF	$27.57	$16,652
3.2	Signage	6	EA	$73.95	$444
	Subtotal				**$17,096**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	2	MONTH	$4,531	$9,062
	Subtotal				**$38,513**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	604	LF	$8.97	$5,416
	Subtotal				**$26,086**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	637	CY	$2.12	$1,353
6.2	Haul RW to Stockpile Area[4]	764	CY	$4.00	$3,058
6.3	Perimeter Air Sampling	14	EA	$243.76	$3,494
6.4	Equipment Decontamination	32	HR	$54.56	$1,738
6.5	Stockpile Management	764	CY	$1.44	$1,099
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$10,742**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[5]	764	CY	$2.44	$1,867
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	32	HR	$54.56	$1,738
7.4	Out-of-Town Transportation of Waste[6]	1,147	TON	$170.00	$194,933
7.5	Out-of-Town Disposal of RW (no treatment)[6, 7]	1,032	TON	$107.10	$110,527
7.6	Out-of-Town Disposal of RW (treatment)[6, 7]	115	TON	$192.00	$22,016
	Subtotal				**$331,081**

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
CT RIGHT-OF-WAY PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	4,300	SF	$1.29	$5,547
8.8	Furnish, Place, and Spread Topsoil (6")[9]	67	CY	$34.65	$2,329
8.9	Hydroseeding with Mulch and Fertilizer	3	MSF	$43.97	$145
8.10	Place, Spread, and Compact Asphalt Base Course (12")	37	ECY	$9.35	$346
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	1,000	SF	$2.27	$2,270
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	569	CY	$11.83	$6,728
8.14	Install Nonwoven Geotextile Fabric	478	SY	$2.21	$1,056
	Subtotal				**$44,349**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$515,582**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$30,935
10.2	Engineering and Design (12%)				$61,870
10.3	Construction management (8%)				$41,247
10.4	Location Adjustment (9%)				$46,402
10.5	Contingency (15%)				$77,337
TOTAL OTHER COSTS					**$257,791**
TOTAL CAPITAL COST FOR ALTERNATIVE 10					**$773,372**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Connecticut ROW Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Volume includes all RW intended for disposal.
[6] A conversion factor of 1.5 was used to convert CY to TON.
[7] Volume of RW for Out-of-Town disposal assumes that 10% would be hazardous requiring treatment prior to disposal.
[8] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[10] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

G-9

250, 304, AND 340 EAST MAIN STREET

COST ESTIMATE BACKUP SHEETS

PRESENT VALUE ANALYSIS
ALTERNATIVE 1 - NO ACTION
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$20,000	$20,000	7.0%	$14,260
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$20,000	$20,000	7.0%	$10,167
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$20,000	$20,000	7.0%	$7,249
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$20,000	$20,000	7.0%	$5,168
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$20,000	$20,000	7.0%	$3,685
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$20,000	$20,000	7.0%	$2,627
TOTAL	**$0**	**$0**	**$120,000**	**$120,000**		**$43,156**
					PV O&M	**$43,156**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$107,278	$0	$0	$107,278	7.0%	$107,278
1	$0	$82,826	$0	$82,826	7.0%	$77,407
2	$0	$82,826	$0	$82,826	7.0%	$72,343
3	$0	$47,320	$0	$47,320	7.0%	$38,627
4	$0	$47,320	$0	$47,320	7.0%	$36,100
5	$0	$47,320	$20,000	$67,320	7.0%	$47,998
6	$0	$47,320	$0	$47,320	7.0%	$31,531
7	$0	$47,320	$0	$47,320	7.0%	$29,468
8	$0	$47,320	$0	$47,320	7.0%	$27,541
9	$0	$47,320	$0	$47,320	7.0%	$25,739
10	$0	$47,320	$20,000	$67,320	7.0%	$34,222
11	$0	$47,320	$0	$47,320	7.0%	$22,481
12	$0	$47,320	$0	$47,320	7.0%	$21,011
13	$0	$47,320	$0	$47,320	7.0%	$19,636
14	$0	$47,320	$0	$47,320	7.0%	$18,351
15	$0	$47,320	$20,000	$67,320	7.0%	$24,400
16	$0	$47,320	$0	$47,320	7.0%	$16,029
17	$0	$47,320	$0	$47,320	7.0%	$14,980
18	$0	$47,320	$0	$47,320	7.0%	$14,000
19	$0	$47,320	$0	$47,320	7.0%	$13,084
20	$0	$47,320	$20,000	$67,320	7.0%	$17,397
21	$0	$47,320	$0	$47,320	7.0%	$11,428
22	$0	$47,320	$0	$47,320	7.0%	$10,681
23	$0	$47,320	$0	$47,320	7.0%	$9,982
24	$0	$47,320	$0	$47,320	7.0%	$9,329
25	$0	$47,320	$20,000	$67,320	7.0%	$12,404
26	$0	$47,320	$0	$47,320	7.0%	$8,148
27	$0	$47,320	$0	$47,320	7.0%	$7,615
28	$0	$47,320	$0	$47,320	7.0%	$7,117
29	$0	$47,320	$0	$47,320	7.0%	$6,651
30	$0	$47,320	$20,000	$67,320	7.0%	$8,844
TOTAL	**$107,278**	**$1,490,605**	**$120,000**	**$1,717,883**		**$801,823**
					PV O&M	**$694,544**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	3	LS	$22,655	$67,964
	Subtotal				**$67,964**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	75	LF	$35.79	$2,684
2.3	Install PVC Well Screens (2" diameter)	50	LF	$19.69	$985
2.4	Install PVC Well Casing (2" diameter)	25	LF	$14.79	$370
2.5	Install Filter Pack	60	LF	$15.52	$931
2.6	Install Bentonite Seal	5	EA	$57.23	$286
2.7	Install Annular Seal	10	LF	$69.04	$690
2.8	PVC Well Plugs	5	EA	$27.86	$139
2.9	Flush-Mount Protective Cover with Locking Cap	5	EA	$451.55	$2,258
2.10	Surface Pad, Concrete 2' x 2'	5	EA	$154.79	$774
2.11	Well Development (2 HR/WELL)	10	EA	$228.23	$2,282
2.12	IDW Transportation/Disposal (drums)	5	EA	$508.52	$2,543
	Subtotal				**$16,695**
3.0 Fencing and Signage					
3.1	Chain Link Fence	799	LF	$27.57	$22,028
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,620**
TOTAL DIRECT COSTS					**$107,278**
TOTAL CAPITAL COST FOR ALTERNATIVE 2					**$107,278**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 250, 304 and 340 East Main Street Property Group.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene

LS = lump sum
EA = each
LF = linear foot

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0	**Groundwater Monitoring (per event)**					
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	24	HR	$110	$2,640	see cost assumptions
OM.1.3	Sampling Labor - Sampler	12	HR	$90	$1,080	see cost assumptions
OM.1.4	Analytical Costs	6	EA	$697	$4,183	see cost assumptions
OM.1.5	Data Validation	6	HR	$110	$660	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$11,835**	
OM.2.0	**Ground Surface Inspections, Maintenance, and Repairs (per year)**					
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.16	MSF	$56.31	$9	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	100	SF	$1.81	$181	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	27	LF	$27.57	$734	see cost assumptions
OM 2.6	Sign Replacement[5]	32	EA	$73.95	$2,366	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	2	EA	$321.75	$644	see cost assumptions
	Subtotal				**$19,384**	
OM.3.0	**Deed Restrictions**					
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	3	EA	$5,000.00	$15,000	see cost assumptions
	Subtotal				**$16,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$82,826**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$47,320**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 250, 304 and 340 East Main Street Property Group.

[2] Assumed that 1% of vegetated surfaces would require repair annually (need for repair to be established during 5-Year Reviews).

[3] Estimated 5% of asphalt surfaces will require repair annually (need for repair to be established during 5-Year Reviews).

[4] Estimated that 100% of fencing would require replacement over the period of O&M (need for repair to be established during 5-Year Reviews).

[5] Estimated that signage would require replacement 4 times over the period of O&M (need for repair to be established during 5-Year Reviews).

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$972,302	$0	$0	$972,302	7.0%	$972,302
1	$0	$80,679	$0	$80,679	7.0%	$75,401
2	$0	$80,679	$0	$80,679	7.0%	$70,469
3	$0	$45,174	$0	$45,174	7.0%	$36,875
4	$0	$45,174	$0	$45,174	7.0%	$34,463
5	$0	$45,174	$20,000	$65,174	7.0%	$46,468
6	$0	$45,174	$0	$45,174	7.0%	$30,101
7	$0	$45,174	$0	$45,174	7.0%	$28,132
8	$0	$45,174	$0	$45,174	7.0%	$26,291
9	$0	$45,174	$0	$45,174	7.0%	$24,571
10	$0	$45,174	$20,000	$65,174	7.0%	$33,131
11	$0	$45,174	$0	$45,174	7.0%	$21,462
12	$0	$45,174	$0	$45,174	7.0%	$20,058
13	$0	$45,174	$0	$45,174	7.0%	$18,745
14	$0	$45,174	$0	$45,174	7.0%	$17,519
15	$0	$45,174	$20,000	$65,174	7.0%	$23,622
16	$0	$45,174	$0	$45,174	7.0%	$15,302
17	$0	$45,174	$0	$45,174	7.0%	$14,301
18	$0	$45,174	$0	$45,174	7.0%	$13,365
19	$0	$45,174	$0	$45,174	7.0%	$12,491
20	$0	$45,174	$20,000	$65,174	7.0%	$16,842
21	$0	$45,174	$0	$45,174	7.0%	$10,910
22	$0	$45,174	$0	$45,174	7.0%	$10,196
23	$0	$45,174	$0	$45,174	7.0%	$9,529
24	$0	$45,174	$0	$45,174	7.0%	$8,906
25	$0	$45,174	$20,000	$65,174	7.0%	$12,008
26	$0	$45,174	$0	$45,174	7.0%	$7,779
27	$0	$45,174	$0	$45,174	7.0%	$7,270
28	$0	$45,174	$0	$45,174	7.0%	$6,794
29	$0	$45,174	$0	$45,174	7.0%	$6,350
30	$0	$45,174	$20,000	$65,174	7.0%	$8,562
TOTAL	**$972,302**	**$1,426,217**	**$120,000**	**$2,518,519**		**$1,640,214**
					PV O&M	**$667,912**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	3	LS	$22,655	$67,964
	Subtotal				**$67,964**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	75	LF	$35.79	$2,684
2.3	Install PVC Well Screens (2" diameter)	50	LF	$19.69	$985
2.4	Install PVC Well Casing (2" diameter)	25	LF	$14.79	$370
2.5	Install Filter Pack	60	LF	$15.52	$931
2.6	Install Bentonite Seal	5	EA	$57.23	$286
2.7	Install Annular Seal	10	LF	$69.04	$690
2.8	PVC Well Plugs	5	EA	$27.86	$139
2.9	Flush-Mount Protective Cover with Locking Cap	5	EA	$451.55	$2,258
2.10	Surface Pad, Concrete 2' x 2'	5	EA	$154.79	$774
2.11	Well Development (2 HR/WELL)	10	EA	$228.23	$2,282
2.12	IDW Transportation/Disposal (drums)	5	EA	$508.52	$2,543
	Subtotal				**$16,695**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	799	LF	$27.57	$22,028
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,620**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	4	MONTH	$4,531	$18,124
	Subtotal				**$47,574**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	1	ACRE	$3,968.29	$3,968
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	799	LF	$8.97	$7,164
	Subtotal				**$31,803**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil[3]	2,519	CY	$2.12	$5,348
6.2	Haul RW/Soil to Stockpile Area[4]	3,022	CY	$4.00	$12,090
6.3	Perimeter Air Sampling	57	EA	$243.76	$13,814
6.4	Equipment Decontamination	126	HR	$54.56	$6,871
6.5	Stockpile Management	3,022	CY	$1.44	$4,343
6.6	Stockpile Characterization[5]	7	EA	$1,535.00	$10,745
	Subtotal				**$53,212**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	2,356	CY	$2.44	$5,753
7.2	Transport RW to in-town consolidation[7]	2,120	CY	$5.52	$11,710
7.3	Equipment Decontamination	126	HR	$54.56	$6,871
7.4	Out-of-Town Transportation of Waste[7, 8]	353	TON	$170.00	$60,067
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)[7, 8]	353	TON	$192.00	$67,840
	Subtotal				**$152,240**

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[9]	600	CY	$2.40	$1,441
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[9]	469	CY	$27.00	$12,648
8.3	Install Geosynthetic Clay Liner (bottom layer)	23,000	SF	$2.86	$65,837
8.4	Install 60 mil HDPE liner	23,000	SF	$2.84	$65,363
8.5	Install Geosynthetic Drainage Layer	23,000	SF	$0.65	$15,042
8.6	Furnish, Spread, and Compact Soil Layer (24")[9]	1,144	CY	$11.83	$13,539
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	23,000	SF	$1.29	$29,670
8.8	Furnish, Place, and Spread Topsoil (6")[9]	428	CY	$34.65	$14,822
8.9	Hydroseeding with Mulch and Fertilizer	21	MSF	$43.97	$923
8.10	Place, Spread, and Compact Asphalt Base Course (12")	74	ECY	$9.35	$693
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2,000	SF	$2.27	$4,540
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	2,556	SY	$2.21	$5,648
	Subtotal				**$256,093**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$648,201**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$38,892
10.2	Engineering and Design (12%)				$77,784
10.3	Construction management (8%)				$51,856
10.4	Location Adjustment (9%)				$58,338
10.5	Contingency (15%)				$97,230
TOTAL OTHER COSTS					**$324,101**
TOTAL CAPITAL COST FOR ALTERNATIVE 3					**$972,302**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 250, 304 and 340 East Main Street Property Group.

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to excavated to a depth of 2.5- or 3-ft below ground surface and additional soil that requires excavation to faciliate cap construction.

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less additionally excavated soil).

[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[8] A conversion factor of 1.5 was used to convert CY to TON.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates for the 24-inch protective layer.

[10] Impacts to floodplains will be evaluated during Remedial Design and will require compensation via backfill material selection to ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	24	HR	$110	$2,640	see cost assumptions
OM.1.3	Sampling Labor - Sampler	12	HR	$90	$1,080	see cost assumptions
OM.1.4	Analytical Costs	6	EA	$697	$4,183	see cost assumptions
OM.1.5	Data Validation	6	HR	$110	$660	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$11,835**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	42	MSF	$7.34	$308	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.21	MSF	$56.31	$12	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	100	SF	$1.81	$181	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	4	EA	$321.75	$1,287	see cost assumptions
	Subtotal				**$17,238**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	3	EA	$5,000.00	$15,000	see cost assumptions
	Subtotal				**$16,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$80,679**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$45,174**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 250, 304 and 340 East Main Street Property Group.

[2] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[3] Assumed 5% of asphalt surfaces will require repair annually.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$2,264,992	$0	0	$2,264,992	7.0%	$2,264,992
1	$0	$80,679	$0	$80,679	7.0%	$75,401
2	$0	$80,679	$0	$80,679	7.0%	$70,469
3	$0	$45,174	$0	$45,174	7.0%	$36,875
4	$0	$45,174	$0	$45,174	7.0%	$34,463
5	$0	$45,174	$20,000	$65,174	7.0%	$46,468
6	$0	$45,174	$0	$45,174	7.0%	$30,101
7	$0	$45,174	$0	$45,174	7.0%	$28,132
8	$0	$45,174	$0	$45,174	7.0%	$26,291
9	$0	$45,174	$0	$45,174	7.0%	$24,571
10	$0	$45,174	$20,000	$65,174	7.0%	$33,131
11	$0	$45,174	$0	$45,174	7.0%	$21,462
12	$0	$45,174	$0	$45,174	7.0%	$20,058
13	$0	$45,174	$0	$45,174	7.0%	$18,745
14	$0	$45,174	$0	$45,174	7.0%	$17,519
15	$0	$45,174	$20,000	$65,174	7.0%	$23,622
16	$0	$45,174	$0	$45,174	7.0%	$15,302
17	$0	$45,174	$0	$45,174	7.0%	$14,301
18	$0	$45,174	$0	$45,174	7.0%	$13,365
19	$0	$45,174	$0	$45,174	7.0%	$12,491
20	$0	$45,174	$20,000	$65,174	7.0%	$16,842
21	$0	$45,174	$0	$45,174	7.0%	$10,910
22	$0	$45,174	$0	$45,174	7.0%	$10,196
23	$0	$45,174	$0	$45,174	7.0%	$9,529
24	$0	$45,174	$0	$45,174	7.0%	$8,906
25	$0	$45,174	$20,000	$65,174	7.0%	$12,008
26	$0	$45,174	$0	$45,174	7.0%	$7,779
27	$0	$45,174	$0	$45,174	7.0%	$7,270
28	$0	$45,174	$0	$45,174	7.0%	$6,794
29	$0	$45,174	$0	$45,174	7.0%	$6,350
30	$0	$45,174	$20,000	$65,174	7.0%	$8,562
TOTAL	**$2,264,992**	**$1,426,217**	**$120,000**	**$3,811,209**		**$2,932,904**
					PV O&M	**$667,912**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	3	LS	$22,655	$67,964
	Subtotal				**$67,964**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	75	LF	$35.79	$2,684
2.3	Install PVC Well Screens (2" diameter)	50	LF	$19.69	$985
2.4	Install PVC Well Casing (2" diameter)	25	LF	$14.79	$370
2.5	Install Filter Pack	60	LF	$15.52	$931
2.6	Install Bentonite Seal	5	EA	$57.23	$286
2.7	Install Annular Seal	10	LF	$69.04	$690
2.8	PVC Well Plugs	5	EA	$27.86	$139
2.9	Flush-Mount Protective Cover with Locking Cap	5	EA	$451.55	$2,258
2.10	Surface Pad, Concrete 2' x 2'	5	EA	$154.79	$774
2.11	Well Development (2 HR/WELL)	10	EA	$228.23	$2,282
2.12	IDW Transportation/Disposal (drums)	5	EA	$508.52	$2,543
	Subtotal				**$16,695**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	799	LF	$27.57	$22,028
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,620**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	4	MONTH	$4,531	$18,124
	Subtotal				**$47,574**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	1	ACRE	$3,968.29	$3,968
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	799	LF	$8.97	$7,164
	Subtotal				**$31,803**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil[3]	2,519	CY	$2.12	$5,348
6.2	Haul RW/Soil to Stockpile Area[4]	3,022	CY	$4.00	$12,090
6.3	Perimeter Air Sampling	57	EA	$243.76	$13,814
6.4	Equipment Decontamination	126	HR	$54.56	$6,871
6.5	Stockpile Management	3,022	CY	$1.44	$4,343
6.6	Stockpile Characterization[5]	2	EA	$1,535.00	$3,070
	Subtotal				**$45,537**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load Raymark Waste into Trucks[6]	2,356	CY	$2.44	$5,753
7.2	Transport Raymark Waste to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	126	HR	$54.56	$6,871
7.4	Out-of-Town Transportation of Waste[7]	3,533	TON	$170.00	$600,667
7.5	Out-of-Town Disposal of Waste (no treatment)[7, 8]	3,180	TON	$107.10	$340,578
7.6	Out-of-Town Treatment of Raymark Waste[7, 8]	353	TON	$192.00	$67,840
	Subtotal				**$1,021,708**

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[9]	600	CY	$2.40	$1,441
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[9]	469	CY	$27.00	$12,648
8.3	Install Geosynthetic Clay Liner (bottom layer)	23,000	SF	$2.86	$65,837
8.4	Install 60 mil HDPE liner	23,000	SF	$2.84	$65,363
8.5	Install Geosynthetic Drainage Layer	23,000	SF	$0.65	$15,042
8.6	Furnish, Spread, and Compact Soil Layer (24")[9]	1,144	CY	$11.83	$13,539
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	23,000	SF	$1.29	$29,670
8.8	Furnish, Place, and Spread Topsoil (6")[9]	428	CY	$34.65	$14,822
8.9	Hydroseeding with Mulch and Fertilizer	21	MSF	$43.97	$923
8.10	Place, Spread, and Compact Asphalt Base Course (12")	74	ECY	$9.35	$693
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2,000	SF	$2.27	$4,540
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	2,556	SY	$2.21	$5,648
	Subtotal				**$256,093**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$1,509,995**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$90,600
10.2	Engineering and Design (12%)				$181,199
10.3	Construction management (8%)				$120,800
10.4	Location Adjustment (9%)				$135,900
10.5	Contingency (15%)				$226,499
TOTAL OTHER COSTS					**$754,997**
TOTAL CAPITAL COST FOR ALTERNATIVE 4					**$2,264,992**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 250, 304 and 340 East Main Street Property Group.

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to excavated to a depth of 2.5- or 3-ft below ground surface and additional soil that requires excavation to faciliate cap construction.

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500).

[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less additionally excavated soil).

[7] A conversion factor of 1.5 was used to convert CY to TON.

[8] Volume of RW for disposal assumes 10% would be hazardous requiring treatment prior to disposal.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates for the 24-inch protective layer.

[10] Impacts to floodplains will be evaluated during Remedial Design and will require compensation via backfill material selection to ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

PRESENT VALUE ANALYSIS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$944,165	$0	$0	$944,165	7.0%	$944,165
1	$0	$67,629	$0	$67,629	7.0%	$63,205
2	$0	$67,629	$0	$67,629	7.0%	$59,070
3	$0	$20,288	$0	$20,288	7.0%	$16,561
4	$0	$20,288	$0	$20,288	7.0%	$15,478
5	$0	$20,288	$20,000	$40,288	7.0%	$28,725
6	$0	$20,288	$0	$20,288	7.0%	$13,519
7	$0	$20,288	$0	$20,288	7.0%	$12,635
8	$0	$20,288	$0	$20,288	7.0%	$11,808
9	$0	$20,288	$0	$20,288	7.0%	$11,035
10	$0	$20,288	$20,000	$40,288	7.0%	$20,481
11	$0	$20,288	$0	$20,288	7.0%	$9,639
12	$0	$20,288	$0	$20,288	7.0%	$9,008
13	$0	$20,288	$0	$20,288	7.0%	$8,419
14	$0	$20,288	$0	$20,288	7.0%	$7,868
15	$0	$20,288	$20,000	$40,288	7.0%	$14,602
16	$0	$20,288	$0	$20,288	7.0%	$6,872
17	$0	$20,288	$0	$20,288	7.0%	$6,423
18	$0	$20,288	$0	$20,288	7.0%	$6,003
19	$0	$20,288	$0	$20,288	7.0%	$5,610
20	$0	$20,288	$20,000	$40,288	7.0%	$10,411
21	$0	$20,288	$0	$20,288	7.0%	$4,900
22	$0	$20,288	$0	$20,288	7.0%	$4,579
23	$0	$20,288	$0	$20,288	7.0%	$4,280
24	$0	$20,288	$0	$20,288	7.0%	$4,000
25	$0	$20,288	$20,000	$40,288	7.0%	$7,423
26	$0	$20,288	$0	$20,288	7.0%	$3,494
27	$0	$20,288	$0	$20,288	7.0%	$3,265
28	$0	$20,288	$0	$20,288	7.0%	$3,051
29	$0	$20,288	$0	$20,288	7.0%	$2,852
30	$0	$20,288	$20,000	$40,288	7.0%	$5,293
TOTAL	**$944,165**	**$703,331**	**$120,000**	**$1,767,496**		**$1,324,674**
					PV O&M	**$380,508**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	3	LS	$22,655	$67,964
	Subtotal				**$67,964**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	75	LF	$35.79	$2,684
2.3	Install PVC Well Screens (2" diameter)	50	LF	$19.69	$985
2.4	Install PVC Well Casing (2" diameter)	25	LF	$14.79	$370
2.5	Install Filter Pack	60	LF	$15.52	$931
2.6	Install Bentonite Seal	5	EA	$57.23	$286
2.7	Install Annular Seal	10	LF	$69.04	$690
2.8	PVC Well Plugs	5	EA	$27.86	$139
2.9	Flush-Mount Protective Cover with Locking Cap	5	EA	$451.55	$2,258
2.10	Surface Pad, Concrete 2' x 2'	5	EA	$154.79	$774
2.11	Well Development (2 HR/WELL)	10	EA	$228.23	$2,282
2.12	IDW Transportation/Disposal (drums)	5	EA	$508.52	$2,543
	Subtotal				**$16,695**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	799	LF	$27.57	$22,028
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,620**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	4	MONTH	$4,531	$18,124
	Subtotal				**$47,574**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	1	ACRE	$3,968.29	$3,968
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	799	LF	$8.97	$7,164
	Subtotal				**$31,803**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[3]	3,556	CY	$2.12	$7,550
6.2	Haul RW/Soil to Stockpile Area[4]	4,267	CY	$4.00	$17,069
6.3	Perimeter Air Sampling	80	EA	$243.76	$19,502
6.4	Equipment Decontamination	178	HR	$54.56	$9,700
6.5	Stockpile Management	4,267	CY	$1.44	$6,132
6.6	Stockpile Characterization[5]	9	EA	$1,535.00	$13,815
	Subtotal				**$73,768**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	4,000	CY	$2.44	$9,768
7.2	Transport RW to in-town consolidation[7]	3,600	CY	$5.52	$19,884
7.3	Equipment Decontamination	178	HR	$54.56	$9,700
7.4	Out-of-Town Transportation of Waste[7, 8]	600	TON	$170.00	$102,000
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)[7, 8]	600	TON	$192.00	$115,200
	Subtotal				**$256,553**

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[9]	240	CY	$2.40	$577
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[10]	18,000	SF	$1.29	$23,220
8.8	Furnish, Place, and Spread Topsoil (6")[9]	448	CY	$34.65	$15,528
8.9	Hydroseeding with Mulch and Fertilizer	22	MSF	$43.97	$967
8.10	Place, Spread, and Compact Asphalt Base Course (12")	74	ECY	$9.35	$693
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2,000	SF	$2.27	$4,540
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	3,093	CY	$11.83	$36,594
8.14	Install Nonwoven Geotextile Fabric	2,000	SY	$2.21	$4,420
	Subtotal				**$112,466**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$629,444**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$37,767
10.2	Engineering and Design (12%)				$75,533
10.3	Construction management (8%)				$50,355
10.4	Location Adjustment (9%)				$56,650
10.5	Contingency (15%)				$94,417
TOTAL OTHER COSTS					**$314,722**
TOTAL CAPITAL COST FOR ALTERNATIVE 5					**$944,165**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 250, 304 and 340 East Main Street Property Group.

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to excavated to a depth of 5-ft below ground surface and additional soil that would be required to be removed to facilitate compliance with safety standards for benching/sloping.

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[8] A conversion factor of 1.5 was used to convert CY to TON.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[10] Delineation ("warning") layer included for excavation area where waste is left-in-place.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0	**Groundwater Monitoring (per event)**					
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	24	HR	$110	$2,640	see cost assumptions
OM.1.3	Sampling Labor - Sampler	12	HR	$90	$1,080	see cost assumptions
OM.1.4	Analytical Costs	6	EA	$697	$4,183	see cost assumptions
OM.1.5	Data Validation	6	HR	$110	$660	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$11,835**	
OM.2.0	**Ground Surface Inspections, Maintenance, and Repairs (per year)**					
OM.2.1	Inspection	10	HR	$110.00	$1,100	see cost assumptions
OM.2.2	Mowing (twice per year)[2]	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[3]	0.24	MSF	$56.31	$14	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[4]	100	SF	$1.81	$181	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[5]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[6]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	2	EA	$321.75	$644	see cost assumptions
	Subtotal				**$4,188**	
OM.3.0	**Deed Restrictions**					
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	3	EA	$5,000.00	$15,000	see cost assumptions
	Subtotal				**$16,100**	
ANNUAL O&M COST (YEARS 1-2)[7]					**$67,629**	
ANNUAL O&M COST (YEARS 3-30)[8]					**$20,288**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 250, 304 and 340 East Main Street Property Group.

[2] Assume no mowing required due to excavation of Raymark waste to the groundwater table elevation.

[3] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[4] Assumed 5% of asphalt surfaces will require repair annually.

[5] Assume fencing will not be required following remedial action.

[6] Assume signage will not be required following remedial action.

[7] O&M for Years 1 and 2 include quarterly groundwater monitoring with annual inspection/repairs of ground surface and annual deed inspection, with one annual report for all O&M activities.

[8] O&M for Years 3 - 30 include annual inspection and repairs to ground surface and annual deed inspection, but may not require additional groundwater sampling pending analytical data and concurrence from the State following the first 2 years of data collection, therefore additional groundwater sampling is not included.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$3,140,429	$0	$0	$3,140,429	7.0%	$3,140,429
1	$0	$67,629	$0	$67,629	7.0%	$63,205
2	$0	$67,629	$0	$67,629	7.0%	$59,070
3	$0	$20,288	$0	$20,288	7.0%	$16,561
4	$0	$20,288	$0	$20,288	7.0%	$15,478
5	$0	$20,288	$20,000	$40,288	7.0%	$28,725
6	$0	$20,288	$0	$20,288	7.0%	$13,519
7	$0	$20,288	$0	$20,288	7.0%	$12,635
8	$0	$20,288	$0	$20,288	7.0%	$11,808
9	$0	$20,288	$0	$20,288	7.0%	$11,035
10	$0	$20,288	$20,000	$40,288	7.0%	$20,481
11	$0	$20,288	$0	$20,288	7.0%	$9,639
12	$0	$20,288	$0	$20,288	7.0%	$9,008
13	$0	$20,288	$0	$20,288	7.0%	$8,419
14	$0	$20,288	$0	$20,288	7.0%	$7,868
15	$0	$20,288	$20,000	$40,288	7.0%	$14,602
16	$0	$20,288	$0	$20,288	7.0%	$6,872
17	$0	$20,288	$0	$20,288	7.0%	$6,423
18	$0	$20,288	$0	$20,288	7.0%	$6,003
19	$0	$20,288	$0	$20,288	7.0%	$5,610
20	$0	$20,288	$20,000	$40,288	7.0%	$10,411
21	$0	$20,288	$0	$20,288	7.0%	$4,900
22	$0	$20,288	$0	$20,288	7.0%	$4,579
23	$0	$20,288	$0	$20,288	7.0%	$4,280
24	$0	$20,288	$0	$20,288	7.0%	$4,000
25	$0	$20,288	$20,000	$40,288	7.0%	$7,423
26	$0	$20,288	$0	$20,288	7.0%	$3,494
27	$0	$20,288	$0	$20,288	7.0%	$3,265
28	$0	$20,288	$0	$20,288	7.0%	$3,051
29	$0	$20,288	$0	$20,288	7.0%	$2,852
30	$0	$20,288	$20,000	$40,288	7.0%	$5,293
TOTAL	**$3,140,429**	**$703,331**	**$120,000**	**$3,963,759**		**$3,520,937**
					PV O&M	**$380,508**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	3	LS	$22,655	$67,964
	Subtotal				**$67,964**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	75	LF	$35.79	$2,684
2.3	Install PVC Well Screens (2" diameter)	50	LF	$19.69	$985
2.4	Install PVC Well Casing (2" diameter)	25	LF	$14.79	$370
2.5	Install Filter Pack	60	LF	$15.52	$931
2.6	Install Bentonite Seal	5	EA	$57.23	$286
2.7	Install Annular Seal	10	LF	$69.04	$690
2.8	PVC Well Plugs	5	EA	$27.86	$139
2.9	Flush-Mount Protective Cover with Locking Cap	5	EA	$451.55	$2,258
2.10	Surface Pad, Concrete 2' x 2'	5	EA	$154.79	$774
2.11	Well Development (2 HR/WELL)	10	EA	$228.23	$2,282
2.12	IDW Transportation/Disposal (drums)	5	EA	$508.52	$2,543
	Subtotal				**$16,695**
3.0	**Fencing and Signage[2]**				
3.1	Chain Link Fence	799	LF	$27.57	$22,028
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,620**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	4	MONTH	$4,531	$18,124
	Subtotal				**$47,574**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	1	ACRE	$3,968.29	$3,968
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	799	LF	$8.97	$7,164
	Subtotal				**$31,803**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
6.1	Excavate and Load RW/Soil[3]	3,556	CY	$2.12	$7,550
6.2	Haul RW/Soil to Stockpile Area[4]	4,267	CY	$4.00	$17,069
6.3	Perimeter Air Sampling	80	EA	$243.76	$19,502
6.4	Equipment Decontamination	178	HR	$54.56	$9,700
6.5	Stockpile Management	4,267	CY	$1.44	$6,132
6.6	Stockpile Characterization[5]	1	EA	$1,535.00	$1,535
	Subtotal				**$61,488**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load Raymark Waste into Trucks[6]	4,000	CY	$2.44	$9,768
7.2	Transport Raymark Waste to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	178	HR	$54.56	$9,700
7.4	Out-of-Town Transportation of Waste[7]	6,000	TON	$170.00	$1,020,000
7.5	Out-of-Town Disposal of Waste (no treatment)[7, 8]	5,400	TON	$107.10	$578,340
7.6	Out-of-Town Treatment of Raymark Waste[7, 8]	600	TON	$192.00	$115,200
	Subtotal				**$1,733,009**

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[9]	240	CY	$2.40	$577
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[10]	18000	SF	$1.29	$23,220
8.8	Furnish, Place, and Spread Topsoil (6")[9]	448	CY	$34.65	$15,528
8.9	Hydroseeding with Mulch and Fertilizer	22	MSF	$43.97	$967
8.10	Place, Spread, and Compact Asphalt Base Course (12")	74	ECY	$9.35	$693
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2000	SF	$2.27	$4,540
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	3093	CY	$11.83	$36,594
8.14	Install Nonwoven Geotextile Fabric	2000	SY	$2.21	$4,420
	Subtotal				**$112,466**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$2,093,619**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$125,617
10.2	Engineering and Design (12%)				$251,234
10.3	Construction management (8%)				$167,490
10.4	Location Adjustment (9%)				$188,426
10.5	Contingency (15%)				$314,043
TOTAL OTHER COSTS					**$1,046,810**
TOTAL CAPITAL COST FOR ALTERNATIVE 6					**$3,140,429**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 250, 304 and 340 East Main Street Property Group.

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to excavated to a depth of 5-ft below ground surface and additional soil that would be required to be removed to facilitate compliance with safety standards for benching/sloping.

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[7] A conversion factor of 1.5 was used to convert CY to TON.

[8] Volume of RW for disposal assumes 10% would be hazardous requiring treatment prior to disposal.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement;
Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain;
additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates

[10] Delineation ("warning") layer included for excavation area where waste is left-in-place.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

PRESENT VALUE ANALYSIS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$797,146	$0	0	$797,146	7.0%	$797,146
1	$0	$80,603	$0	$80,603	7.0%	$75,330
2	$0	$80,603	$0	$80,603	7.0%	$70,402
3	$0	$45,097	$0	$45,097	7.0%	$36,813
4	$0	$45,097	$0	$45,097	7.0%	$34,405
5	$0	$45,097	$20,000	$65,097	7.0%	$46,413
6	$0	$45,097	$0	$45,097	7.0%	$30,050
7	$0	$45,097	$0	$45,097	7.0%	$28,084
8	$0	$45,097	$0	$45,097	7.0%	$26,247
9	$0	$45,097	$0	$45,097	7.0%	$24,530
10	$0	$45,097	$20,000	$65,097	7.0%	$33,092
11	$0	$45,097	$0	$45,097	7.0%	$21,425
12	$0	$45,097	$0	$45,097	7.0%	$20,024
13	$0	$45,097	$0	$45,097	7.0%	$18,714
14	$0	$45,097	$0	$45,097	7.0%	$17,490
15	$0	$45,097	$20,000	$65,097	7.0%	$23,594
16	$0	$45,097	$0	$45,097	7.0%	$15,276
17	$0	$45,097	$0	$45,097	7.0%	$14,277
18	$0	$45,097	$0	$45,097	7.0%	$13,343
19	$0	$45,097	$0	$45,097	7.0%	$12,470
20	$0	$45,097	$20,000	$65,097	7.0%	$16,822
21	$0	$45,097	$0	$45,097	7.0%	$10,892
22	$0	$45,097	$0	$45,097	7.0%	$10,179
23	$0	$45,097	$0	$45,097	7.0%	$9,513
24	$0	$45,097	$0	$45,097	7.0%	$8,891
25	$0	$45,097	$20,000	$65,097	7.0%	$11,994
26	$0	$45,097	$0	$45,097	7.0%	$7,766
27	$0	$45,097	$0	$45,097	7.0%	$7,258
28	$0	$45,097	$0	$45,097	7.0%	$6,783
29	$0	$45,097	$0	$45,097	7.0%	$6,339
30	$0	$45,097	$20,000	$65,097	7.0%	$8,552
TOTAL	**$797,146**	**$1,423,932**	**$120,000**	**$2,341,078**		**$1,464,113**
					PV O&M	**$666,966**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	3	LS	$22,655	$67,964
	Subtotal				**$67,964**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	75	LF	$35.79	$2,684
2.3	Install PVC Well Screens (2" diameter)	50	LF	$19.69	$985
2.4	Install PVC Well Casing (2" diameter)	25	LF	$14.79	$370
2.5	Install Filter Pack	60	LF	$15.52	$931
2.6	Install Bentonite Seal	5	EA	$57.23	$286
2.7	Install Annular Seal	10	LF	$69.04	$690
2.8	PVC Well Plugs	5	EA	$27.86	$139
2.9	Flush-Mount Protective Cover with Locking Cap	5	EA	$451.55	$2,258
2.10	Surface Pad, Concrete 2' x 2'	5	EA	$154.79	$774
2.11	Well Development (2 HR/WELL)	10	EA	$228.23	$2,282
2.12	IDW Transportation/Disposal (drums)	5	EA	$508.52	$2,543
	Subtotal				**$16,695**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	799	LF	$27.57	$22,028
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,620**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	4	MONTH	$4,531	$18,124
	Subtotal				**$47,574**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	1	ACRE	$3,968.29	$3,968
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	799	LF	$8.97	$7,164
	Subtotal				**$31,803**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	2,519	CY	$2.12	$5,348
6.2	Haul RW to Stockpile Area[4]	3,022	CY	$4.00	$12,090
6.3	Perimeter Air Sampling	57	EA	$243.76	$13,814
6.4	Equipment Decontamination	126	HR	$54.56	$6,871
6.5	Stockpile Management	3,022	CY	$1.44	$4,343
6.6	Stockpile Characterization[5]	7	EA	$1,535.00	$10,745
	Subtotal				**$53,212**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	3,022	CY	$2.44	$7,381
7.2	Transport RW to in-town consolidation[7]	2,720	CY	$5.52	$15,024
7.3	Equipment Decontamination	126	HR	$54.56	$6,871
7.4	Out-of-Town Transportation of Waste[7, 8]	453	TON	$170.00	$77,067
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	453	TON	$192.00	$87,040
	Subtotal				**$193,382**

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[9]	18,000	SF	$1.29	$23,220
8.8	Furnish, Place, and Spread Topsoil (6")[10]	326	CY	$34.65	$11,293
8.9	Hydroseeding with Mulch and Fertilizer	16	MSF	$43.97	$704
8.10	Place, Spread, and Compact Asphalt Base Course (12")	74	ECY	$9.35	$693
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2,000	SF	$2.27	$4,540
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	2,315	CY	$11.83	$27,384
8.14	Install Nonwoven Geotextile Fabric	2,000	SY	$2.21	$4,420
	Subtotal				**$98,181**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$531,431**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$31,886
10.2	Engineering and Design (12%)				$63,772
10.3	Construction management (8%)				$42,514
10.4	Location Adjustment (9%)				$47,829
10.5	Contingency (15%)				$79,715
TOTAL OTHER COSTS					**$265,715**
TOTAL CAPITAL COST FOR ALTERNATIVE 7					**$797,146**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 250, 304 and 340 East Main Street Property Group.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 2 or 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal.
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	24	HR	$110	$2,640	see cost assumptions
OM.1.3	Sampling Labor - Sampler	12	HR	$90	$1,080	see cost assumptions
OM.1.4	Analytical Costs	6	EA	$697	$4,183	see cost assumptions
OM.1.5	Data Validation	6	HR	$110	$660	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$11,835**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	32	MSF	$7.34	$235	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.16	MSF	$56.31	$9	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	100	SF	$1.81	$181	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	4	EA	$321.75	$1,287	see cost assumptions
	Subtotal				**$17,162**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	3	EA	$5,000.00	$15,000	see cost assumptions
	Subtotal				**$16,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$80,603**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$45,097**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 250, 304 and 340 East Main Street Property Group.

[2] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[3] Assumed 5% of asphalt surfaces will require repair annually.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$2,454,345	$0	0	$2,454,345	7.0%	$2,454,345
1	$0	$80,603	$0	$80,603	7.0%	$75,330
2	$0	$80,603	$0	$80,603	7.0%	$70,402
3	$0	$45,097	$0	$45,097	7.0%	$36,813
4	$0	$45,097	$0	$45,097	7.0%	$34,405
5	$0	$45,097	$20,000	$65,097	7.0%	$46,413
6	$0	$45,097	$0	$45,097	7.0%	$30,050
7	$0	$45,097	$0	$45,097	7.0%	$28,084
8	$0	$45,097	$0	$45,097	7.0%	$26,247
9	$0	$45,097	$0	$45,097	7.0%	$24,530
10	$0	$45,097	$20,000	$65,097	7.0%	$33,092
11	$0	$45,097	$0	$45,097	7.0%	$21,425
12	$0	$45,097	$0	$45,097	7.0%	$20,024
13	$0	$45,097	$0	$45,097	7.0%	$18,714
14	$0	$45,097	$0	$45,097	7.0%	$17,490
15	$0	$45,097	$20,000	$65,097	7.0%	$23,594
16	$0	$45,097	$0	$45,097	7.0%	$15,276
17	$0	$45,097	$0	$45,097	7.0%	$14,277
18	$0	$45,097	$0	$45,097	7.0%	$13,343
19	$0	$45,097	$0	$45,097	7.0%	$12,470
20	$0	$45,097	$20,000	$65,097	7.0%	$16,822
21	$0	$45,097	$0	$45,097	7.0%	$10,892
22	$0	$45,097	$0	$45,097	7.0%	$10,179
23	$0	$45,097	$0	$45,097	7.0%	$9,513
24	$0	$45,097	$0	$45,097	7.0%	$8,891
25	$0	$45,097	$20,000	$65,097	7.0%	$11,994
26	$0	$45,097	$0	$45,097	7.0%	$7,766
27	$0	$45,097	$0	$45,097	7.0%	$7,258
28	$0	$45,097	$0	$45,097	7.0%	$6,783
29	$0	$45,097	$0	$45,097	7.0%	$6,339
30	$0	$45,097	$20,000	$65,097	7.0%	$8,552
TOTAL	**$2,454,345**	**$1,423,932**	**$120,000**	**$3,998,277**		**$3,121,312**
					PV O&M	**$666,966**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	3	LS	$22,655	$67,964
	Subtotal				**$67,964**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	75	LF	$35.79	$2,684
2.3	Install PVC Well Screens (2" diameter)	50	LF	$19.69	$985
2.4	Install PVC Well Casing (2" diameter)	25	LF	$14.79	$370
2.5	Install Filter Pack	60	LF	$15.52	$931
2.6	Install Bentonite Seal	5	EA	$57.23	$286
2.7	Install Annular Seal	10	LF	$69.04	$690
2.8	PVC Well Plugs	5	EA	$27.86	$139
2.9	Flush-Mount Protective Cover with Locking Cap	5	EA	$451.55	$2,258
2.10	Surface Pad, Concrete 2' x 2'	5	EA	$154.79	$774
2.11	Well Development (2 HR/WELL)	10	EA	$228.23	$2,282
2.12	IDW Transportation/Disposal (drums)	5	EA	$508.52	$2,543
	Subtotal				**$16,695**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	799	LF	$27.57	$22,028
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,620**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	4	MONTH	$4,531	$18,124
	Subtotal				**$47,574**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	1	ACRE	$3,968.29	$3,968
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	799	LF	$8.97	$7,164
	Subtotal				**$31,803**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	2,519	CY	$2.12	$5,348
6.2	Haul RW to Stockpile Area[4]	3,022	CY	$4.00	$12,090
6.3	Perimeter Air Sampling	57	EA	$243.76	$13,814
6.4	Equipment Decontamination	126	HR	$54.56	$6,871
6.5	Stockpile Management	3,022	CY	$1.44	$4,343
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$42,467**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[5]	3,022	CY	$2.44	$7,381
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	126	HR	$54.56	$6,871
7.4	Out-of-Town Transportation of Waste[6]	4,533	TON	$170.00	$770,667
7.5	Out-of-Town Disposal of RW (no treatment)[6, 7]	4,080	TON	$107.10	$436,968
7.6	Out-of-Town Disposal of RW (treatment)[6, 7]	453	TON	$192.00	$87,040
	Subtotal				**$1,308,926**

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	18,000	SF	$1.29	$23,220
8.8	Furnish, Place, and Spread Topsoil (6")[9]	326	CY	$34.65	$11,293
8.9	Hydroseeding with Mulch and Fertilizer	16	MSF	$43.97	$704
8.10	Place, Spread, and Compact Asphalt Base Course (12")	74	ECY	$9.35	$693
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2,000	SF	$2.27	$4,540
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	2,315	CY	$11.83	$27,384
8.14	Install Nonwoven Geotextile Fabric	2,000	SY	$2.21	$4,420
	Subtotal				**$98,181**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$1,636,230**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$98,174
10.2	Engineering and Design (12%)				$196,348
10.3	Construction management (8%)				$130,898
10.4	Location Adjustment (9%)				$147,261
10.5	Contingency (15%)				$245,435
TOTAL OTHER COSTS					**$818,115**
TOTAL CAPITAL COST FOR ALTERNATIVE 8					**$2,454,345**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 250, 304 and 340 East Main Street Property Group.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 2 or 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area for characterization includes a bulking factor of 1.2.
[5] Volume includes all RW intended for disposal.
[6] A conversion factor of 1.5 was used to convert CY to TON.
[7] Volume of RW for Out-of-Town disposal assumes that 10% would be hazardous requiring treatment prior to disposal.
[8] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[10] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

PRESENT VALUE ANALYSIS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$820,848	$0	0	$820,848	7.0%	$820,848
1	$0	$80,603	$0	$80,603	7.0%	$75,330
2	$0	$80,603	$0	$80,603	7.0%	$70,402
3	$0	$45,097	$0	$45,097	7.0%	$36,813
4	$0	$45,097	$0	$45,097	7.0%	$34,405
5	$0	$45,097	$20,000	$65,097	7.0%	$46,413
6	$0	$45,097	$0	$45,097	7.0%	$30,050
7	$0	$45,097	$0	$45,097	7.0%	$28,084
8	$0	$45,097	$0	$45,097	7.0%	$26,247
9	$0	$45,097	$0	$45,097	7.0%	$24,530
10	$0	$45,097	$20,000	$65,097	7.0%	$33,092
11	$0	$45,097	$0	$45,097	7.0%	$21,425
12	$0	$45,097	$0	$45,097	7.0%	$20,024
13	$0	$45,097	$0	$45,097	7.0%	$18,714
14	$0	$45,097	$0	$45,097	7.0%	$17,490
15	$0	$45,097	$20,000	$65,097	7.0%	$23,594
16	$0	$45,097	$0	$45,097	7.0%	$15,276
17	$0	$45,097	$0	$45,097	7.0%	$14,277
18	$0	$45,097	$0	$45,097	7.0%	$13,343
19	$0	$45,097	$0	$45,097	7.0%	$12,470
20	$0	$45,097	$20,000	$65,097	7.0%	$16,822
21	$0	$45,097	$0	$45,097	7.0%	$10,892
22	$0	$45,097	$0	$45,097	7.0%	$10,179
23	$0	$45,097	$0	$45,097	7.0%	$9,513
24	$0	$45,097	$0	$45,097	7.0%	$8,891
25	$0	$45,097	$20,000	$65,097	7.0%	$11,994
26	$0	$45,097	$0	$45,097	7.0%	$7,766
27	$0	$45,097	$0	$45,097	7.0%	$7,258
28	$0	$45,097	$0	$45,097	7.0%	$6,783
29	$0	$45,097	$0	$45,097	7.0%	$6,339
30	$0	$45,097	$20,000	$65,097	7.0%	$8,552
TOTAL	**$820,848**	**$1,423,932**	**$120,000**	**$2,364,780**		**$1,487,815**
					PV O&M	**$666,966**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	3	LS	$22,655	$67,964
	Subtotal				**$67,964**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	75	LF	$35.79	$2,684
2.3	Install PVC Well Screens (2" diameter)	50	LF	$19.69	$985
2.4	Install PVC Well Casing (2" diameter)	25	LF	$14.79	$370
2.5	Install Filter Pack	60	LF	$15.52	$931
2.6	Install Bentonite Seal	5	EA	$57.23	$286
2.7	Install Annular Seal	10	LF	$69.04	$690
2.8	PVC Well Plugs	5	EA	$27.86	$139
2.9	Flush-Mount Protective Cover with Locking Cap	5	EA	$451.55	$2,258
2.10	Surface Pad, Concrete 2' x 2'	5	EA	$154.79	$774
2.11	Well Development (2 HR/WELL)	10	EA	$228.23	$2,282
2.12	IDW Transportation/Disposal (drums)	5	EA	$508.52	$2,543
	Subtotal				**$16,695**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	799	LF	$27.57	$22,028
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,620**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	4	MONTH	$4,531	$18,124
	Subtotal				**$47,574**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	1	ACRE	$3,968.29	$3,968
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	799	LF	$8.97	$7,164
	Subtotal				**$31,803**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	2,667	CY	$2.12	$5,663
6.2	Haul RW to Stockpile Area[4]	3,200	CY	$4.00	$12,801
6.3	Perimeter Air Sampling	60	EA	$243.76	$14,627
6.4	Equipment Decontamination	133	HR	$54.56	$7,275
6.5	Stockpile Management	3,200	CY	$1.44	$4,599
6.6	Stockpile Characterization[5]	7	EA	$1,535.00	$10,745
	Subtotal				**$55,710**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	3,200	CY	$2.44	$7,815
7.2	Transport RW to in-town consolidation[7]	2,880	CY	$5.52	$15,907
7.3	Equipment Decontamination	133	HR	$54.56	$7,275
7.4	Out-of-Town Transportation of Waste[7, 8]	480	TON	$170.00	$81,600
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	480	TON	$192.00	$92,160
	Subtotal				**$204,758**

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[9]	18,000	SF	$1.29	$23,220
8.8	Furnish, Place, and Spread Topsoil (6")[10]	326	CY	$34.65	$11,293
8.9	Hydroseeding with Mulch and Fertilizer	16	MSF	$43.97	$704
8.10	Place, Spread, and Compact Asphalt Base Course (12")	74	ECY	$9.35	$693
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2000	SF	$2.27	$4,540
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	2478	CY	$11.83	$29,312
8.14	Install Nonwoven Geotextile Fabric	2,000	SY	$2.21	$4,420
	Subtotal				**$100,109**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$547,232**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$32,834
10.2	Engineering and Design (12%)				$65,668
10.3	Construction management (8%)				$43,779
10.4	Location Adjustment (9%)				$49,251
10.5	Contingency (15%)				$82,085
TOTAL OTHER COSTS					**$273,616**
TOTAL CAPITAL COST FOR ALTERNATIVE 9					**$820,848**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 250, 304 and 340 East Main Street Property Group.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal.
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

PRESENT VALUE ANALYSIS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$2,576,478	$0	0	$2,576,478	7.0%	$2,576,478
1	$0	$80,603	$0	$80,603	7.0%	$75,330
2	$0	$80,603	$0	$80,603	7.0%	$70,402
3	$0	$45,097	$0	$45,097	7.0%	$36,813
4	$0	$45,097	$0	$45,097	7.0%	$34,405
5	$0	$45,097	$20,000	$65,097	7.0%	$46,413
6	$0	$45,097	$0	$45,097	7.0%	$30,050
7	$0	$45,097	$0	$45,097	7.0%	$28,084
8	$0	$45,097	$0	$45,097	7.0%	$26,247
9	$0	$45,097	$0	$45,097	7.0%	$24,530
10	$0	$45,097	$20,000	$65,097	7.0%	$33,092
11	$0	$45,097	$0	$45,097	7.0%	$21,425
12	$0	$45,097	$0	$45,097	7.0%	$20,024
13	$0	$45,097	$0	$45,097	7.0%	$18,714
14	$0	$45,097	$0	$45,097	7.0%	$17,490
15	$0	$45,097	$20,000	$65,097	7.0%	$23,594
16	$0	$45,097	$0	$45,097	7.0%	$15,276
17	$0	$45,097	$0	$45,097	7.0%	$14,277
18	$0	$45,097	$0	$45,097	7.0%	$13,343
19	$0	$45,097	$0	$45,097	7.0%	$12,470
20	$0	$45,097	$20,000	$65,097	7.0%	$16,822
21	$0	$45,097	$0	$45,097	7.0%	$10,892
22	$0	$45,097	$0	$45,097	7.0%	$10,179
23	$0	$45,097	$0	$45,097	7.0%	$9,513
24	$0	$45,097	$0	$45,097	7.0%	$8,891
25	$0	$45,097	$20,000	$65,097	7.0%	$11,994
26	$0	$45,097	$0	$45,097	7.0%	$7,766
27	$0	$45,097	$0	$45,097	7.0%	$7,258
28	$0	$45,097	$0	$45,097	7.0%	$6,783
29	$0	$45,097	$0	$45,097	7.0%	$6,339
30	$0	$45,097	$20,000	$65,097	7.0%	$8,552
TOTAL	**$2,576,478**	**$1,423,932**	**$120,000**	**$4,120,410**		**$3,243,444**
					PV O&M	**$666,966**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	3	LS	$22,655	$67,964
	Subtotal				**$67,964**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	75	LF	$35.79	$2,684
2.3	Install PVC Well Screens (2" diameter)	50	LF	$19.69	$985
2.4	Install PVC Well Casing (2" diameter)	25	LF	$14.79	$370
2.5	Install Filter Pack	60	LF	$15.52	$931
2.6	Install Bentonite Seal	5	EA	$57.23	$286
2.7	Install Annular Seal	10	LF	$69.04	$690
2.8	PVC Well Plugs	5	EA	$27.86	$139
2.9	Flush-Mount Protective Cover with Locking Cap	5	EA	$451.55	$2,258
2.10	Surface Pad, Concrete 2' x 2'	5	EA	$154.79	$774
2.11	Well Development (2 HR/WELL)	10	EA	$228.23	$2,282
2.12	IDW Transportation/Disposal (drums)	5	EA	$508.52	$2,543
	Subtotal				**$16,695**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	799	LF	$27.57	$22,028
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,620**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	4	MONTH	$4,531	$18,124
	Subtotal				**$47,574**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	1	ACRE	$3,968.29	$3,968
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	799	LF	$8.97	$7,164
	Subtotal				**$31,803**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	2,667	CY	$2.12	$5,663
6.2	Haul RW to Stockpile Area[4]	3,200	CY	$4.00	$12,801
6.3	Perimeter Air Sampling	60	EA	$243.76	$14,627
6.4	Equipment Decontamination	133	HR	$54.56	$7,275
6.5	Stockpile Management	3,200	CY	$1.44	$4,599
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$44,965**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[5]	3,200	CY	$2.44	$7,815
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	133	HR	$54.56	$7,275
7.4	Out-of-Town Transportation of Waste[6]	4,800	TON	$170.00	$816,000
7.5	Out-of-Town Disposal of RW (no treatment)[6, 7]	4,320	TON	$107.10	$462,672
7.6	Out-of-Town Disposal of RW (treatment)[6, 7]	480	TON	$192.00	$92,160
	Subtotal				**$1,385,922**

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	18,000	SF	$1.29	$23,220
8.8	Furnish, Place, and Spread Topsoil (6")[9]	326	CY	$34.65	$11,293
8.9	Hydroseeding with Mulch and Fertilizer	16	MSF	$43.97	$704
8.10	Place, Spread, and Compact Asphalt Base Course (12")	74	ECY	$9.35	$693
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2,000	SF	$2.27	$4,540
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	2,478	CY	$11.83	$29,312
8.14	Install Nonwoven Geotextile Fabric	2,000	SY	$2.21	$4,420
	Subtotal				**$100,109**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$1,717,652**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$103,059
10.2	Engineering and Design (12%)				$206,118
10.3	Construction management (8%)				$137,412
10.4	Location Adjustment (9%)				$154,589
10.5	Contingency (15%)				$257,648
TOTAL OTHER COSTS					**$858,826**
TOTAL CAPITAL COST FOR ALTERNATIVE 10					**$2,576,478**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 250, 304 and 340 East Main Street Property Group.

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.

[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.

[5] Volume includes all RW intended for disposal.

[6] A conversion factor of 1.5 was used to convert CY to TON.

[7] Volume of RW for Out-of-Town disposal assumes that 10% would be hazardous requiring treatment prior to disposal.

[8] Delineation ("warning") layer included for excavation area where waste is left-in-place.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.

[10] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

G-10

380 EAST MAIN STREET

COST ESTIMATE BACKUP SHEETS

PRESENT VALUE ANALYSIS
ALTERNATIVE 1 - NO ACTION
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$10,000	$10,000	7.0%	$7,130
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$10,000	$10,000	7.0%	$5,083
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$10,000	$10,000	7.0%	$3,624
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$10,000	$10,000	7.0%	$2,584
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$10,000	$10,000	7.0%	$1,842
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$10,000	$10,000	7.0%	$1,314
TOTAL	**$0**	**$0**	**$60,000**	**$60,000**		**$21,578**
					PV O&M	**$21,578**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review [1]	Total	Discount Rate[2]	Present Value
0	$37,229	$0	$0	$37,229	7.0%	$37,229
1	$0	$58,498	$0	$58,498	7.0%	$54,671
2	$0	$58,498	$0	$58,498	7.0%	$51,094
3	$0	$31,555	$0	$31,555	7.0%	$25,758
4	$0	$31,555	$0	$31,555	7.0%	$24,073
5	$0	$31,555	$10,000	$41,555	7.0%	$29,628
6	$0	$31,555	$0	$31,555	7.0%	$21,026
7	$0	$31,555	$0	$31,555	7.0%	$19,651
8	$0	$31,555	$0	$31,555	7.0%	$18,365
9	$0	$31,555	$0	$31,555	7.0%	$17,164
10	$0	$31,555	$10,000	$41,555	7.0%	$21,124
11	$0	$31,555	$0	$31,555	7.0%	$14,991
12	$0	$31,555	$0	$31,555	7.0%	$14,011
13	$0	$31,555	$0	$31,555	7.0%	$13,094
14	$0	$31,555	$0	$31,555	7.0%	$12,237
15	$0	$31,555	$10,000	$41,555	7.0%	$15,061
16	$0	$31,555	$0	$31,555	7.0%	$10,689
17	$0	$31,555	$0	$31,555	7.0%	$9,989
18	$0	$31,555	$0	$31,555	7.0%	$9,336
19	$0	$31,555	$0	$31,555	7.0%	$8,725
20	$0	$31,555	$10,000	$41,555	7.0%	$10,739
21	$0	$31,555	$0	$31,555	7.0%	$7,621
22	$0	$31,555	$0	$31,555	7.0%	$7,122
23	$0	$31,555	$0	$31,555	7.0%	$6,656
24	$0	$31,555	$0	$31,555	7.0%	$6,221
25	$0	$31,555	$10,000	$41,555	7.0%	$7,656
26	$0	$31,555	$0	$31,555	7.0%	$5,434
27	$0	$31,555	$0	$31,555	7.0%	$5,078
28	$0	$31,555	$0	$31,555	7.0%	$4,746
29	$0	$31,555	$0	$31,555	7.0%	$4,435
30	$0	$31,555	$10,000	$41,555	7.0%	$5,459
TOTAL	**$37,229**	**$1,000,529**	**$60,000**	**$1,097,757**		**$499,085**
					PV O&M	**$461,856**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage					
3.1	Chain Link Fence	120	LF	$27.57	$3,308
3.2	Signage	2	EA	$73.95	$148
	Subtotal				**$3,456**
TOTAL DIRECT COSTS					**$37,229**
TOTAL CAPITAL COST FOR ALTERNATIVE 2					**$37,229**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 380 East Main Street Property.
PVC = polyvinyl chloride
IDW = investigation derived waste
LS = lump sum
EA = each
LF = linear foot

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0	**Groundwater Monitoring (per event)**					
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0	**Ground Surface Inspections, Maintenance, and Repairs (per year)**					
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	0.00	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.00	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	4	LF	$27.57	$110	see cost assumptions
OM 2.6	Sign Replacement[5]	8	EA	$73.95	$592	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	1	EA	$321.75	$322	see cost assumptions
	Subtotal				**$16,474**	
OM.3.0	**Deed Restrictions**					
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$58,498**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$31,555**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 380 East Main Street Property.

[2] Assumed that 1% of vegetated surfaces would require repair annually (need for repair to be established during 5-Year Reviews); cost calculated is negligible due to small area of RW delineated within the property group (i.e.; 130 SF).

[3] Assume Raymark waste is not located below pavement at this property group.

[4] Estimated that 100% of fencing would require replacement over the period of O&M (need for repair to be established during 5-Year Reviews).

[5] Estimated that signage would require replacement 4 times over the period of O&M (need for repair to be established during 5-Year Reviews).

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$164,888	$0	$0	$164,888	7.0%	$164,888
1	$0	$58,446	$0	$58,446	7.0%	$54,622
2	$0	$58,446	$0	$58,446	7.0%	$51,049
3	$0	$31,502	$0	$31,502	7.0%	$25,715
4	$0	$31,502	$0	$31,502	7.0%	$24,033
5	$0	$31,502	$10,000	$41,502	7.0%	$29,591
6	$0	$31,502	$0	$31,502	7.0%	$20,991
7	$0	$31,502	$0	$31,502	7.0%	$19,618
8	$0	$31,502	$0	$31,502	7.0%	$18,335
9	$0	$31,502	$0	$31,502	7.0%	$17,135
10	$0	$31,502	$10,000	$41,502	7.0%	$21,098
11	$0	$31,502	$0	$31,502	7.0%	$14,967
12	$0	$31,502	$0	$31,502	7.0%	$13,987
13	$0	$31,502	$0	$31,502	7.0%	$13,072
14	$0	$31,502	$0	$31,502	7.0%	$12,217
15	$0	$31,502	$10,000	$41,502	7.0%	$15,042
16	$0	$31,502	$0	$31,502	7.0%	$10,671
17	$0	$31,502	$0	$31,502	7.0%	$9,973
18	$0	$31,502	$0	$31,502	7.0%	$9,320
19	$0	$31,502	$0	$31,502	7.0%	$8,711
20	$0	$31,502	$10,000	$41,502	7.0%	$10,725
21	$0	$31,502	$0	$31,502	7.0%	$7,608
22	$0	$31,502	$0	$31,502	7.0%	$7,111
23	$0	$31,502	$0	$31,502	7.0%	$6,645
24	$0	$31,502	$0	$31,502	7.0%	$6,211
25	$0	$31,502	$10,000	$41,502	7.0%	$7,647
26	$0	$31,502	$0	$31,502	7.0%	$5,425
27	$0	$31,502	$0	$31,502	7.0%	$5,070
28	$0	$31,502	$0	$31,502	7.0%	$4,738
29	$0	$31,502	$0	$31,502	7.0%	$4,428
30	$0	$31,502	$10,000	$41,502	7.0%	$5,452
TOTAL	**$164,888**	**$998,958**	**$60,000**	**$1,223,847**		**$626,095**
					PV O&M	**$461,206**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	120	LF	$27.57	$3,308
3.2	Signage	2	EA	$73.95	$148
	Subtotal				**$3,456**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	1	MONTH	$4,531	$4,531
	Subtotal				**$33,982**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0.01	ACRE	$3,968.29	$40
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	120	LF	$8.97	$1,076
	Subtotal				**$21,786**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction[3]					
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0 Transportation and Treatment/Disposal of Raymark Waste[3]					
7.1	Load RW into Trucks	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of Waste	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[4]	8	CY	$27.00	$220
8.3	Install Geosynthetic Clay Liner (bottom layer)	400	SF	$2.86	$1,145
8.4	Install 60 mil HDPE liner	400	SF	$2.84	$1,137
8.5	Install Geosynthetic Drainage Layer	400	SF	$0.65	$262
8.6	Furnish, Spread, and Compact Soil Layer (24")[4]	33	CY	$11.83	$386
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	400	SF	$1.29	$516
8.8	Furnish, Place, and Spread Topsoil (6")[4]	8	CY	$34.65	$282
8.9	Hydroseeding with Mulch and Fertilizer	0.40	MSF	$43.97	$18
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 3" binder, 3" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	32	HR	$405.12	$12,964
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	44	SY	$2.21	$98
	Subtotal				**$16,929**
9.0	**Flood Storage Mitigation/Stormwater Management[5]**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$109,926**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$6,596
10.2	Engineering and Design (12%)				$13,191
10.3	Construction management (8%)				$8,794
10.4	Location Adjustment (9%)				$9,893
10.5	Contingency (15%)				$16,489
TOTAL OTHER COSTS					**$54,963**
TOTAL CAPITAL COST FOR ALTERNATIVE 3					**$164,888**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 380 East Main Street Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] No excavation prior to cap construction would be required at this property.
[4] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement.
[5] No floodplains or wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Cost for demolition and disposal of existing structures (if required) has not been included

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	0.80	MSF	$7.34	$6	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.00	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	3	EA	$321.75	$965	see cost assumptions
	Subtotal				**$16,421**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$58,446**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$31,502**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 380 East Main Street Property.

[2] Assumed that 1% of vegetated surfaces would require repair annually; cost calculated is negligible due to small area of RCRA cap required to contain RW delineated within the property group (i.e.; 400 SF).

[3] Assume Raymark waste is not located below pavement at this property group.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review	Total	Discount Rate	Present Value
0	$0	$0	0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Notes:

This Alternative is not applicable to this property group - see Section 4.10 of the FS.

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.10	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0 Fencing and Signage					
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.95	$0
	Subtotal				**$0**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of Waste	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 3" binder, 3" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405.12	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 4					**$0**

Notes:
This Alternative is not applicable to this property group - see Section 4.10 of the FS.

PRESENT VALUE ANALYSIS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$152,544	$0	$0	$152,544	7.0%	$152,544
1	$0	$35,924	$0	$35,924	7.0%	$33,574
2	$0	$35,924	$0	$35,924	7.0%	$31,378
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$10,000	$10,000	7.0%	$7,130
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$10,000	$10,000	7.0%	$5,083
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$10,000	$10,000	7.0%	$3,624
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$10,000	$10,000	7.0%	$2,584
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$10,000	$10,000	7.0%	$1,842
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$10,000	$10,000	7.0%	$1,314
TOTAL	**$152,544**	**$71,848**	**$60,000**	**$284,392**		**$239,074**
					PV O&M	**$86,530**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees [2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	120	LF	$27.57	$3,308
3.2	Signage	2	EA	$73.95	$148
	Subtotal				**$3,456**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	1	MONTH	$4,531	$4,531
	Subtotal				**$33,982**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0.01	ACRE	$3,968.29	$40
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	120	LF	$8.97	$1,076
	Subtotal				**$21,786**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[4]	60	CY	$2.12	$128
6.2	Haul RW/Soil to Stockpile Area[5]	72	CY	$4.00	$290
6.3	Perimeter Air Sampling	1	EA	$243.76	$244
6.4	Equipment Decontamination	3	HR	$54.56	$165
6.5	Stockpile Management	72	CY	$1.44	$104
6.6	Stockpile Characterization[6]	1	EA	$1,535.00	$1,535
	Subtotal				**$2,466**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	29	CY	$2.44	$71
7.2	Transport RW to in-town consolidation[8]	26	CY	$5.52	$144
7.3	Equipment Decontamination	3	HR	$54.56	$165
7.4	Out-of-Town Transportation of RW[8, 9]	4	TON	$170.00	$737
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[8, 9]	4	TON	$192.00	$832
	Subtotal				**$1,948**

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	39	CY	$2.40	$94
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	23	CY	$34.65	$783
8.9	Hydroseeding with Mulch and Fertilizer	1	MSF	$43.97	$49
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	5	CY	$11.83	$54
8.14	Install Nonwoven Geotextile Fabric	14	SY	$2.21	$32
	Subtotal				**$26,940**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$101,696**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$6,102
10.2	Engineering and Design (12%)				$12,204
10.3	Construction management (8%)				$8,136
10.4	Location Adjustment (9%)				$9,153
10.5	Contingency (15%)				$15,254
TOTAL OTHER COSTS					**$50,848**
TOTAL CAPITAL COST FOR ALTERNATIVE 5					**$152,544**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 380 East Main Street Property
[2] Excavation to water table at this property will achieve complete excavation of RW and will not require transactional fees due to deed management.
[3] Assume fencing and signage to be temporary and required during construction activities for site security only.
[4] Represents in situ estimate of RW to excavated to a depth of 5-ft below ground surface and additional soil that would be required to be removed to facilitate compliance with safety standards for benching/sloping.
[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.
[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).
[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).
[8] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[9] A conversion factor of 1.5 was used to convert CY to TON.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.
[11] No floodplains or wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0	**Groundwater Monitoring (per event)**					
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0	**Ground Surface Inspections, Maintenance, and Repairs (per year)[2]**					
OM.2.1	Inspection	0	HR	$110.00	$0	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation	0	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	0	LS	$2,250.00	$0	see cost assumptions
OM.2.8	Contractor mobilizations	0	EA	$321.75	$0	see cost assumptions
	Subtotal				**$0**	
OM.3.0	**Deed Restrictions[2]**					
OM.3.1	Inspection (annual)	0	LS	$1,100.00	$0	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	0	EA	$5,000.00	$0	see cost assumptions
	Subtotal				**$0**	
ANNUAL O&M COST (YEARS 1-2)[3]					**$35,924**	
ANNUAL O&M COST (YEARS 3-30)[4]					**$0**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 380 East Main Street Property.

[2] Assume deed restrictions and O&M for ground surfaces would not be required following complete excavation of Raymark waste.

[3] O&M for Years 1 and 2 include quarterly groundwater monitoring with annual reporting.

[4] O&M for Years 3 - 30 will not be required pending analytical data and concurrence from the State following the first 2 years of groundwater data collection.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$168,372	$0	$0	$168,372	7.0%	$168,372
1	$0	$35,924	$0	$35,924	7.0%	$33,574
2	$0	$35,924	$0	$35,924	7.0%	$31,378
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$10,000	$10,000	7.0%	$7,130
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$10,000	$10,000	7.0%	$5,083
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$10,000	$10,000	7.0%	$3,624
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$10,000	$10,000	7.0%	$2,584
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$10,000	$10,000	7.0%	$1,842
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$10,000	$10,000	7.0%	$1,314
TOTAL	**$168,372**	**$71,848**	**$60,000**	**$300,221**		**$254,902**
					PV O&M	**$86,530**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	120	LF	$27.57	$3,308
3.2	Signage	2	EA	$73.95	$148
	Subtotal				**$3,456**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	1	MONTH	$4,531	$4,531
	Subtotal				**$33,982**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0.01	ACRE	$3,968.29	$40
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	120	LF	$8.97	$1,076
	Subtotal				**$21,786**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[4]	60	CY	$2.12	$128
6.2	Haul RW/Soil to Stockpile Area[5]	72	CY	$4.00	$290
6.3	Perimeter Air Sampling	1	EA	$243.76	$244
6.4	Equipment Decontamination	2	HR	$54.56	$109
6.5	Stockpile Management	72	CY	$1.44	$104
6.6	Stockpile Characterization[6]	1	EA	$1,535.00	$1,535
	Subtotal				**$2,410**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	29	CY	$2.44	$71
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	2	HR	$54.56	$109
7.4	Out-of-Town Transportation of RW[8]	43	TON	$170.00	$7,367
7.5	Out-of-Town Disposal of RW (no treatment)[8, 9]	39	TON	$107.10	$4,177
7.6	Out-of-Town Disposal of RW (treatment)[8, 9]	4	TON	$192.00	$832
	Subtotal				**$12,555**

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	39	CY	$2.40	$94
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	23	CY	$34.65	$783
8.9	Hydroseeding with Mulch and Fertilizer	1	MSF	$43.97	$49
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	5	CY	$11.83	$54
8.14	Install Nonwoven Geotextile Fabric	14	SY	$2.21	$32
	Subtotal				**$26,940**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$112,248**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$6,735
10.2	Engineering and Design (12%)				$13,470
10.3	Construction management (8%)				$8,980
10.4	Location Adjustment (9%)				$10,102
10.5	Contingency (15%)				$16,837
TOTAL OTHER COSTS					**$56,124**
TOTAL CAPITAL COST FOR ALTERNATIVE 6					**$168,372**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 380 East Main Street Property.
[2] Excavation to water table at this property will achieve complete excavation of RW and will not require transactional fees due to deed management.
[3] Assume fencing and signage to be temporary and required during construction activities for site security only.
[4] Represents in situ estimate of RW to excavated to a depth of 5-ft below ground surface and additional soil that would be required to be removed to facilitate compliance with safety standards for benching/sloping.
[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.
[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).
[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Volume of RW for disposal assumes 10% would be hazardous requiring treatment prior to disposal.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; additionally excavated soil is intended for re-use on-site pending analytical results for PHCs and was deducted from backfill estimates.
[11] No floodplains or wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

PRESENT VALUE ANALYSIS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review	Total	Discount Rate	Present Value
0	$0	$0	0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Notes:

This Alternative is not applicable to this property group - see Section 4.10 of the FS.

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.10	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0 Fencing and Signage					
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.95	$0
	Subtotal				**$0**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW	0	CY	$2.12	$0
6.2	Haul RW to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidaton	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of RW	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0.00	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 3" binder, 3" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405.12	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 7					**$0**

Notes:
This Alternative is not applicable to this property group - see Section 4.10 of the FS.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	0.26	MSF	$7.34	$2	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	3	EA	$321.75	$965	see cost assumptions
	Subtotal				**$16,417**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$51,841**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$27,008**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 380 East Main Street Property.

[2] Assumed that 1% of vegetated surfaces would require repair annually; cost calculated is negligible due to small area of RW delineated within the property group (i.e.; 130 SF).

[3] Assume Raymark waste is not located below pavement at this property group.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review	Total	Discount Rate	Present Value
0	$0	$0	0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Notes:

This Alternative is not applicable to this property group - see Section 4.10 of the FS.

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHE 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.10	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0 Fencing and Signage					
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.95	$0
	Subtotal				**$0**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW	0	CY	$2.12	$0
6.2	Haul RW to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidaton	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of RW	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHE 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 3" binder, 3" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405.12	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 8					**$0**

Notes:
This Alternative is not applicable to this property group - see Section 4.10 of the FS.

PRESENT VALUE ANALYSIS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$145,485	$0	0	$145,485	7.0%	$145,485
1	$0	$51,841	$0	$51,841	7.0%	$48,450
2	$0	$51,841	$0	$51,841	7.0%	$45,280
3	$0	$27,008	$0	$27,008	7.0%	$22,046
4	$0	$27,008	$0	$27,008	7.0%	$20,604
5	$0	$27,008	$10,000	$37,008	7.0%	$26,386
6	$0	$27,008	$0	$27,008	7.0%	$17,996
7	$0	$27,008	$0	$27,008	7.0%	$16,819
8	$0	$27,008	$0	$27,008	7.0%	$15,719
9	$0	$27,008	$0	$27,008	7.0%	$14,690
10	$0	$27,008	$10,000	$37,008	7.0%	$18,813
11	$0	$27,008	$0	$27,008	7.0%	$12,831
12	$0	$27,008	$0	$27,008	7.0%	$11,992
13	$0	$27,008	$0	$27,008	7.0%	$11,207
14	$0	$27,008	$0	$27,008	7.0%	$10,474
15	$0	$27,008	$10,000	$37,008	7.0%	$13,413
16	$0	$27,008	$0	$27,008	7.0%	$9,148
17	$0	$27,008	$0	$27,008	7.0%	$8,550
18	$0	$27,008	$0	$27,008	7.0%	$7,991
19	$0	$27,008	$0	$27,008	7.0%	$7,468
20	$0	$27,008	$10,000	$37,008	7.0%	$9,564
21	$0	$27,008	$0	$27,008	7.0%	$6,523
22	$0	$27,008	$0	$27,008	7.0%	$6,096
23	$0	$27,008	$0	$27,008	7.0%	$5,697
24	$0	$27,008	$0	$27,008	7.0%	$5,324
25	$0	$27,008	$10,000	$37,008	7.0%	$6,819
26	$0	$27,008	$0	$27,008	7.0%	$4,651
27	$0	$27,008	$0	$27,008	7.0%	$4,346
28	$0	$27,008	$0	$27,008	7.0%	$4,062
29	$0	$27,008	$0	$27,008	7.0%	$3,796
30	$0	$27,008	$10,000	$37,008	7.0%	$4,862
TOTAL	**$145,485**	**$859,900**	**$60,000**	**$1,065,385**		**$547,103**
					PV O&M	**$401,618**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	120	LF	$27.57	$3,308
3.2	Signage	2	EA	$73.95	$148
	Subtotal				**$3,456**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	1	MONTH	$4,531	$4,531
	Subtotal				**$33,982**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0.01	ACRE	$3,968.29	$40
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	120	LF	$8.97	$1,076
	Subtotal				**$21,786**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	19	CY	$2.12	$41
6.2	Haul RW to Stockpile Area[4]	23	CY	$4.00	$92
6.3	Perimeter Air Sampling	1	EA	$243.76	$244
6.4	Equipment Decontamination	1	HR	$54.56	$53
6.5	Stockpile Management	23	CY	$1.44	$33
6.6	Stockpile Characterization[5]	1	EA	$1,535.00	$1,535
	Subtotal				**$1,998**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	23	CY	$2.44	$56
7.2	Transport RW to in-town consolidation[7]	21	CY	$5.52	$115
7.3	Equipment Decontamination	1	HR	$54.56	$53
7.4	Out-of-Town Transportation of Waste[7, 8]	3	TON	$170.00	$589
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	3	TON	$192.00	$666
	Subtotal				**$1,479**

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[9]	130	SF	$1.29	$168
8.8	Furnish, Place, and Spread Topsoil (6")[10]	3	CY	$34.65	$92
8.9	Hydroseeding with Mulch and Fertilizer	0.13	MSF	$43.97	$6
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405.12	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	19	CY	$11.83	$219
8.14	Install Nonwoven Geotextile Fabric	14	SY	$2.21	$32
	Subtotal				**$516**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$96,990**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$5,819
10.2	Engineering and Design (12%)				$11,639
10.3	Construction management (8%)				$7,759
10.4	Location Adjustment (9%)				$8,729
10.5	Contingency (15%)				$14,549
TOTAL OTHER COSTS					**$48,495**
TOTAL CAPITAL COST FOR ALTERNATIVE 9					**$145,485**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 380 East Main Street Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal.
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement.
[11] No floodplains or wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation
Cost for demolition and disposal of existing structures (if required) has not been included

PRESENT VALUE ANALYSIS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$155,979	$0	0	$155,979	7.0%	$155,979
1	$0	$51,841	$0	$51,841	7.0%	$48,450
2	$0	$51,841	$0	$51,841	7.0%	$45,280
3	$0	$27,008	$0	$27,008	7.0%	$22,046
4	$0	$27,008	$0	$27,008	7.0%	$20,604
5	$0	$27,008	$10,000	$37,008	7.0%	$26,386
6	$0	$27,008	$0	$27,008	7.0%	$17,996
7	$0	$27,008	$0	$27,008	7.0%	$16,819
8	$0	$27,008	$0	$27,008	7.0%	$15,719
9	$0	$27,008	$0	$27,008	7.0%	$14,690
10	$0	$27,008	$10,000	$37,008	7.0%	$18,813
11	$0	$27,008	$0	$27,008	7.0%	$12,831
12	$0	$27,008	$0	$27,008	7.0%	$11,992
13	$0	$27,008	$0	$27,008	7.0%	$11,207
14	$0	$27,008	$0	$27,008	7.0%	$10,474
15	$0	$27,008	$10,000	$37,008	7.0%	$13,413
16	$0	$27,008	$0	$27,008	7.0%	$9,148
17	$0	$27,008	$0	$27,008	7.0%	$8,550
18	$0	$27,008	$0	$27,008	7.0%	$7,991
19	$0	$27,008	$0	$27,008	7.0%	$7,468
20	$0	$27,008	$10,000	$37,008	7.0%	$9,564
21	$0	$27,008	$0	$27,008	7.0%	$6,523
22	$0	$27,008	$0	$27,008	7.0%	$6,096
23	$0	$27,008	$0	$27,008	7.0%	$5,697
24	$0	$27,008	$0	$27,008	7.0%	$5,324
25	$0	$27,008	$10,000	$37,008	7.0%	$6,819
26	$0	$27,008	$0	$27,008	7.0%	$4,651
27	$0	$27,008	$0	$27,008	7.0%	$4,346
28	$0	$27,008	$0	$27,008	7.0%	$4,062
29	$0	$27,008	$0	$27,008	7.0%	$3,796
30	$0	$27,008	$10,000	$37,008	7.0%	$4,862
TOTAL	**$155,979**	**$859,900**	**$60,000**	**$1,075,879**		**$557,597**
					PV O&M	**$401,618**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	120	LF	$27.57	$3,308
3.2	Signage	2	EA	$73.95	$148
	Subtotal				**$3,456**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	1	MONTH	$4,531	$4,531
	Subtotal				**$33,982**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0.01	ACRE	$3,968.29	$40
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	120	LF	$8.97	$1,076
	Subtotal				**$21,786**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	19	CY	$2.12	$41
6.2	Haul RW to Stockpile Area[4]	23	CY	$4.00	$92
6.3	Perimeter Air Sampling	1	EA	$243.76	$244
6.4	Equipment Decontamination	1	HR	$54.56	$53
6.5	Stockpile Management	23	CY	$1.44	$33
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$463**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[5]	23	CY	$2.44	$56
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	1	HR	$54.56	$53
7.4	Out-of-Town Transportation of Waste[6]	35	TON	$170.00	$5,893
7.5	Out-of-Town Disposal of RW (no treatment)[6, 7]	31	TON	$107.10	$3,342
7.6	Out-of-Town Disposal of RW (treatment)[6, 7]	3	TON	$192.00	$666
	Subtotal				**$10,009**

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
380 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	130	SF	$1.29	$168
8.8	Furnish, Place, and Spread Topsoil (6")[9]	3	CY	$34.65	$92
8.9	Hydroseeding with Mulch and Fertilizer	0.13	MSF	$43.97	$6
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405.12	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	19	CY	$11.83	$219
8.14	Install Nonwoven Geotextile Fabric	14	SY	$2.21	$32
	Subtotal				**$516**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$103,986**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$6,239
10.2	Engineering and Design (12%)				$12,478
10.3	Construction management (8%)				$8,319
10.4	Location Adjustment (9%)				$9,359
10.5	Contingency (15%)				$15,598
TOTAL OTHER COSTS					**$51,993**
TOTAL CAPITAL COST FOR ALTERNATIVE 10					**$155,979**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 380 East Main Street Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area for characterization to determine final disposition includes a bulking factor of 1.2.
[5] Volume includes all RW intended for disposal.
[6] A conversion factor of 1.5 was used to convert CY to TON.
[7] Volume of RW for Out-of-Town disposal assumes that 10% would be hazardous requiring treatment prior to disposal.
[8] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement.
[10] No floodplains or wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

G-11

DEPARTMENT OF PUBLIC WORKS LOT – AREA OF CONCERN 1

COST ESTIMATE BACKUP SHEETS

PRESENT VALUE ANALYSIS
ALTERNATIVE 1 - NO ACTION
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$10,000	$10,000	7.0%	$7,130
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$10,000	$10,000	7.0%	$5,083
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$10,000	$10,000	7.0%	$3,624
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$10,000	$10,000	7.0%	$2,584
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$10,000	$10,000	7.0%	$1,842
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$10,000	$10,000	7.0%	$1,314
TOTAL	**$0**	**$0**	**$60,000**	**$60,000**		**$21,578**
					PV O&M	**$21,578**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review [1]	Total	Discount Rate[2]	Present Value
0	$55,869	$0	$0	$55,869	7.0%	$55,869
1	$0	$62,782	$0	$62,782	7.0%	$58,675
2	$0	$62,782	$0	$62,782	7.0%	$54,836
3	$0	$35,839	$0	$35,839	7.0%	$29,255
4	$0	$35,839	$0	$35,839	7.0%	$27,342
5	$0	$35,839	$10,000	$45,839	7.0%	$32,683
6	$0	$35,839	$0	$35,839	7.0%	$23,881
7	$0	$35,839	$0	$35,839	7.0%	$22,319
8	$0	$35,839	$0	$35,839	7.0%	$20,859
9	$0	$35,839	$0	$35,839	7.0%	$19,494
10	$0	$35,839	$10,000	$45,839	7.0%	$23,302
11	$0	$35,839	$0	$35,839	7.0%	$17,027
12	$0	$35,839	$0	$35,839	7.0%	$15,913
13	$0	$35,839	$0	$35,839	7.0%	$14,872
14	$0	$35,839	$0	$35,839	7.0%	$13,899
15	$0	$35,839	$10,000	$45,839	7.0%	$16,614
16	$0	$35,839	$0	$35,839	7.0%	$12,140
17	$0	$35,839	$0	$35,839	7.0%	$11,346
18	$0	$35,839	$0	$35,839	7.0%	$10,604
19	$0	$35,839	$0	$35,839	7.0%	$9,910
20	$0	$35,839	$10,000	$45,839	7.0%	$11,846
21	$0	$35,839	$0	$35,839	7.0%	$8,656
22	$0	$35,839	$0	$35,839	7.0%	$8,089
23	$0	$35,839	$0	$35,839	7.0%	$7,560
24	$0	$35,839	$0	$35,839	7.0%	$7,066
25	$0	$35,839	$10,000	$45,839	7.0%	$8,446
26	$0	$35,839	$0	$35,839	7.0%	$6,171
27	$0	$35,839	$0	$35,839	7.0%	$5,768
28	$0	$35,839	$0	$35,839	7.0%	$5,390
29	$0	$35,839	$0	$35,839	7.0%	$5,038
30	$0	$35,839	$10,000	$45,839	7.0%	$6,022
TOTAL	**$55,869**	**$1,129,062**	**$60,000**	**$1,244,930**		**$570,890**
					PV O&M	**$515,022**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage					
3.1	Chain Link Fence	780	LF	$27.57	$21,505
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,096**
TOTAL DIRECT COSTS					**$55,869**
TOTAL CAPITAL COST FOR ALTERNATIVE 2					**$55,869**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the DPW Lot (AOC 1) Property.
PVC = polyvinyl chloride
IDW = investigation derived waste
LS = lump sum
EA = each
LF = linear foot

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	1,050	SF	$1.81	$1,903	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	26	LF	$27.57	$717	see cost assumptions
OM 2.6	Sign Replacement[5]	32	EA	$73.95	$2,366	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	1	EA	$321.75	$322	see cost assumptions
	Subtotal				**$20,758**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$62,782**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$35,839**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the DPW Lot (AOC 1) Property.

[2] Assumed that there is no RW located below vegetated surfaces at this property group.

[3] Assumed 5% of asphalt surfaces will require repair annually (need for repair to be established during 5-Year Reviews).

[4] Estimated that 100% of fencing would require replacement over the period of O&M (need for repair to be established during 5-Year Reviews).

[5] Estimated that signage would require replacement 4 times over the period of O&M (need for repair to be established during 5-Year Reviews).

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$946,657	$0	$0	$946,657	7.0%	$946,657
1	$0	$60,062	$0	$60,062	7.0%	$56,132
2	$0	$60,062	$0	$60,062	7.0%	$52,460
3	$0	$33,118	$0	$33,118	7.0%	$27,035
4	$0	$33,118	$0	$33,118	7.0%	$25,266
5	$0	$33,118	$10,000	$43,118	7.0%	$30,743
6	$0	$33,118	$0	$33,118	7.0%	$22,068
7	$0	$33,118	$0	$33,118	7.0%	$20,625
8	$0	$33,118	$0	$33,118	7.0%	$19,275
9	$0	$33,118	$0	$33,118	7.0%	$18,014
10	$0	$33,118	$10,000	$43,118	7.0%	$21,919
11	$0	$33,118	$0	$33,118	7.0%	$15,734
12	$0	$33,118	$0	$33,118	7.0%	$14,705
13	$0	$33,118	$0	$33,118	7.0%	$13,743
14	$0	$33,118	$0	$33,118	7.0%	$12,844
15	$0	$33,118	$10,000	$43,118	7.0%	$15,628
16	$0	$33,118	$0	$33,118	7.0%	$11,218
17	$0	$33,118	$0	$33,118	7.0%	$10,484
18	$0	$33,118	$0	$33,118	7.0%	$9,799
19	$0	$33,118	$0	$33,118	7.0%	$9,158
20	$0	$33,118	$10,000	$43,118	7.0%	$11,143
21	$0	$33,118	$0	$33,118	7.0%	$7,999
22	$0	$33,118	$0	$33,118	7.0%	$7,475
23	$0	$33,118	$0	$33,118	7.0%	$6,986
24	$0	$33,118	$0	$33,118	7.0%	$6,529
25	$0	$33,118	$10,000	$43,118	7.0%	$7,945
26	$0	$33,118	$0	$33,118	7.0%	$5,703
27	$0	$33,118	$0	$33,118	7.0%	$5,330
28	$0	$33,118	$0	$33,118	7.0%	$4,981
29	$0	$33,118	$0	$33,118	7.0%	$4,655
30	$0	$33,118	$10,000	$43,118	7.0%	$5,664
TOTAL	**$946,657**	**$1,047,440**	**$60,000**	**$2,054,097**		**$1,427,917**
					PV O&M	**$481,260**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	780	LF	$27.57	$21,505
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,096**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	4	MONTH	$4,531	$18,124
	Subtotal				**$47,574**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	780	LF	$8.97	$6,994
	Subtotal				**$27,664**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil[3]	2,315	CY	$2.12	$4,916
6.2	Haul RW/Soil to Stockpile Area[4]	2,778	CY	$4.00	$11,112
6.3	Perimeter Air Sampling	52	EA	$243.76	$12,697
6.4	Equipment Decontamination	96	HR	$54.56	$5,263
6.5	Stockpile Management	2,778	CY	$1.44	$3,992
6.6	Stockpile Characterization[5]	6	EA	$1,535.00	$9,210
	Subtotal				**$47,190**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	2,333	CY	$2.44	$5,698
7.2	Transport RW to in-town consolidation[7]	2,100	CY	$5.52	$11,599
7.3	Equipment Decontamination	96	HR	$54.56	$5,263
7.4	Out-of-Town Transportation of Waste[7, 8]	350	TON	$170.00	$59,500
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)[7, 8]	350	TON	$192.00	$67,200
	Subtotal				**$149,260**

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[9]	400	CY	$2.40	$961
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[9]	509	CY	$27.00	$13,748
8.3	Install Geosynthetic Clay Liner (bottom layer)	25,000	SF	$2.86	$71,562
8.4	Install 60 mil HDPE liner	25,000	SF	$2.84	$71,047
8.5	Install Geosynthetic Drainage Layer	25,000	SF	$0.65	$16,350
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	25,000	SF	$1.29	$32,250
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")[9]	943	ECY	$9.35	$8,813
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	25,000	SF	$2.27	$56,750
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	2,778	SY	$2.21	$6,139
	Subtotal				**$303,547**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$631,104**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$37,866
10.2	Engineering and Design (12%)				$75,733
10.3	Construction management (8%)				$50,488
10.4	Location Adjustment (9%)				$56,799
10.5	Contingency (15%)				$94,666
TOTAL OTHER COSTS					**$315,552**
TOTAL CAPITAL COST FOR ALTERNATIVE 3					**$946,657**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the DPW Lot (AOC 1) Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to excavated to a depth of 2.5-ft below ground surface and additional soil that requires excavation to faciliate cap construction.
[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less additionally excavated soil).
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; pending PHC analysis, additionally excavated soil may be re-used onsite and was included in the estimate for asphalt base.
[10] No floodplains or wetlands would be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	1,250	SF	$1.81	$2,266	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	1	EA	$321.75	$322	see cost assumptions
	Subtotal				**$18,037**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$60,062**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$33,118**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the DPW Lot (AOC 1) Property.

[2] Assumed that there is no RW located below vegetated surfaces at this property group.

[3] Assumed 5% of asphalt surfaces will require repair annually.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$2,230,200	$0	0	$2,230,200	7.0%	$2,230,200
1	$0	$60,062	$0	$60,062	7.0%	$56,132
2	$0	$60,062	$0	$60,062	7.0%	$52,460
3	$0	$33,118	$0	$33,118	7.0%	$27,035
4	$0	$33,118	$0	$33,118	7.0%	$25,266
5	$0	$33,118	$10,000	$43,118	7.0%	$30,743
6	$0	$33,118	$0	$33,118	7.0%	$22,068
7	$0	$33,118	$0	$33,118	7.0%	$20,625
8	$0	$33,118	$0	$33,118	7.0%	$19,275
9	$0	$33,118	$0	$33,118	7.0%	$18,014
10	$0	$33,118	$10,000	$43,118	7.0%	$21,919
11	$0	$33,118	$0	$33,118	7.0%	$15,734
12	$0	$33,118	$0	$33,118	7.0%	$14,705
13	$0	$33,118	$0	$33,118	7.0%	$13,743
14	$0	$33,118	$0	$33,118	7.0%	$12,844
15	$0	$33,118	$10,000	$43,118	7.0%	$15,628
16	$0	$33,118	$0	$33,118	7.0%	$11,218
17	$0	$33,118	$0	$33,118	7.0%	$10,484
18	$0	$33,118	$0	$33,118	7.0%	$9,799
19	$0	$33,118	$0	$33,118	7.0%	$9,158
20	$0	$33,118	$10,000	$43,118	7.0%	$11,143
21	$0	$33,118	$0	$33,118	7.0%	$7,999
22	$0	$33,118	$0	$33,118	7.0%	$7,475
23	$0	$33,118	$0	$33,118	7.0%	$6,986
24	$0	$33,118	$0	$33,118	7.0%	$6,529
25	$0	$33,118	$10,000	$43,118	7.0%	$7,945
26	$0	$33,118	$0	$33,118	7.0%	$5,703
27	$0	$33,118	$0	$33,118	7.0%	$5,330
28	$0	$33,118	$0	$33,118	7.0%	$4,981
29	$0	$33,118	$0	$33,118	7.0%	$4,655
30	$0	$33,118	$10,000	$43,118	7.0%	$5,664
TOTAL	**$2,230,200**	**$1,047,440**	**$60,000**	**$3,337,641**		**$2,711,461**
					PV O&M	**$481,260**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	780	LF	$27.57	$21,505
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,096**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	4	MONTH	$4,531	$18,124
	Subtotal				**$47,574**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	780	LF	$8.97	$6,994
	Subtotal				**$27,664**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW[3]	2,315	CY	$2.12	$4,916
6.2	Haul RW to Stockpile Area[4]	2,778	CY	$4.00	$11,112
6.3	Perimeter Air Sampling	52	EA	$243.76	$12,697
6.4	Equipment Decontamination	116	HR	$54.56	$6,315
6.5	Stockpile Management	2,778	CY	$1.44	$3,992
6.6	Stockpile Characterization[5]	1	EA	$1,535.00	$1,535
	Subtotal				**$40,567**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	2,333	CY	$2.44	$5,698
7.2	Transport RW to in-town consolidation[7]	0	CY	$5.52	$0
7.3	Equipment Decontamination	116	HR	$54.56	$6,315
7.4	Out-of-Town Transportation of Waste[7, 8]	3,500	TON	$170.00	$595,000
7.5	Out-of-Town Disposal of RW (no treatment)	3,150	TON	$107.10	$337,365
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	350	TON	$192.00	$67,200
	Subtotal				**$1,011,579**

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[9]	400	CY	$2.40	$961
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[9]	509	CY	$27.00	$13,748
8.3	Install Geosynthetic Clay Liner (bottom layer)	25,000	SF	$2.86	$71,562
8.4	Install 60 mil HDPE liner	25,000	SF	$2.84	$71,047
8.5	Install Geosynthetic Drainage Layer	25,000	SF	$0.65	$16,350
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	25,000	SF	$1.29	$32,250
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")[9]	943	ECY	$9.35	$8,813
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	25,000	SF	$2.27	$56,750
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	2,778	SY	$2.21	$6,139
	Subtotal				**$303,547**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$1,486,800**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$89,208
10.2	Engineering and Design (12%)				$178,416
10.3	Construction management (8%)				$118,944
10.4	Location Adjustment (9%)				$133,812
10.5	Contingency (15%)				$223,020
TOTAL OTHER COSTS					**$743,400**
TOTAL CAPITAL COST FOR ALTERNATIVE 4					**$2,230,200**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the DPW Lot (AOC 1) Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to excavated to a depth of 2.5-ft below ground surface and additional soil that requires excavation to faciliate cap construction.
[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500).
[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less additionally excavated soil).
[7] A conversion factor of 1.5 was used to convert CY to TON.
[8] Volume of RW for disposal assumes that 10% would be hazardous and require treatment prior to disposal.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; pending PHC analysis, additionally excavated soil may be re-used onsite and was included in the estimate for asphalt base.
[10] No floodplains or wetlands would be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

PRESENT VALUE ANALYSIS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$1,337,378	$0	$0	$1,337,378	7.0%	$1,337,378
1	$0	$35,924	$0	$35,924	7.0%	$33,574
2	$0	$35,924	$0	$35,924	7.0%	$31,378
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$1,337,378**	**$71,848**	**$0**	**$1,409,227**		**$1,402,330**
					PV O&M	**$64,952**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal; not required for complete excavation of Raymark waste

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
DPQ LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	780	LF	$27.57	$21,505
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,096**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	4	MONTH	$4,531	$18,124
	Subtotal				**$47,574**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	780	LF	$8.97	$6,994
	Subtotal				**$27,664**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[4]	7,200	CY	$2.12	$15,290
6.2	Haul RW/Soil to Stockpile Area[5]	8,640	CY	$4.00	$34,564
6.3	Perimeter Air Sampling	162	EA	$243.76	$39,492
6.4	Equipment Decontamination	360	HR	$54.56	$19,643
6.5	Stockpile Management	8,640	CY	$1.44	$12,417
6.6	Stockpile Characterization[6]	18	EA	$1,535.00	$27,630
	Subtotal				**$149,036**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	7,467	CY	$2.44	$18,234
7.2	Transport RW to in-town consolidation[8]	6,720	CY	$5.52	$37,117
7.3	Equipment Decontamination	360	HR	$54.56	$19,643
7.4	Out-of-Town Transportation of RW[8, 9]	1,120	TON	$170.00	$190,400
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[8, 9]	1,120	TON	$192.00	$215,040
	Subtotal				**$480,435**

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
DPQ LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	1056	CY	$2.40	$2,537
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	778	ECY	$9.35	$7,272
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	21,000	SF	$2.27	$47,670
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	5,503	CY	$11.83	$65,098
8.14	Install Nonwoven Geotextile Fabric	2,333	SY	$2.21	$5,157
	Subtotal				**$153,662**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$891,586**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$53,495
10.2	Engineering and Design (12%)				$106,990
10.3	Construction management (8%)				$71,327
10.4	Location Adjustment (9%)				$80,243
10.5	Contingency (15%)				$133,738
TOTAL OTHER COSTS					**$445,793**
TOTAL CAPITAL COST FOR ALTERNATIVE 5					**$1,337,378**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the DPW Lot (AOC 1) Property.

[2] Excavation to water table at this property will achieve complete excavation of RW and will not require transactional fees due to deed management.

[3] Assume fencing and signage to be temporary and required during construction activities for site security only.

[4] Represents in situ estimate of RW to excavated to a depth of 8-ft below ground surface and additional soil that would be required to be removed to facilitate compliance with safety standards for benching/sloping.

[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[8] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[9] A conversion factor of 1.5 was used to convert CY to TON.

[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; pending PHC analysis, additionally excavated soil may be re-used onsite and was included in the estimate for asphalt base.

[11] No floodplains or wetlands would be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)[2]						
OM.2.1	Inspection	0	HR	$110.00	$0	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation	0	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	0	LS	$2,250.00	$0	see cost assumptions
OM.2.8	Contractor mobilizations	0	EA	$321.75	$0	see cost assumptions
	Subtotal				**$0**	
OM.3.0 Deed Restrictions[2]						
OM.3.1	Inspection (annual)	0	LS	$1,100.00	$0	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	0	EA	$5,000.00	$0	see cost assumptions
	Subtotal				**$0**	
ANNUAL O&M COST (YEARS 1-2)[3]					**$35,924**	
ANNUAL O&M COST (YEARS 3-30)[4]					**$0**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the DPW Lot (AOC 1) Property.

[2] Assume deed restrictions and O&M for ground surfaces would not be required following complete excavation of Raymark waste.

[3] O&M for Years 1 and 2 include quarterly groundwater monitoring with annual reporting.

[4] O&M for Years 3 - 30 will not be required pending analytical data and concurrence from the State following the first 2 years of groundwater data collection.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$5,436,917	$0	$0	$5,436,917	7.0%	$5,436,917
1	$0	$35,924	$0	$35,924	7.0%	$33,574
2	$0	$35,924	$0	$35,924	7.0%	$31,378
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$5,436,917**	**$71,848**	**$0**	**$5,508,765**		**$5,501,868**
					PV O&M	**$64,952**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	780	LF	$27.57	$21,505
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,096**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	4	MONTH	$4,531	$18,124
	Subtotal				**$47,574**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	780	LF	$8.97	$6,994
	Subtotal				**$27,664**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[4]	7,200	CY	$2.12	$15,290
6.2	Haul RW/Soil to Stockpile Area[5]	8,640	CY	$4.00	$34,564
6.3	Perimeter Air Sampling	162	EA	$243.76	$39,492
6.4	Equipment Decontamination	360	HR	$54.56	$19,643
6.5	Stockpile Management	8,640	CY	$1.44	$12,417
6.6	Stockpile Characterization[6]	3	EA	$1,535.00	$4,605
	Subtotal				**$126,011**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	7,467	CY	$2.44	$18,234
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	360	HR	$54.56	$19,643
7.4	Out-of-Town Transportation of RW[8]	11,200	TON	$170.00	$1,904,000
7.5	Out-of-Town Disposal of RW (no treatment)[8, 9]	10,080	TON	$107.10	$1,079,568
7.6	Out-of-Town Disposal of RW (treatment)[8, 9]	1,120	TON	$192.00	$215,040
	Subtotal				**$3,236,486**

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	1056	CY	$2.40	$2,537
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	778	ECY	$9.35	$7,272
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	21000	SF	$2.27	$47,670
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	5503	CY	$11.83	$65,098
8.14	Install Nonwoven Geotextile Fabric	2333	SY	$2.21	$5,157
	Subtotal				**$153,662**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$3,624,611**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$217,477
10.2	Engineering and Design (12%)				$434,953
10.3	Construction management (8%)				$289,969
10.4	Location Adjustment (9%)				$326,215
10.5	Contingency (15%)				$543,692
TOTAL OTHER COSTS					**$1,812,306**
TOTAL CAPITAL COST FOR ALTERNATIVE 6					**$5,436,917**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the DPW Lot (AOC 1) Property.
[2] Excavation to water table at this property will achieve complete excavation of RW and will not require transactional fees due to deed management.
[3] Assume fencing and signage to be temporary and required during construction activities for site security only.
[4] Represents in situ estimate of RW to excavated to a depth of 8-ft below ground surface and additional soil that would be required to be removed to facilitate compliance with safety standards for benching/sloping.
[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.
[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).
[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Volume of RW for disposal assumes that 10% would be hazardous and require treatment prior to disposal.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; pending PHC analysis, additionally excavated soil may be re-used onsite and was included in the estimate for asphalt base.
[11] No floodplains or wetlands would be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

PRESENT VALUE ANALYSIS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$590,708	$0	0	$590,708	7.0%	$590,708
1	$0	$59,699	$0	$59,699	7.0%	$55,794
2	$0	$59,699	$0	$59,699	7.0%	$52,143
3	$0	$32,756	$0	$32,756	7.0%	$26,739
4	$0	$32,756	$0	$32,756	7.0%	$24,989
5	$0	$32,756	$10,000	$42,756	7.0%	$30,484
6	$0	$32,756	$0	$32,756	7.0%	$21,827
7	$0	$32,756	$0	$32,756	7.0%	$20,399
8	$0	$32,756	$0	$32,756	7.0%	$19,064
9	$0	$32,756	$0	$32,756	7.0%	$17,817
10	$0	$32,756	$10,000	$42,756	7.0%	$21,735
11	$0	$32,756	$0	$32,756	7.0%	$15,562
12	$0	$32,756	$0	$32,756	7.0%	$14,544
13	$0	$32,756	$0	$32,756	7.0%	$13,593
14	$0	$32,756	$0	$32,756	7.0%	$12,703
15	$0	$32,756	$10,000	$42,756	7.0%	$15,497
16	$0	$32,756	$0	$32,756	7.0%	$11,096
17	$0	$32,756	$0	$32,756	7.0%	$10,370
18	$0	$32,756	$0	$32,756	7.0%	$9,691
19	$0	$32,756	$0	$32,756	7.0%	$9,057
20	$0	$32,756	$10,000	$42,756	7.0%	$11,049
21	$0	$32,756	$0	$32,756	7.0%	$7,911
22	$0	$32,756	$0	$32,756	7.0%	$7,393
23	$0	$32,756	$0	$32,756	7.0%	$6,910
24	$0	$32,756	$0	$32,756	7.0%	$6,458
25	$0	$32,756	$10,000	$42,756	7.0%	$7,878
26	$0	$32,756	$0	$32,756	7.0%	$5,640
27	$0	$32,756	$0	$32,756	7.0%	$5,271
28	$0	$32,756	$0	$32,756	7.0%	$4,927
29	$0	$32,756	$0	$32,756	7.0%	$4,604
30	$0	$32,756	$10,000	$42,756	7.0%	$5,617
TOTAL	**$590,708**	**$1,036,565**	**$60,000**	**$1,687,273**		**$1,067,470**
					PV O&M	**$476,762**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	780	LF	$27.57	$21,505
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,096**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	3	MONTH	$4,531	$13,593
	Subtotal				**$43,044**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	780	LF	$8.97	$6,994
	Subtotal				**$27,664**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	1,556	CY	$2.12	$3,303
6.2	Haul RW to Stockpile Area[4]	1,867	CY	$4.00	$7,468
6.3	Perimeter Air Sampling	35	EA	$243.76	$8,532
6.4	Equipment Decontamination	78	HR	$54.56	$4,244
6.5	Stockpile Management	1,867	CY	$1.44	$2,683
6.6	Stockpile Characterization[5]	4	EA	$1,535.00	$6,140
	Subtotal				**$32,370**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	1,867	CY	$2.44	$4,559
7.2	Transport RW to in-town consolidation[7]	1,680	CY	$5.52	$9,279
7.3	Equipment Decontamination	78	HR	$54.56	$4,244
7.4	Out-of-Town Transportation of Waste[7, 8]	280	TON	$170.00	$47,600
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	280	TON	$192.00	$53,760
	Subtotal				**$119,442**

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[9]	21,000	SF	$1.29	$27,090
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	778	ECY	$9.35	$7,272
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	21,000	SF	$2.27	$47,670
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	194	CY	$11.83	$2,300
8.14	Install Nonwoven Geotextile Fabric	2,333	SY	$2.21	$5,157
	Subtotal				**$115,417**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$393,805**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$23,628
10.2	Engineering and Design (12%)				$47,257
10.3	Construction management (8%)				$31,504
10.4	Location Adjustment (9%)				$35,442
10.5	Contingency (15%)				$59,071
TOTAL OTHER COSTS					**$196,903**
TOTAL CAPITAL COST FOR ALTERNATIVE 7					**$590,708**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the DPW Lot (AOC 1) Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 2 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal.
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement.
[11] No floodplains or wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0	**Groundwater Monitoring (per event)**					
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0	**Ground Surface Inspections, Maintenance, and Repairs (per year)**					
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	1,050	SF	$1.81	$1,903	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	1	EA	$321.75	$322	see cost assumptions
	Subtotal				**$17,675**	
OM.3.0	**Deed Restrictions**					
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$59,699**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$32,756**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the DPW Lot (AOC 1) Property.

[2] Assumed that there is no RW located below vegetated surfaces at this property group.

[3] Assumed 5% of asphalt surfaces will require repair annually.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$1,615,017	$0	0	$1,615,017	7.0%	$1,615,017
1	$0	$59,699	$0	$59,699	7.0%	$55,794
2	$0	$59,699	$0	$59,699	7.0%	$52,143
3	$0	$32,756	$0	$32,756	7.0%	$26,739
4	$0	$32,756	$0	$32,756	7.0%	$24,989
5	$0	$32,756	$10,000	$42,756	7.0%	$30,484
6	$0	$32,756	$0	$32,756	7.0%	$21,827
7	$0	$32,756	$0	$32,756	7.0%	$20,399
8	$0	$32,756	$0	$32,756	7.0%	$19,064
9	$0	$32,756	$0	$32,756	7.0%	$17,817
10	$0	$32,756	$10,000	$42,756	7.0%	$21,735
11	$0	$32,756	$0	$32,756	7.0%	$15,562
12	$0	$32,756	$0	$32,756	7.0%	$14,544
13	$0	$32,756	$0	$32,756	7.0%	$13,593
14	$0	$32,756	$0	$32,756	7.0%	$12,703
15	$0	$32,756	$10,000	$42,756	7.0%	$15,497
16	$0	$32,756	$0	$32,756	7.0%	$11,096
17	$0	$32,756	$0	$32,756	7.0%	$10,370
18	$0	$32,756	$0	$32,756	7.0%	$9,691
19	$0	$32,756	$0	$32,756	7.0%	$9,057
20	$0	$32,756	$10,000	$42,756	7.0%	$11,049
21	$0	$32,756	$0	$32,756	7.0%	$7,911
22	$0	$32,756	$0	$32,756	7.0%	$7,393
23	$0	$32,756	$0	$32,756	7.0%	$6,910
24	$0	$32,756	$0	$32,756	7.0%	$6,458
25	$0	$32,756	$10,000	$42,756	7.0%	$7,878
26	$0	$32,756	$0	$32,756	7.0%	$5,640
27	$0	$32,756	$0	$32,756	7.0%	$5,271
28	$0	$32,756	$0	$32,756	7.0%	$4,927
29	$0	$32,756	$0	$32,756	7.0%	$4,604
30	$0	$32,756	$10,000	$42,756	7.0%	$5,617
TOTAL	**$1,615,017**	**$1,036,565**	**$60,000**	**$2,711,582**		**$2,091,779**
					PV O&M	**$476,762**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	780	LF	$27.57	$21,505
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,096**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	3	MONTH	$4,531	$13,593
	Subtotal				**$43,044**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	780	LF	$8.97	$6,994
	Subtotal				**$27,664**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	1,556	CY	$2.12	$3,303
6.2	Haul RW to Stockpile Area[4]	1,867	CY	$4.00	$7,468
6.3	Perimeter Air Sampling	35	EA	$243.76	$8,532
6.4	Equipment Decontamination	78	HR	$54.56	$4,244
6.5	Stockpile Management	1,867	CY	$1.44	$2,683
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$26,230**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[5]	1,867	CY	$2.44	$4,559
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	78	HR	$54.56	$4,244
7.4	Out-of-Town Transportation of Waste[6]	2,800	TON	$170.00	$476,000
7.5	Out-of-Town Disposal of RW (no treatment)[6, 7]	2,520	TON	$107.10	$269,892
7.6	Out-of-Town Disposal of RW (treatment)[6, 7]	280	TON	$192.00	$53,760
	Subtotal				**$808,455**

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	21,000	SF	$1.29	$27,090
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	778	ECY	$9.35	$7,272
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	21,000	SF	$2.27	$47,670
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	194	CY	$11.83	$2,300
8.14	Install Nonwoven Geotextile Fabric	2,333	SY	$2.21	$5,157
	Subtotal				**$115,417**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$1,076,678**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$64,601
10.2	Engineering and Design (12%)				$129,201
10.3	Construction management (8%)				$86,134
10.4	Location Adjustment (9%)				$96,901
10.5	Contingency (15%)				$161,502
TOTAL OTHER COSTS					**$538,339**
TOTAL CAPITAL COST FOR ALTERNATIVE 8					**$1,615,017**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the DPW Lot (AOC 1) Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 2 ft below ground surface.
[4] Volume for hauling RW to the stockpile area for characterization includes a bulking factor of 1.2.
[5] Volume includes all RW intended for disposal.
[6] A conversion factor of 1.5 was used to convert CY to TON.
[7] Volume of RW for Out-of-Town disposal assumes that 10% would be hazardous requiring treatment prior to disposal.
[8] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement.
[10] No floodplains or wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

PRESENT VALUE ANALYSIS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$836,448	$0	0	$836,448	7.0%	$836,448
1	$0	$59,699	$0	$59,699	7.0%	$55,794
2	$0	$59,699	$0	$59,699	7.0%	$52,143
3	$0	$32,756	$0	$32,756	7.0%	$26,739
4	$0	$32,756	$0	$32,756	7.0%	$24,989
5	$0	$32,756	$10,000	$42,756	7.0%	$30,484
6	$0	$32,756	$0	$32,756	7.0%	$21,827
7	$0	$32,756	$0	$32,756	7.0%	$20,399
8	$0	$32,756	$0	$32,756	7.0%	$19,064
9	$0	$32,756	$0	$32,756	7.0%	$17,817
10	$0	$32,756	$10,000	$42,756	7.0%	$21,735
11	$0	$32,756	$0	$32,756	7.0%	$15,562
12	$0	$32,756	$0	$32,756	7.0%	$14,544
13	$0	$32,756	$0	$32,756	7.0%	$13,593
14	$0	$32,756	$0	$32,756	7.0%	$12,703
15	$0	$32,756	$10,000	$42,756	7.0%	$15,497
16	$0	$32,756	$0	$32,756	7.0%	$11,096
17	$0	$32,756	$0	$32,756	7.0%	$10,370
18	$0	$32,756	$0	$32,756	7.0%	$9,691
19	$0	$32,756	$0	$32,756	7.0%	$9,057
20	$0	$32,756	$10,000	$42,756	7.0%	$11,049
21	$0	$32,756	$0	$32,756	7.0%	$7,911
22	$0	$32,756	$0	$32,756	7.0%	$7,393
23	$0	$32,756	$0	$32,756	7.0%	$6,910
24	$0	$32,756	$0	$32,756	7.0%	$6,458
25	$0	$32,756	$10,000	$42,756	7.0%	$7,878
26	$0	$32,756	$0	$32,756	7.0%	$5,640
27	$0	$32,756	$0	$32,756	7.0%	$5,271
28	$0	$32,756	$0	$32,756	7.0%	$4,927
29	$0	$32,756	$0	$32,756	7.0%	$4,604
30	$0	$32,756	$10,000	$42,756	7.0%	$5,617
TOTAL	**$836,448**	**$1,036,565**	**$60,000**	**$1,933,013**		**$1,313,210**
					PV O&M	**$476,762**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	780	LF	$27.57	$21,505
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,096**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	3	MONTH	$4,531	$13,593
	Subtotal				**$43,044**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	780	LF	$8.97	$6,994
	Subtotal				**$27,664**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	3,111	CY	$2.12	$6,607
6.2	Haul RW to Stockpile Area[4]	3,733	CY	$4.00	$14,935
6.3	Perimeter Air Sampling	35	EA	$243.76	$8,532
6.4	Equipment Decontamination	156	HR	$54.56	$8,488
6.5	Stockpile Management	3,733	CY	$1.44	$5,365
6.6	Stockpile Characterization[5]	7	EA	$1,535.00	$10,745
	Subtotal				**$54,672**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	3,733	CY	$2.44	$9,117
7.2	Transport RW to in-town consolidation[7]	3,360	CY	$5.52	$18,559
7.3	Equipment Decontamination	156	HR	$54.56	$8,488
7.4	Out-of-Town Transportation of Waste[7, 8]	560	TON	$170.00	$95,200
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	560	TON	$192.00	$107,520
	Subtotal				**$238,884**

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[9]	21,000	SF	$1.29	$27,090
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	778	ECY	$9.35	$7,272
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	21000	SF	$2.27	$47,670
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	2061	CY	$11.83	$24,383
8.14	Install Nonwoven Geotextile Fabric	2333	SY	$2.21	$5,157
	Subtotal				**$137,499**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$557,632**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$33,458
10.2	Engineering and Design (12%)				$66,916
10.3	Construction management (8%)				$44,611
10.4	Location Adjustment (9%)				$50,187
10.5	Contingency (15%)				$83,645
TOTAL OTHER COSTS					**$278,816**
TOTAL CAPITAL COST FOR ALTERNATIVE 9					**$836,448**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the DPW Lot (AOC 1) Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal.
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement.
[11] No floodplains or wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

PRESENT VALUE ANALYSIS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$2,887,368	$0	0	$2,887,368	7.0%	$2,887,368
1	$0	$59,699	$0	$59,699	7.0%	$55,794
2	$0	$59,699	$0	$59,699	7.0%	$52,143
3	$0	$32,756	$0	$32,756	7.0%	$26,739
4	$0	$32,756	$0	$32,756	7.0%	$24,989
5	$0	$32,756	$10,000	$42,756	7.0%	$30,484
6	$0	$32,756	$0	$32,756	7.0%	$21,827
7	$0	$32,756	$0	$32,756	7.0%	$20,399
8	$0	$32,756	$0	$32,756	7.0%	$19,064
9	$0	$32,756	$0	$32,756	7.0%	$17,817
10	$0	$32,756	$10,000	$42,756	7.0%	$21,735
11	$0	$32,756	$0	$32,756	7.0%	$15,562
12	$0	$32,756	$0	$32,756	7.0%	$14,544
13	$0	$32,756	$0	$32,756	7.0%	$13,593
14	$0	$32,756	$0	$32,756	7.0%	$12,703
15	$0	$32,756	$10,000	$42,756	7.0%	$15,497
16	$0	$32,756	$0	$32,756	7.0%	$11,096
17	$0	$32,756	$0	$32,756	7.0%	$10,370
18	$0	$32,756	$0	$32,756	7.0%	$9,691
19	$0	$32,756	$0	$32,756	7.0%	$9,057
20	$0	$32,756	$10,000	$42,756	7.0%	$11,049
21	$0	$32,756	$0	$32,756	7.0%	$7,911
22	$0	$32,756	$0	$32,756	7.0%	$7,393
23	$0	$32,756	$0	$32,756	7.0%	$6,910
24	$0	$32,756	$0	$32,756	7.0%	$6,458
25	$0	$32,756	$10,000	$42,756	7.0%	$7,878
26	$0	$32,756	$0	$32,756	7.0%	$5,640
27	$0	$32,756	$0	$32,756	7.0%	$5,271
28	$0	$32,756	$0	$32,756	7.0%	$4,927
29	$0	$32,756	$0	$32,756	7.0%	$4,604
30	$0	$32,756	$10,000	$42,756	7.0%	$5,617
TOTAL	**$2,887,368**	**$1,036,565**	**$60,000**	**$3,983,933**		**$3,364,130**
					PV O&M	**$476,762**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	780	LF	$27.57	$21,505
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,096**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	3	MONTH	$4,531	$13,593
	Subtotal				**$43,044**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	780	LF	$8.97	$6,994
	Subtotal				**$27,664**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	3,111	CY	$2.12	$6,607
6.2	Haul RW to Stockpile Area[4]	3,733	CY	$4.00	$14,935
6.3	Perimeter Air Sampling	35	EA	$243.76	$8,532
6.4	Equipment Decontamination	156	HR	$54.56	$8,488
6.5	Stockpile Management	3,733	CY	$1.44	$5,365
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$43,927**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[5]	3,733	CY	$2.44	$9,117
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	156	HR	$54.56	$8,488
7.4	Out-of-Town Transportation of Waste[6]	5,600	TON	$170.00	$952,000
7.5	Out-of-Town Disposal of RW (no treatment)[6, 7]	5,040	TON	$107.10	$539,784
7.6	Out-of-Town Disposal of RW (treatment)[6, 7]	560	TON	$192.00	$107,520
	Subtotal				**$1,616,909**

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
DPW LOT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	21,000	SF	$1.29	$27,090
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	778	ECY	$9.35	$7,272
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	21,000	SF	$2.27	$47,670
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	2,061	CY	$11.83	$24,383
8.14	Install Nonwoven Geotextile Fabric	2,333	SY	$2.21	$5,157
	Subtotal				**$137,499**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$1,924,912**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$115,495
10.2	Engineering and Design (12%)				$230,989
10.3	Construction management (8%)				$153,993
10.4	Location Adjustment (9%)				$173,242
10.5	Contingency (15%)				$288,737
TOTAL OTHER COSTS					**$962,456**
TOTAL CAPITAL COST FOR ALTERNATIVE 10					**$2,887,368**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the DPW Lot (AOC 1) Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area for characterization includes a bulking factor of 1.2.
[5] Volume includes all RW intended for disposal.
[6] A conversion factor of 1.5 was used to convert CY to TON.
[7] Volume of RW for Out-of-Town disposal assumes that 10% would be hazardous requiring treatment prior to disposal.
[8] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement.
[10] No floodplains or wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

G-12

DEPARTMENT OF PUBLIC WORKS LOT – AREA OF CONCERN 2 AND 251 EAST MAIN STREET

COST ESTIMATE BACKUP SHEETS

PRESENT VALUE ANALYSIS
ALTERNATIVE 1 - NO ACTION
DPW (AOC) 2 AND 251 EAST MAIN ST
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$15,000	$15,000	7.0%	$10,695
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$15,000	$15,000	7.0%	$7,625
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$15,000	$15,000	7.0%	$5,437
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$15,000	$15,000	7.0%	$3,876
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$15,000	$15,000	7.0%	$2,764
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$15,000	$15,000	7.0%	$1,971
TOTAL	**$0**	**$0**	**$90,000**	**$90,000**		**$32,367**
					PV O&M	**$32,367**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
DPW (AOC) 2 AND 251 EAST MAIN ST
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review [1]	Total	Discount Rate[2]	Present Value
0	$71,368	$0	$0	$71,368	7.0%	$71,368
1	$0	$71,669	$0	$71,669	7.0%	$66,980
2	$0	$71,669	$0	$71,669	7.0%	$62,598
3	$0	$40,444	$0	$40,444	7.0%	$33,015
4	$0	$40,444	$0	$40,444	7.0%	$30,855
5	$0	$40,444	$15,000	$55,444	7.0%	$39,531
6	$0	$40,444	$0	$40,444	7.0%	$26,950
7	$0	$40,444	$0	$40,444	7.0%	$25,187
8	$0	$40,444	$0	$40,444	7.0%	$23,539
9	$0	$40,444	$0	$40,444	7.0%	$21,999
10	$0	$40,444	$15,000	$55,444	7.0%	$28,185
11	$0	$40,444	$0	$40,444	7.0%	$19,215
12	$0	$40,444	$0	$40,444	7.0%	$17,958
13	$0	$40,444	$0	$40,444	7.0%	$16,783
14	$0	$40,444	$0	$40,444	7.0%	$15,685
15	$0	$40,444	$15,000	$55,444	7.0%	$20,096
16	$0	$40,444	$0	$40,444	7.0%	$13,700
17	$0	$40,444	$0	$40,444	7.0%	$12,804
18	$0	$40,444	$0	$40,444	7.0%	$11,966
19	$0	$40,444	$0	$40,444	7.0%	$11,183
20	$0	$40,444	$15,000	$55,444	7.0%	$14,328
21	$0	$40,444	$0	$40,444	7.0%	$9,768
22	$0	$40,444	$0	$40,444	7.0%	$9,129
23	$0	$40,444	$0	$40,444	7.0%	$8,532
24	$0	$40,444	$0	$40,444	7.0%	$7,973
25	$0	$40,444	$15,000	$55,444	7.0%	$10,216
26	$0	$40,444	$0	$40,444	7.0%	$6,964
27	$0	$40,444	$0	$40,444	7.0%	$6,509
28	$0	$40,444	$0	$40,444	7.0%	$6,083
29	$0	$40,444	$0	$40,444	7.0%	$5,685
30	$0	$40,444	$15,000	$55,444	7.0%	$7,284
TOTAL	**$71,368**	**$1,275,776**	**$90,000**	**$1,437,143**		**$662,063**
					PV O&M	**$590,696**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
DPW (AOC) 2 AND 251 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	2	LS	$22,655	$45,309
	Subtotal				**$45,309**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0	**Fencing and Signage**				
3.1	Chain Link Fence	526	LF	$27.57	$14,497
3.2	Signage	6	EA	$73.95	$444
	Subtotal				**$14,941**
TOTAL DIRECT COSTS					**$71,368**
TOTAL CAPITAL COST FOR ALTERNATIVE 2					**$71,368**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the DPW Lot (AOC 2) and 251 East Main St Property Group.
PVC = polyvinyl chloride
IDW = investigation derived waste
LS = lump sum
EA = each
LF = linear foot

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
DPW (AOC)2 AND 251 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	20	HR	$110	$2,200	see cost assumptions
OM.1.3	Sampling Labor - Sampler	10	HR	$90	$900	see cost assumptions
OM.1.4	Analytical Costs	5	EA	$697	$3,486	see cost assumptions
OM.1.5	Data Validation	5	HR	$110	$550	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$10,408**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	500	SF	$1.81	$906	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	18	LF	$27.57	$483	see cost assumptions
OM 2.6	Sign Replacement[5]	24	EA	$73.95	$1,775	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	1	EA	$321.75	$322	see cost assumptions
	Subtotal				**$18,936**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	2	EA	$5,000.00	$10,000	see cost assumptions
	Subtotal				**$11,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$71,669**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$40,444**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the DPW Lot (AOC 2) and 251 East Main St Property Group.

[2] Assumed that there is no RW located below vegetated surfaces at this property group.

[3] Assumed 5% of asphalt surfaces will require repair annually (need for repair to be established during 5-Year Reviews).

[4] Estimated that 100% of fencing would require replacement over the period of O&M (need for repair to be established during 5-Year Reviews).

[5] Estimated that signage would require replacement 4 times over the period of O&M (need for repair to be established during 5-Year Reviews).

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
DPW (AOC)2 AND 251 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$584,005	$0	$0	$584,005	7.0%	$584,005
1	$0	$69,592	$0	$69,592	7.0%	$65,039
2	$0	$69,592	$0	$69,592	7.0%	$60,784
3	$0	$38,367	$0	$38,367	7.0%	$31,319
4	$0	$38,367	$0	$38,367	7.0%	$29,270
5	$0	$38,367	$15,000	$53,367	7.0%	$38,050
6	$0	$38,367	$0	$38,367	7.0%	$25,566
7	$0	$38,367	$0	$38,367	7.0%	$23,893
8	$0	$38,367	$0	$38,367	7.0%	$22,330
9	$0	$38,367	$0	$38,367	7.0%	$20,869
10	$0	$38,367	$15,000	$53,367	7.0%	$27,129
11	$0	$38,367	$0	$38,367	7.0%	$18,228
12	$0	$38,367	$0	$38,367	7.0%	$17,036
13	$0	$38,367	$0	$38,367	7.0%	$15,921
14	$0	$38,367	$0	$38,367	7.0%	$14,880
15	$0	$38,367	$15,000	$53,367	7.0%	$19,343
16	$0	$38,367	$0	$38,367	7.0%	$12,996
17	$0	$38,367	$0	$38,367	7.0%	$12,146
18	$0	$38,367	$0	$38,367	7.0%	$11,352
19	$0	$38,367	$0	$38,367	7.0%	$10,609
20	$0	$38,367	$15,000	$53,367	7.0%	$13,791
21	$0	$38,367	$0	$38,367	7.0%	$9,266
22	$0	$38,367	$0	$38,367	7.0%	$8,660
23	$0	$38,367	$0	$38,367	7.0%	$8,093
24	$0	$38,367	$0	$38,367	7.0%	$7,564
25	$0	$38,367	$15,000	$53,367	7.0%	$9,833
26	$0	$38,367	$0	$38,367	7.0%	$6,607
27	$0	$38,367	$0	$38,367	7.0%	$6,174
28	$0	$38,367	$0	$38,367	7.0%	$5,771
29	$0	$38,367	$0	$38,367	7.0%	$5,393
30	$0	$38,367	$15,000	$53,367	7.0%	$7,011
TOTAL	**$584,005**	**$1,213,473**	**$90,000**	**$1,887,478**		**$1,148,931**
					PV O&M	**$564,925**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
DPW (AOC) 2 AND 251 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	2	LS	$22,655	$45,309
	Subtotal				**$45,309**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	526	LF	$27.57	$14,497
3.2	Signage	6	EA	$73.95	$444
	Subtotal				**$14,941**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	2	MONTH	$4,531	$9,062
	Subtotal				**$38,513**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	526	LF	$8.97	$4,715
	Subtotal				**$25,385**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil[3]	1,111	CY	$2.12	$2,360
6.2	Haul RW/Soil to Stockpile Area[4]	1,333	CY	$4.00	$5,334
6.3	Perimeter Air Sampling	25	EA	$243.76	$6,094
6.4	Equipment Decontamination	56	HR	$54.56	$3,031
6.5	Stockpile Management	1,333	CY	$1.44	$1,916
6.6	Stockpile Characterization[5]	3	EA	$1,535.00	$4,605
	Subtotal				**$23,340**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	1,111	CY	$2.44	$2,713
7.2	Transport RW to in-town consolidation[7]	1,000	CY	$5.52	$5,523
7.3	Equipment Decontamination	56	HR	$54.56	$3,031
7.4	Out-of-Town Transportation of Waste[7, 8]	167	TON	$170.00	$28,333
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)[7, 8]	167	TON	$192.00	$32,000
	Subtotal				**$71,602**

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
DPW (AOC) 2 AND 251 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[9]	200	CY	$2.40	$480
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[9]	244	CY	$27.00	$6,599
8.3	Install Geosynthetic Clay Liner (bottom layer)	12,000	SF	$2.86	$34,350
8.4	Install 60 mil HDPE liner	12,000	SF	$2.84	$34,103
8.5	Install Geosynthetic Drainage Layer	12,000	SF	$0.65	$7,848
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	12,000	SF	$1.29	$15,480
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")[9]	444	ECY	$9.35	$4,156
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	12,000	SF	$2.27	$27,240
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	1,333	SY	$2.21	$2,947
	Subtotal				**$159,129**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$389,337**
	10.0 OTHER COSTS				
10.1	Project Management (6%)				$23,360
10.2	Engineering and Design (12%)				$46,720
10.3	Construction management (8%)				$31,147
10.4	Location Adjustment (9%)				$35,040
10.5	Contingency (15%)				$58,401
TOTAL OTHER COSTS					**$194,668**
TOTAL CAPITAL COST FOR ALTERNATIVE 3					**$584,005**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the DPW Lot (AOC 2) and 251 East Main St Property Group.

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to excavated to a depth of 2.5-ft below ground surface and additional soil that requires excavation to faciliate cap construction.

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less additionally excavated soil).

[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[8] A conversion factor of 1.5 was used to convert CY to TON.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; pending PHC analysis, additionally excavated soil may be re-used onsite and was included in the estimate for asphalt base.

[10] No floodplains or wetlands would be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
DPW (AOC) 2 AND 251 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	20	HR	$110	$2,200	see cost assumptions
OM.1.3	Sampling Labor - Sampler	10	HR	$90	$900	see cost assumptions
OM.1.4	Analytical Costs	5	EA	$697	$3,486	see cost assumptions
OM.1.5	Data Validation	5	HR	$110	$550	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$10,408**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	600	SF	$1.81	$1,088	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	1	EA	$321.75	$322	see cost assumptions
	Subtotal				**$16,859**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	2	EA	$5,000.00	$10,000	see cost assumptions
	Subtotal				**$11,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$69,592**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$38,367**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the DPW Lot (AOC 2) and 251 East Main St Property Group.

[2] Assumed that there is no RW located below vegetated surfaces at this property group.

[3] Assumed 5% of asphalt surfaces will require repair annually.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
DPW (AOC) 2 AND 251 EAST MAIN ST
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$1,194,590	$0	0	$1,194,590	7.0%	$1,194,590
1	$0	$69,592	$0	$69,592	7.0%	$65,039
2	$0	$69,592	$0	$69,592	7.0%	$60,784
3	$0	$38,367	$0	$38,367	7.0%	$31,319
4	$0	$38,367	$0	$38,367	7.0%	$29,270
5	$0	$38,367	$15,000	$53,367	7.0%	$38,050
6	$0	$38,367	$0	$38,367	7.0%	$25,566
7	$0	$38,367	$0	$38,367	7.0%	$23,893
8	$0	$38,367	$0	$38,367	7.0%	$22,330
9	$0	$38,367	$0	$38,367	7.0%	$20,869
10	$0	$38,367	$15,000	$53,367	7.0%	$27,129
11	$0	$38,367	$0	$38,367	7.0%	$18,228
12	$0	$38,367	$0	$38,367	7.0%	$17,036
13	$0	$38,367	$0	$38,367	7.0%	$15,921
14	$0	$38,367	$0	$38,367	7.0%	$14,880
15	$0	$38,367	$15,000	$53,367	7.0%	$19,343
16	$0	$38,367	$0	$38,367	7.0%	$12,996
17	$0	$38,367	$0	$38,367	7.0%	$12,146
18	$0	$38,367	$0	$38,367	7.0%	$11,352
19	$0	$38,367	$0	$38,367	7.0%	$10,609
20	$0	$38,367	$15,000	$53,367	7.0%	$13,791
21	$0	$38,367	$0	$38,367	7.0%	$9,266
22	$0	$38,367	$0	$38,367	7.0%	$8,660
23	$0	$38,367	$0	$38,367	7.0%	$8,093
24	$0	$38,367	$0	$38,367	7.0%	$7,564
25	$0	$38,367	$15,000	$53,367	7.0%	$9,833
26	$0	$38,367	$0	$38,367	7.0%	$6,607
27	$0	$38,367	$0	$38,367	7.0%	$6,174
28	$0	$38,367	$0	$38,367	7.0%	$5,771
29	$0	$38,367	$0	$38,367	7.0%	$5,393
30	$0	$38,367	$15,000	$53,367	7.0%	$7,011
TOTAL	**$1,194,590**	**$1,213,473**	**$90,000**	**$2,498,063**		**$1,759,515**
					PV O&M	**$564,925**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILTY CAP WITH OUT-OF-TOWN DISPOSAL
DPW (AOC) 2 AND 251 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	2	LS	$22,655	$45,309
	Subtotal				**$45,309**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	526	LF	$27.57	$14,497
3.2	Signage	6	EA	$73.95	$444
	Subtotal				**$14,941**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	2	MONTH	$4,531	$9,062
	Subtotal				**$38,513**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	526	LF	$8.97	$4,715
	Subtotal				**$25,385**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW[3]	1,111	CY	$2.12	$2,360
6.2	Haul RW to Stockpile Area[4]	1,333	CY	$4.00	$5,334
6.3	Perimeter Air Sampling	25	EA	$243.76	$6,094
6.4	Equipment Decontamination	56	HR	$54.56	$3,031
6.5	Stockpile Management	1,333	CY	$1.44	$1,916
6.6	Stockpile Characterization[5]	1	EA	$1,535.00	$1,535
	Subtotal				**$20,270**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	1,111	CY	$2.44	$2,713
7.2	Transport RW to in-town consolidation[7]	0	CY	$5.52	$0
7.3	Equipment Decontamination	56	HR	$54.56	$3,031
7.4	Out-of-Town Transportation of Waste[7, 8]	1,667	TON	$170.00	$283,333
7.5	Out-of-Town Disposal of RW (no treatment)	1,500	TON	$107.10	$160,650
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	167	TON	$192.00	$32,000
	Subtotal				**$481,728**

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILTY CAP WITH OUT-OF-TOWN DISPOSAL
DPW (AOC) 2 AND 251 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[9]	200	CY	$2.40	$480
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[9]	244	CY	$27.00	$6,599
8.3	Install Geosynthetic Clay Liner (bottom layer)	12,000	SF	$2.86	$34,350
8.4	Install 60 mil HDPE liner	12,000	SF	$2.84	$34,103
8.5	Install Geosynthetic Drainage Layer	12,000	SF	$0.65	$7,848
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	12,000	SF	$1.29	$15,480
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")[9]	444	ECY	$9.35	$4,156
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	12,000	SF	$2.27	$27,240
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	1,333	SY	$2.21	$2,947
	Subtotal				**$159,129**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$796,394**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$47,784
10.2	Engineering and Design (12%)				$95,567
10.3	Construction management (8%)				$63,711
10.4	Location Adjustment (9%)				$71,675
10.5	Contingency (15%)				$119,459
TOTAL OTHER COSTS					**$398,197**
TOTAL CAPITAL COST FOR ALTERNATIVE 4					**$1,194,590**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the DPW Lot (AOC 2) and 251 East Main St Property Group.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to excavated to a depth of 2.5-ft below ground surface and additional soil that requires excavation to faciliate cap construction.
[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500).
[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less additionally excavated soil).
[7] A conversion factor of 1.5 was used to convert CY to TON.
[8] Volume of RW for disposal assumes that 10% would be hazardous and require treatment prior to disposal.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; pending PHC analysis, additionally excavated soil may be re-used onsite and was included in the estimate for asphalt base.
[10] No floodplains or wetlands would be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

PRESENT VALUE ANALYSIS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
DPW (AOC) 2 AND 251 EAST MAIN ST
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review	Total	Discount Rate[2]	Present Value
0	$696,366	$0	$0	$696,366	7.0%	$696,366
1	$0	$41,633	$0	$41,633	7.0%	$38,909
2	$0	$41,633	$0	$41,633	7.0%	$36,364
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$696,366**	**$83,265**	**$0**	**$779,631**		**$771,639**
					PV O&M	**$75,273**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal; not required for complete excavation of Raymark waste

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
DPW (AOC) 2 AND 251 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	526	LF	$27.57	$14,497
3.2	Signage	6	EA	$73.95	$444
	Subtotal				**$14,941**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	3	MONTH	$4,531	$13,593
	Subtotal				**$43,044**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	526	LF	$8.97	$4,715
	Subtotal				**$25,385**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[4]	3,348	CY	$2.12	$7,110
6.2	Haul RW/Soil to Stockpile Area[5]	4,018	CY	$4.00	$16,073
6.3	Perimeter Air Sampling	75	EA	$243.76	$18,364
6.4	Equipment Decontamination	167	HR	$54.56	$9,135
6.5	Stockpile Management	4,018	CY	$1.44	$5,774
6.6	Stockpile Characterization[6]	9	EA	$1,535.00	$13,815
	Subtotal				**$70,271**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	3,333	CY	$2.44	$8,140
7.2	Transport RW to in-town consolidation[8]	3,000	CY	$5.52	$16,570
7.3	Equipment Decontamination	167	HR	$54.56	$9,135
7.4	Out-of-Town Transportation of RW[8, 9]	500	TON	$170.00	$85,000
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[8, 9]	500	TON	$192.00	$96,000
	Subtotal				**$214,845**

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
DPW (AOC) 2 AND 251 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	616	CY	$2.40	$1,480
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	370	ECY	$9.35	$3,463
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	10,000	SF	$2.27	$22,700
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	2,419	CY	$11.83	$28,614
8.14	Install Nonwoven Geotextile Fabric	1,111	SY	$2.21	$2,456
	Subtotal				**$84,640**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$464,244**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$27,855
10.2	Engineering and Design (12%)				$55,709
10.3	Construction management (8%)				$37,140
10.4	Location Adjustment (9%)				$41,782
10.5	Contingency (15%)				$69,637
TOTAL OTHER COSTS					**$232,122**
TOTAL CAPITAL COST FOR ALTERNATIVE 5					**$696,366**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the DPW Lot (AOC 2) and 251 East Main St Property Group.

[2] Excavation to water table at this property will achieve complete excavation of RW and will not require transactional fees due to deed management.

[3] Assume fencing and signage to be temporary and required during construction activities for site security only.

[4] Represents in situ estimate of RW to excavated to a depth of 7.5-ft below ground surface and additional soil that would be required to be removed to facilitate compliance with safety standards for benching/sloping.

[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[8] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[9] A conversion factor of 1.5 was used to convert CY to TON.

[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; pending PHC analysis, additionally excavated soil may be re-used onsite and was included in the estimate for asphalt base.

[11] No floodplains or wetlands would be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
ALTERNATIGE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
DPW (AOC) 2 AND 251 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	20	HR	$110	$2,200	see cost assumptions
OM.1.3	Sampling Labor - Sampler	10	HR	$90	$900	see cost assumptions
OM.1.4	Analytical Costs	5	EA	$697	$3,486	see cost assumptions
OM.1.5	Data Validation	5	HR	$110	$550	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$10,408**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)[2]						
OM.2.1	Inspection	0	HR	$110.00	$0	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation	0	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	0	LS	$2,250.00	$0	see cost assumptions
OM.2.8	Contractor mobilizations	0	EA	$321.75	$0	see cost assumptions
	Subtotal				**$0**	
OM.3.0 Deed Restrictions[2]						
OM.3.1	Inspection (annual)	0	LS	$300.00	$0	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	0	EA	$4,000	$0	see cost assumptions
	Subtotal				**$0**	
ANNUAL O&M COST (YEARS 1-2)[3]					**$41,633**	
ANNUAL O&M COST (YEARS 3-30)[4]					**$0**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the DPW Lot (AOC 2) and 251 East Main Street Property Group.

[2] Assume deed restrictions and O&M for ground surfaces would not be required following complete excavation of Raymark waste.

[3] O&M for Years 1 and 2 include quarterly groundwater monitoring with annual reporting.

[4] O&M for Years 3 - 30 will not be required pending analytical data and concurrence from the State following the first 2 years of groundwater data collection.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
DPW (AOC) 2 AND 251 EAST MAIN ST
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$2,525,818	$0	$0	$2,525,818	7.0%	$2,525,818
1	$0	$41,633	$0	$41,633	7.0%	$38,909
2	$0	$41,633	$0	$41,633	7.0%	$36,364
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$2,525,818**	**$83,265**	**$0**	**$2,609,084**		**$2,601,091**
					PV O&M	**$75,273**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
DPW (AOC) 2 AND 251 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0	**Fencing and Signage[3]**				
3.1	Chain Link Fence	526	LF	$27.57	$14,497
3.2	Signage	6	EA	$73.95	$444
	Subtotal				**$14,941**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	3	MONTH	$4,531	$13,593
	Subtotal				**$43,044**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	526	LF	$8.97	$4,715
	Subtotal				**$25,385**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
6.1	Excavate and Load RW/Soil[4]	3,348	CY	$2.12	$7,110
6.2	Haul RW/Soil to Stockpile Area[5]	4,018	CY	$4.00	$16,073
6.3	Perimeter Air Sampling	75	EA	$243.76	$18,364
6.4	Equipment Decontamination	167	HR	$54.56	$9,135
6.5	Stockpile Management	4,018	CY	$1.44	$5,774
6.6	Stockpile Characterization[6]	2	EA	$1,535.00	$3,070
	Subtotal				**$59,526**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks[7]	3,333	CY	$2.44	$8,140
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	167	HR	$54.56	$9,135
7.4	Out-of-Town Transportation of RW[8]	5,000	TON	$170.00	$850,000
7.5	Out-of-Town Disposal of RW (no treatment)[8, 9]	4,500	TON	$107.10	$481,950
7.6	Out-of-Town Disposal of RW (treatment)[8, 9]	500	TON	$192.00	$96,000
	Subtotal				**$1,445,225**

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
DPW (AOC) 2 AND 251 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	616	CY	$2.40	$1,480
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	370	ECY	$9.35	$3,463
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	10000	SF	$2.27	$22,700
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	2419	CY	$11.83	$28,614
8.14	Install Nonwoven Geotextile Fabric	1111	SY	$2.21	$2,456
	Subtotal				**$84,640**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$1,683,879**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$101,033
10.2	Engineering and Design (12%)				$202,065
10.3	Construction management (8%)				$134,710
10.4	Location Adjustment (9%)				$151,549
10.5	Contingency (15%)				$252,582
TOTAL OTHER COSTS					**$841,939**
TOTAL CAPITAL COST FOR ALTERNATIVE 6					**$2,525,818**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the DPW Lot (AOC 2) and 251 East Main St Property Group.

[2] Excavation to water table at this property will achieve complete excavation of RW and will not require transactional fees due to deed management.

[3] Assume fencing and signage to be temporary and required during construction activities for site security only.

[4] Represents in situ estimate of RW to excavated to a depth of 7.5-ft below ground surface and additional soil that would be required to be removed to facilitate compliance with safety standards for benching/sloping.

[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[8] A conversion factor of 1.5 was used to convert CY to TON.

[9] Volume of RW for disposal assumes that 10% would be hazardous and require treatment prior to disposal.

[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; pending PHC analysis, additionally excavated soil may be re-used onsite and was included in the estimate for asphalt base.

[11] No floodplains or wetlands would be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavati
Cost for demolition and disposal of existing structures (if required) has not been include

PRESENT VALUE ANALYSIS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
DPW (AOC) 2 AND 251 EAST MAIN ST
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$414,367	$0	0	$414,367	7.0%	$414,367
1	$0	$69,411	$0	$69,411	7.0%	$64,870
2	$0	$69,411	$0	$69,411	7.0%	$60,626
3	$0	$38,186	$0	$38,186	7.0%	$31,171
4	$0	$38,186	$0	$38,186	7.0%	$29,132
5	$0	$38,186	$15,000	$53,186	7.0%	$37,921
6	$0	$38,186	$0	$38,186	7.0%	$25,445
7	$0	$38,186	$0	$38,186	7.0%	$23,780
8	$0	$38,186	$0	$38,186	7.0%	$22,225
9	$0	$38,186	$0	$38,186	7.0%	$20,771
10	$0	$38,186	$15,000	$53,186	7.0%	$27,037
11	$0	$38,186	$0	$38,186	7.0%	$18,142
12	$0	$38,186	$0	$38,186	7.0%	$16,955
13	$0	$38,186	$0	$38,186	7.0%	$15,846
14	$0	$38,186	$0	$38,186	7.0%	$14,809
15	$0	$38,186	$15,000	$53,186	7.0%	$19,277
16	$0	$38,186	$0	$38,186	7.0%	$12,935
17	$0	$38,186	$0	$38,186	7.0%	$12,089
18	$0	$38,186	$0	$38,186	7.0%	$11,298
19	$0	$38,186	$0	$38,186	7.0%	$10,559
20	$0	$38,186	$15,000	$53,186	7.0%	$13,744
21	$0	$38,186	$0	$38,186	7.0%	$9,222
22	$0	$38,186	$0	$38,186	7.0%	$8,619
23	$0	$38,186	$0	$38,186	7.0%	$8,055
24	$0	$38,186	$0	$38,186	7.0%	$7,528
25	$0	$38,186	$15,000	$53,186	7.0%	$9,800
26	$0	$38,186	$0	$38,186	7.0%	$6,575
27	$0	$38,186	$0	$38,186	7.0%	$6,145
28	$0	$38,186	$0	$38,186	7.0%	$5,743
29	$0	$38,186	$0	$38,186	7.0%	$5,368
30	$0	$38,186	$15,000	$53,186	7.0%	$6,987
TOTAL	**$414,367**	**$1,208,035**	**$90,000**	**$1,712,402**		**$977,043**
					PV O&M	**$562,676**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
DPW (AOC) 2 AND 251 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	2	LS	$22,655	$45,309
	Subtotal				**$45,309**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	526	LF	$27.57	$14,497
3.2	Signage	6	EA	$73.95	$444
	Subtotal				**$14,941**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	2	MONTH	$4,531	$9,062
	Subtotal				**$38,513**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	526	LF	$8.97	$4,715
	Subtotal				**$25,385**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	741	CY	$2.12	$1,573
6.2	Haul RW to Stockpile Area[4]	889	CY	$4.00	$3,556
6.3	Perimeter Air Sampling	17	EA	$243.76	$4,063
6.4	Equipment Decontamination	37	HR	$54.56	$2,021
6.5	Stockpile Management	889	CY	$1.44	$1,277
6.6	Stockpile Characterization[5]	2	EA	$1,535.00	$3,070
	Subtotal				**$15,560**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	889	CY	$2.44	$2,171
7.2	Transport RW to in-town consolidation[7]	800	CY	$5.52	$4,419
7.3	Equipment Decontamination	37	HR	$54.56	$2,021
7.4	Out-of-Town Transportation of Waste[7, 8]	133	TON	$170.00	$22,667
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	133	TON	$192.00	$25,600
	Subtotal				**$56,877**

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
DPW (AOC) 2 AND 251 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[9]	10,000	SF	$1.29	$12,900
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	370	ECY	$9.35	$3,463
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	10,000	SF	$2.27	$22,700
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	93	CY	$11.83	$1,095
8.14	Install Nonwoven Geotextile Fabric	1,111	SY	$2.21	$2,456
	Subtotal				**$68,542**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$276,245**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$16,575
10.2	Engineering and Design (12%)				$33,149
10.3	Construction management (8%)				$22,100
10.4	Location Adjustment (9%)				$24,862
10.5	Contingency (15%)				$41,437
TOTAL OTHER COSTS					**$138,122**
TOTAL CAPITAL COST FOR ALTERNATIVE 7					**$414,367**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the DPW Lot (AOC 2) and 251 East Main St Property Group.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 2 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal.
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement.
[11] No floodplains or wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
DPW (AOC) 2 AND 251 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	20	HR	$110	$2,200	see cost assumptions
OM.1.3	Sampling Labor - Sampler	10	HR	$90	$900	see cost assumptions
OM.1.4	Analytical Costs	5	EA	$697	$3,486	see cost assumptions
OM.1.5	Data Validation	5	HR	$110	$550	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$10,408**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	500	SF	$1.81	$906	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	1	EA	$321.75	$322	see cost assumptions
	Subtotal				**$16,678**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	2	EA	$5,000.00	$10,000	see cost assumptions
	Subtotal				**$11,100**	
ANNUAL O&M COST (YEARS 1-2)[4]					**$69,411**	
ANNUAL O&M COST (YEARS 3-30)[5]					**$38,186**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the DPW Lot (AOC 2) and 251 East Main St Property Group.

[2] Assumed that there is no RW located below vegetated surfaces at this property group.

[3] Assumed 5% of asphalt surfaces will require repair annually.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
DPW (AOC) 2 AND 251 EAST MAIN ST
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$901,914	$0	0	$901,914	7.0%	$901,914
1	$0	$69,411	$0	$69,411	7.0%	$64,870
2	$0	$69,411	$0	$69,411	7.0%	$60,626
3	$0	$38,186	$0	$38,186	7.0%	$31,171
4	$0	$38,186	$0	$38,186	7.0%	$29,132
5	$0	$38,186	$15,000	$53,186	7.0%	$37,921
6	$0	$38,186	$0	$38,186	7.0%	$25,445
7	$0	$38,186	$0	$38,186	7.0%	$23,780
8	$0	$38,186	$0	$38,186	7.0%	$22,225
9	$0	$38,186	$0	$38,186	7.0%	$20,771
10	$0	$38,186	$15,000	$53,186	7.0%	$27,037
11	$0	$38,186	$0	$38,186	7.0%	$18,142
12	$0	$38,186	$0	$38,186	7.0%	$16,955
13	$0	$38,186	$0	$38,186	7.0%	$15,846
14	$0	$38,186	$0	$38,186	7.0%	$14,809
15	$0	$38,186	$15,000	$53,186	7.0%	$19,277
16	$0	$38,186	$0	$38,186	7.0%	$12,935
17	$0	$38,186	$0	$38,186	7.0%	$12,089
18	$0	$38,186	$0	$38,186	7.0%	$11,298
19	$0	$38,186	$0	$38,186	7.0%	$10,559
20	$0	$38,186	$15,000	$53,186	7.0%	$13,744
21	$0	$38,186	$0	$38,186	7.0%	$9,222
22	$0	$38,186	$0	$38,186	7.0%	$8,619
23	$0	$38,186	$0	$38,186	7.0%	$8,055
24	$0	$38,186	$0	$38,186	7.0%	$7,528
25	$0	$38,186	$15,000	$53,186	7.0%	$9,800
26	$0	$38,186	$0	$38,186	7.0%	$6,575
27	$0	$38,186	$0	$38,186	7.0%	$6,145
28	$0	$38,186	$0	$38,186	7.0%	$5,743
29	$0	$38,186	$0	$38,186	7.0%	$5,368
30	$0	$38,186	$15,000	$53,186	7.0%	$6,987
TOTAL	**$901,914**	**$1,208,035**	**$90,000**	**$2,199,949**		**$1,464,590**
					PV O&M	**$562,676**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
DPW (AOC) 2 AND 251 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	2	LS	$22,655	$45,309
	Subtotal				**$45,309**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	526	LF	$27.57	$14,497
3.2	Signage	6	EA	$73.95	$444
	Subtotal				**$14,941**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	2	MONTH	$4,531	$9,062
	Subtotal				**$38,513**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	526	LF	$8.97	$4,715
	Subtotal				**$25,385**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	741	CY	$2.12	$1,573
6.2	Haul RW to Stockpile Area[4]	889	CY	$4.00	$3,556
6.3	Perimeter Air Sampling	17	EA	$243.76	$4,063
6.4	Equipment Decontamination	37	HR	$54.56	$2,021
6.5	Stockpile Management	889	CY	$1.44	$1,277
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$12,490**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[5]	889	CY	$2.44	$2,171
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	37	HR	$54.56	$2,021
7.4	Out-of-Town Transportation of Waste[6]	1,333	TON	$170.00	$226,667
7.5	Out-of-Town Disposal of RW (no treatment)[6, 7]	1,200	TON	$107.10	$128,520
7.6	Out-of-Town Disposal of RW (treatment)[6, 7]	133	TON	$192.00	$25,600
	Subtotal				**$384,978**

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
DPW (AOC) 2 AND 251 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	10,000	SF	$1.29	$12,900
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	370	ECY	$9.35	$3,463
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	10,000	SF	$2.27	$22,700
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	93	CY	$11.83	$1,095
8.14	Install Nonwoven Geotextile Fabric	1,111	SY	$2.21	$2,456
	Subtotal				**$68,542**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$601,276**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$36,077
10.2	Engineering and Design (12%)				$72,153
10.3	Construction management (8%)				$48,102
10.4	Location Adjustment (9%)				$54,115
10.5	Contingency (15%)				$90,191
TOTAL OTHER COSTS					**$300,638**
TOTAL CAPITAL COST FOR ALTERNATIVE 8					**$901,914**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the DPW Lot (AOC 2) and 251 East Main St Property Group.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 2 ft below ground surface.
[4] Volume for hauling RW to the stockpile area for characterization includes a bulking factor of 1.2.
[5] Volume includes all RW intended for disposal.
[6] A conversion factor of 1.5 was used to convert CY to TON.
[7] Volume of RW for Out-of-Town disposal assumes that 10% would be hazardous requiring treatment prior to disposal.
[8] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement.
[10] No floodplains or wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

PRESENT VALUE ANALYSIS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
DPW (AOC) 2 AND 251 EAST MAIN ST
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$538,796	$0	0	$538,796	7.0%	$538,796
1	$0	$69,411	$0	$69,411	7.0%	$64,870
2	$0	$69,411	$0	$69,411	7.0%	$60,626
3	$0	$38,186	$0	$38,186	7.0%	$31,171
4	$0	$38,186	$0	$38,186	7.0%	$29,132
5	$0	$38,186	$15,000	$53,186	7.0%	$37,921
6	$0	$38,186	$0	$38,186	7.0%	$25,445
7	$0	$38,186	$0	$38,186	7.0%	$23,780
8	$0	$38,186	$0	$38,186	7.0%	$22,225
9	$0	$38,186	$0	$38,186	7.0%	$20,771
10	$0	$38,186	$15,000	$53,186	7.0%	$27,037
11	$0	$38,186	$0	$38,186	7.0%	$18,142
12	$0	$38,186	$0	$38,186	7.0%	$16,955
13	$0	$38,186	$0	$38,186	7.0%	$15,846
14	$0	$38,186	$0	$38,186	7.0%	$14,809
15	$0	$38,186	$15,000	$53,186	7.0%	$19,277
16	$0	$38,186	$0	$38,186	7.0%	$12,935
17	$0	$38,186	$0	$38,186	7.0%	$12,089
18	$0	$38,186	$0	$38,186	7.0%	$11,298
19	$0	$38,186	$0	$38,186	7.0%	$10,559
20	$0	$38,186	$15,000	$53,186	7.0%	$13,744
21	$0	$38,186	$0	$38,186	7.0%	$9,222
22	$0	$38,186	$0	$38,186	7.0%	$8,619
23	$0	$38,186	$0	$38,186	7.0%	$8,055
24	$0	$38,186	$0	$38,186	7.0%	$7,528
25	$0	$38,186	$15,000	$53,186	7.0%	$9,800
26	$0	$38,186	$0	$38,186	7.0%	$6,575
27	$0	$38,186	$0	$38,186	7.0%	$6,145
28	$0	$38,186	$0	$38,186	7.0%	$5,743
29	$0	$38,186	$0	$38,186	7.0%	$5,368
30	$0	$38,186	$15,000	$53,186	7.0%	$6,987
TOTAL	**$538,796**	**$1,208,035**	**$90,000**	**$1,836,831**		**$1,101,472**
					PV O&M	**$562,676**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
DPW (AOC) 2 AND 251 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	2	LS	$22,655	$45,309
	Subtotal				**$45,309**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	526	LF	$27.57	$14,497
3.2	Signage	6	EA	$73.95	$444
	Subtotal				**$14,941**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	2	MONTH	$4,531	$9,062
	Subtotal				**$38,513**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	526	LF	$8.97	$4,715
	Subtotal				**$25,385**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	1,481	CY	$2.12	$3,146
6.2	Haul RW to Stockpile Area[4]	1,778	CY	$4.00	$7,112
6.3	Perimeter Air Sampling	33	EA	$243.76	$8,126
6.4	Equipment Decontamination	74	HR	$54.56	$4,042
6.5	Stockpile Management	1,778	CY	$1.44	$2,555
6.6	Stockpile Characterization[5]	4	EA	$1,535.00	$6,140
	Subtotal				**$31,121**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	1,778	CY	$2.44	$4,342
7.2	Transport RW to in-town consolidation[7]	1,600	CY	$5.52	$8,837
7.3	Equipment Decontamination	74	HR	$54.56	$4,042
7.4	Out-of-Town Transportation of Waste[7, 8]	267	TON	$170.00	$45,333
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	267	TON	$192.00	$51,200
	Subtotal				**$113,754**

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
DPW (AOC) 2 AND 251 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[9]	10,000	SF	$1.29	$12,900
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	370	ECY	$9.35	$3,463
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	10000	SF	$2.27	$22,700
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	981	CY	$11.83	$11,611
8.14	Install Nonwoven Geotextile Fabric	1,111	SY	$2.21	$2,456
	Subtotal				**$79,057**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$359,197**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$21,552
10.2	Engineering and Design (12%)				$43,104
10.3	Construction management (8%)				$28,736
10.4	Location Adjustment (9%)				$32,328
10.5	Contingency (15%)				$53,880
TOTAL OTHER COSTS					**$179,599**
TOTAL CAPITAL COST FOR ALTERNATIVE 9					**$538,796**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the DPW Lot (AOC 2) and 251 East Main St Property Group.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal.
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement.
[11] No floodplains or wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.

PRESENT VALUE ANALYSIS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
DPW (AOC) 2 AND 251 EAST MAIN ST
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$1,513,890	$0	0	$1,513,890	7.0%	$1,513,890
1	$0	$69,411	$0	$69,411	7.0%	$64,870
2	$0	$69,411	$0	$69,411	7.0%	$60,626
3	$0	$38,186	$0	$38,186	7.0%	$31,171
4	$0	$38,186	$0	$38,186	7.0%	$29,132
5	$0	$38,186	$15,000	$53,186	7.0%	$37,921
6	$0	$38,186	$0	$38,186	7.0%	$25,445
7	$0	$38,186	$0	$38,186	7.0%	$23,780
8	$0	$38,186	$0	$38,186	7.0%	$22,225
9	$0	$38,186	$0	$38,186	7.0%	$20,771
10	$0	$38,186	$15,000	$53,186	7.0%	$27,037
11	$0	$38,186	$0	$38,186	7.0%	$18,142
12	$0	$38,186	$0	$38,186	7.0%	$16,955
13	$0	$38,186	$0	$38,186	7.0%	$15,846
14	$0	$38,186	$0	$38,186	7.0%	$14,809
15	$0	$38,186	$15,000	$53,186	7.0%	$19,277
16	$0	$38,186	$0	$38,186	7.0%	$12,935
17	$0	$38,186	$0	$38,186	7.0%	$12,089
18	$0	$38,186	$0	$38,186	7.0%	$11,298
19	$0	$38,186	$0	$38,186	7.0%	$10,559
20	$0	$38,186	$15,000	$53,186	7.0%	$13,744
21	$0	$38,186	$0	$38,186	7.0%	$9,222
22	$0	$38,186	$0	$38,186	7.0%	$8,619
23	$0	$38,186	$0	$38,186	7.0%	$8,055
24	$0	$38,186	$0	$38,186	7.0%	$7,528
25	$0	$38,186	$15,000	$53,186	7.0%	$9,800
26	$0	$38,186	$0	$38,186	7.0%	$6,575
27	$0	$38,186	$0	$38,186	7.0%	$6,145
28	$0	$38,186	$0	$38,186	7.0%	$5,743
29	$0	$38,186	$0	$38,186	7.0%	$5,368
30	$0	$38,186	$15,000	$53,186	7.0%	$6,987
TOTAL	**$1,513,890**	**$1,208,035**	**$90,000**	**$2,811,925**		**$2,076,566**
					PV O&M	**$562,676**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
DPW (AOC) 2 AND 251 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	2	LS	$22,655	$45,309
	Subtotal				**$45,309**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	526	LF	$27.57	$14,497
3.2	Signage	6	EA	$73.95	$444
	Subtotal				**$14,941**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	2	MONTH	$4,531	$9,062
	Subtotal				**$38,513**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	526	LF	$8.97	$4,715
	Subtotal				**$25,385**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	1,481	CY	$2.12	$3,146
6.2	Haul RW to Stockpile Area[4]	1,778	CY	$4.00	$7,112
6.3	Perimeter Air Sampling	33	EA	$243.76	$8,126
6.4	Equipment Decontamination	74	HR	$54.56	$4,042
6.5	Stockpile Management	1,778	CY	$1.44	$2,555
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$24,981**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[5]	1,778	CY	$2.44	$4,342
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	74	HR	$54.56	$4,042
7.4	Out-of-Town Transportation of Waste[6]	2,667	TON	$170.00	$453,333
7.5	Out-of-Town Disposal of RW (no treatment)[6, 7]	2,400	TON	$107.10	$257,040
7.6	Out-of-Town Disposal of RW (treatment)[6, 7]	267	TON	$192.00	$51,200
	Subtotal				**$769,957**

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
DPW (AOC) 2 AND 251 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	10,000	SF	$1.29	$12,900
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	370	ECY	$9.35	$3,463
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	10,000	SF	$2.27	$22,700
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	981	CY	$11.83	$11,611
8.14	Install Nonwoven Geotextile Fabric	1,111	SY	$2.21	$2,456
	Subtotal				**$79,057**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$1,009,260**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$60,556
10.2	Engineering and Design (12%)				$121,111
10.3	Construction management (8%)				$80,741
10.4	Location Adjustment (9%)				$90,833
10.5	Contingency (15%)				$151,389
TOTAL OTHER COSTS					**$504,630**
TOTAL CAPITAL COST FOR ALTERNATIVE 10					**$1,513,890**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the DPW Lot (AOC 2) and 251 East Main St Property Group.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area for characterization includes a bulking factor of 1.2.
[5] Volume includes all RW intended for disposal.
[6] A conversion factor of 1.5 was used to convert CY to TON.
[7] Volume of RW for Out-of-Town disposal assumes that 10% would be hazardous requiring treatment prior to disposal.
[8] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement.
[10] No floodplains or wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation
Cost for demolition and disposal of existing structures (if required) has not been included

G-13

BEACON POINT AREA OF CONCERN 1

COST ESTIMATE BACKUP SHEETS

PRESENT VALUE ANALYSIS
ALTERNATIVE 1 - NO ACTION
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$10,000	$10,000	7.0%	$7,130
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$10,000	$10,000	7.0%	$5,083
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$10,000	$10,000	7.0%	$3,624
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$10,000	$10,000	7.0%	$2,584
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$10,000	$10,000	7.0%	$1,842
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$10,000	$10,000	7.0%	$1,314
TOTAL	**$0**	**$0**	**$60,000**	**$60,000**		**$21,578**
					PV O&M	**$21,578**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review [1]	Total	Discount Rate[2]	Present Value
0	$50,758	$0	$0	$50,758	7.0%	$50,758
1	$0	$60,681	$0	$60,681	7.0%	$56,711
2	$0	$60,681	$0	$60,681	7.0%	$53,001
3	$0	$33,738	$0	$33,738	7.0%	$27,540
4	$0	$33,738	$0	$33,738	7.0%	$25,739
5	$0	$33,738	$10,000	$43,738	7.0%	$31,185
6	$0	$33,738	$0	$33,738	7.0%	$22,481
7	$0	$33,738	$0	$33,738	7.0%	$21,010
8	$0	$33,738	$0	$33,738	7.0%	$19,636
9	$0	$33,738	$0	$33,738	7.0%	$18,351
10	$0	$33,738	$10,000	$43,738	7.0%	$22,234
11	$0	$33,738	$0	$33,738	7.0%	$16,029
12	$0	$33,738	$0	$33,738	7.0%	$14,980
13	$0	$33,738	$0	$33,738	7.0%	$14,000
14	$0	$33,738	$0	$33,738	7.0%	$13,084
15	$0	$33,738	$10,000	$43,738	7.0%	$15,853
16	$0	$33,738	$0	$33,738	7.0%	$11,428
17	$0	$33,738	$0	$33,738	7.0%	$10,681
18	$0	$33,738	$0	$33,738	7.0%	$9,982
19	$0	$33,738	$0	$33,738	7.0%	$9,329
20	$0	$33,738	$10,000	$43,738	7.0%	$11,303
21	$0	$33,738	$0	$33,738	7.0%	$8,148
22	$0	$33,738	$0	$33,738	7.0%	$7,615
23	$0	$33,738	$0	$33,738	7.0%	$7,117
24	$0	$33,738	$0	$33,738	7.0%	$6,651
25	$0	$33,738	$10,000	$43,738	7.0%	$8,059
26	$0	$33,738	$0	$33,738	7.0%	$5,810
27	$0	$33,738	$0	$33,738	7.0%	$5,429
28	$0	$33,738	$0	$33,738	7.0%	$5,074
29	$0	$33,738	$0	$33,738	7.0%	$4,742
30	$0	$33,738	$10,000	$43,738	7.0%	$5,746
TOTAL	**$50,758**	**$1,066,030**	**$60,000**	**$1,176,788**		**$539,708**
					PV O&M	**$488,950**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage					
3.1	Chain Link Fence	600	LF	$27.57	$16,542
3.2	Signage	6	EA	$73.95	$444
	Subtotal				**$16,986**
TOTAL DIRECT COSTS					**$50,758**
TOTAL CAPITAL COST FOR ALTERNATIVE 2					**$50,758**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Beacon Point AOC 1 Property.

PVC = polyvinyl chloride
IDW = investigation derived waste
LS = lump sum
HR = hour
EA = each
LF = linear foot

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.03	MSF	$56.31	$2	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	130	SF	$1.81	$236	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	20	LF	$27.57	$551	see cost assumptions
OM 2.6	Sign Replacement[5]	24	EA	$73.95	$1,775	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	2	EA	$321.75	$644	see cost assumptions
	Subtotal				**$18,657**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$60,681**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$33,738**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Beacon Point AOC 1 Property.

[2] Assumed that 1% of vegetated surfaces would require repair annually (need for repair to be established during 5-Year Reviews).

[3] Estimated 5% of asphalt surfaces will require repair annually (need for repair to be established during 5-Year Reviews).

[4] Estimated that 100% of fencing would require replacement over the period of O&M (need for repair to be established during 5-Year Reviews).

[5] Estimated that signage would require replacement 4 times over the period of O&M (need for repair to be established during 5-Year Reviews).

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$551,582	$0	$0	$551,582	7.0%	$551,582
1	$0	$59,186	$0	$59,186	7.0%	$55,314
2	$0	$59,186	$0	$59,186	7.0%	$51,695
3	$0	$32,243	$0	$32,243	7.0%	$26,320
4	$0	$32,243	$0	$32,243	7.0%	$24,598
5	$0	$32,243	$10,000	$42,243	7.0%	$30,118
6	$0	$32,243	$0	$32,243	7.0%	$21,485
7	$0	$32,243	$0	$32,243	7.0%	$20,079
8	$0	$32,243	$0	$32,243	7.0%	$18,765
9	$0	$32,243	$0	$32,243	7.0%	$17,538
10	$0	$32,243	$10,000	$42,243	7.0%	$21,474
11	$0	$32,243	$0	$32,243	7.0%	$15,318
12	$0	$32,243	$0	$32,243	7.0%	$14,316
13	$0	$32,243	$0	$32,243	7.0%	$13,380
14	$0	$32,243	$0	$32,243	7.0%	$12,504
15	$0	$32,243	$10,000	$42,243	7.0%	$15,311
16	$0	$32,243	$0	$32,243	7.0%	$10,922
17	$0	$32,243	$0	$32,243	7.0%	$10,207
18	$0	$32,243	$0	$32,243	7.0%	$9,539
19	$0	$32,243	$0	$32,243	7.0%	$8,915
20	$0	$32,243	$10,000	$42,243	7.0%	$10,916
21	$0	$32,243	$0	$32,243	7.0%	$7,787
22	$0	$32,243	$0	$32,243	7.0%	$7,278
23	$0	$32,243	$0	$32,243	7.0%	$6,801
24	$0	$32,243	$0	$32,243	7.0%	$6,357
25	$0	$32,243	$10,000	$42,243	7.0%	$7,783
26	$0	$32,243	$0	$32,243	7.0%	$5,552
27	$0	$32,243	$0	$32,243	7.0%	$5,189
28	$0	$32,243	$0	$32,243	7.0%	$4,849
29	$0	$32,243	$0	$32,243	7.0%	$4,532
30	$0	$32,243	$10,000	$42,243	7.0%	$5,549
TOTAL	**$551,582**	**$1,021,164**	**$60,000**	**$1,632,747**		**$1,021,974**
					PV O&M	**$470,392**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	600	LF	$27.57	$16,542
3.2	Signage	6	EA	$73.95	$444
	Subtotal				**$16,986**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	2	MONTH	$4,531	$9,062
	Subtotal				**$38,513**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	600	LF	$8.97	$5,380
	Subtotal				**$26,051**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil[3]	1,619	CY	$2.12	$3,437
6.2	Haul RW/Soil to Stockpile Area[4]	1,942	CY	$4.00	$7,770
6.3	Perimeter Air Sampling	36	EA	$243.76	$8,877
6.4	Equipment Decontamination	81	HR	$54.56	$4,416
6.5	Stockpile Management	1,942	CY	$1.44	$2,791
6.6	Stockpile Characterization[5]	4	EA	$1,535.00	$6,140
	Subtotal				**$33,431**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	702	CY	$2.44	$1,715
7.2	Transport RW to in-town consolidation[7]	632	CY	$5.52	$3,491
7.3	Equipment Decontamination	81	HR	$54.56	$4,416
7.4	Out-of-Town Transportation of Waste[7, 8]	105	TON	$170.00	$17,907
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)[7, 8]	105	TON	$192.00	$20,224
	Subtotal				**$47,752**

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[9]	1,054	CY	$2.40	$2,532
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[9]	306	CY	$27.00	$8,249
8.3	Install Geosynthetic Clay Liner (bottom layer)	15,000	SF	$2.86	$42,937
8.4	Install 60 mil HDPE liner	15,000	SF	$2.84	$42,628
8.5	Install Geosynthetic Drainage Layer	15,000	SF	$0.65	$9,810
8.6	Furnish, Spread, and Compact Soil Layer (24")[9]	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	15,000	SF	$1.29	$19,350
8.8	Furnish, Place, and Spread Topsoil (6")[9]	253	CY	$34.65	$8,752
8.9	Hydroseeding with Mulch and Fertilizer	12	MSF	$43.97	$545
8.10	Place, Spread, and Compact Asphalt Base Course (12")	96	ECY	$9.35	$900
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2,600	SF	$2.27	$5,902
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	1,667	SY	$2.21	$3,683
	Subtotal				**$171,217**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$367,722**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$22,063
10.2	Engineering and Design (12%)				$44,127
10.3	Construction management (8%)				$29,418
10.4	Location Adjustment (9%)				$33,095
10.5	Contingency (15%)				$55,158
TOTAL OTHER COSTS					**$183,861**
TOTAL CAPITAL COST FOR ALTERNATIVE 3					**$551,582**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Beacon Point AOC 1 Property.

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to excavated to a depth of 2.5- or 3-ft below ground surface and additional soil that requires excavation to faciliate cap construction.

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less additionally excavated soil).

[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[8] A conversion factor of 1.5 was used to convert CY to TON.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates for construction of the 24-inch protective barrier.

[10] Impacts to floodplains will be evaluated during Remedial Design and will require compensation via backfill material selection to ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	25	MSF	$7.34	$182	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.12	MSF	$56.31	$7	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	130	SF	$1.81	$236	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	4	EA	$321.75	$1,287	see cost assumptions
	Subtotal				**$17,162**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$59,186**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$32,243**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Beacon Point AOC 1 Property.

[2] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[3] Assumed 5% of asphalt surfaces will require repair annually.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$938,080	$0	0	$938,080	7.0%	$938,080
1	$0	$59,186	$0	$59,186	7.0%	$55,314
2	$0	$59,186	$0	$59,186	7.0%	$51,695
3	$0	$32,243	$0	$32,243	7.0%	$26,320
4	$0	$32,243	$0	$32,243	7.0%	$24,598
5	$0	$32,243	$10,000	$42,243	7.0%	$30,118
6	$0	$32,243	$0	$32,243	7.0%	$21,485
7	$0	$32,243	$0	$32,243	7.0%	$20,079
8	$0	$32,243	$0	$32,243	7.0%	$18,765
9	$0	$32,243	$0	$32,243	7.0%	$17,538
10	$0	$32,243	$10,000	$42,243	7.0%	$21,474
11	$0	$32,243	$0	$32,243	7.0%	$15,318
12	$0	$32,243	$0	$32,243	7.0%	$14,316
13	$0	$32,243	$0	$32,243	7.0%	$13,380
14	$0	$32,243	$0	$32,243	7.0%	$12,504
15	$0	$32,243	$10,000	$42,243	7.0%	$15,311
16	$0	$32,243	$0	$32,243	7.0%	$10,922
17	$0	$32,243	$0	$32,243	7.0%	$10,207
18	$0	$32,243	$0	$32,243	7.0%	$9,539
19	$0	$32,243	$0	$32,243	7.0%	$8,915
20	$0	$32,243	$10,000	$42,243	7.0%	$10,916
21	$0	$32,243	$0	$32,243	7.0%	$7,787
22	$0	$32,243	$0	$32,243	7.0%	$7,278
23	$0	$32,243	$0	$32,243	7.0%	$6,801
24	$0	$32,243	$0	$32,243	7.0%	$6,357
25	$0	$32,243	$10,000	$42,243	7.0%	$7,783
26	$0	$32,243	$0	$32,243	7.0%	$5,552
27	$0	$32,243	$0	$32,243	7.0%	$5,189
28	$0	$32,243	$0	$32,243	7.0%	$4,849
29	$0	$32,243	$0	$32,243	7.0%	$4,532
30	$0	$32,243	$10,000	$42,243	7.0%	$5,549
TOTAL	**$938,080**	**$1,021,164**	**$60,000**	**$2,019,244**		**$1,408,471**
					PV O&M	**$470,392**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	600	LF	$27.57	$16,542
3.2	Signage	6	EA	$73.95	$444
	Subtotal				**$16,986**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	2	MONTH	$4,531	$9,062
	Subtotal				**$38,513**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	600	LF	$8.97	$5,380
	Subtotal				**$26,051**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil[3]	1,619	CY	$2.12	$3,437
6.2	Haul RW/Soil to Stockpile Area[4]	1,942	CY	$4.00	$7,770
6.3	Perimeter Air Sampling	36	EA	$243.76	$8,877
6.4	Equipment Decontamination	81	HR	$54.56	$4,416
6.5	Stockpile Management	1,942	CY	$1.44	$2,791
6.6	Stockpile Characterization[5]	3	EA	$1,535.00	$4,605
	Subtotal				**$31,896**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load Raymark Waste into Trucks[6]	702	CY	$2.44	$1,715
7.2	Transport Raymark Waste to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	81	HR	$54.56	$4,416
7.4	Out-of-Town Transportation of Waste[7]	1,053	TON	$170.00	$179,067
7.5	Out-of-Town Disposal of Waste (no treatment)[7, 8]	948	TON	$107.10	$101,531
7.6	Out-of-Town Treatment of Raymark Waste[7, 8]	105	TON	$192.00	$20,224
	Subtotal				**$306,952**

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[9]	1,054	CY	$2.40	$2,532
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[9]	306	CY	$27.00	$8,249
8.3	Install Geosynthetic Clay Liner (bottom layer)	15,000	SF	$2.86	$42,937
8.4	Install 60 mil HDPE liner	15,000	SF	$2.84	$42,628
8.5	Install Geosynthetic Drainage Layer	15,000	SF	$0.65	$9,810
8.6	Furnish, Spread, and Compact Soil Layer (24")[9]	0	SF	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	15,000	CY	$1.29	$19,350
8.8	Furnish, Place, and Spread Topsoil (6")[9]	253	CY	$34.65	$8,752
8.9	Hydroseeding with Mulch and Fertilizer	12	MSF	$43.97	$545
8.10	Place, Spread, and Compact Asphalt Base Course (12")	96	ECY	$9.35	$900
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2,600	SF	$2.27	$5,902
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	1,667	SY	$2.21	$3,683
	Subtotal				**$171,217**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$625,387**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$37,523
10.2	Engineering and Design (12%)				$75,046
10.3	Construction management (8%)				$50,031
10.4	Location Adjustment (9%)				$56,285
10.5	Contingency (15%)				$93,808
TOTAL OTHER COSTS					**$312,693**
TOTAL CAPITAL COST FOR ALTERNATIVE 4					**$938,080**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Beacon Point AOC 1 Property.

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to excavated to a depth of 2.5- or 3-ft below ground surface and additional soil that requires excavation to faciliate cap construction.

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500).

[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less additionally excavated soil).

[7] A conversion factor of 1.5 was used to convert CY to TON.

[8] Volume of RW for disposal assumes 10% would be hazardous requiring treatment prior to disposal.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates for the 24-inch protective layer.

[10] Impacts to floodplains will be evaluated during Remedial Design and will require compensation via backfill material selection to ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation

PRESENT VALUE ANALYSIS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$419,359	$0	$0	$419,359	7.0%	$419,359
1	$0	$35,924	$0	$35,924	7.0%	$33,574
2	$0	$35,924	$0	$35,924	7.0%	$31,378
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$419,359**	**$71,848**	**$0**	**$491,207**		**$484,311**
					PV O&M	**$64,952**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal; not required for complete excavation of Raymark waste

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	600	LF	$27.57	$16,542
3.2	Signage	6	EA	$73.95	$444
	Subtotal				**$16,986**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	3	MONTH	$4,531	$13,593
	Subtotal				**$43,044**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	600	LF	$8.97	$5,380
	Subtotal				**$26,051**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[4]	1,520	CY	$2.12	$3,228
6.2	Haul RW/Soil to Stockpile Area[5]	1,824	CY	$4.00	$7,297
6.3	Perimeter Air Sampling	34	EA	$243.76	$8,337
6.4	Equipment Decontamination	76	HR	$54.56	$4,147
6.5	Stockpile Management	1,824	CY	$1.44	$2,621
6.6	Stockpile Characterization[6]	4	EA	$1,535.00	$6,140
	Subtotal				**$31,770**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	1,520	CY	$2.44	$3,712
7.2	Transport RW to in-town consolidation[8]	1,368	CY	$5.52	$7,556
7.3	Equipment Decontamination	76	HR	$54.56	$4,147
7.4	Out-of-Town Transportation of RW[8, 9]	228	TON	$170.00	$38,760
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[8, 9]	228	TON	$192.00	$43,776
	Subtotal				**$97,951**

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	274	CY	$2.40	$657
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	133	CY	$34.65	$4,602
8.9	Hydroseeding with Mulch and Fertilizer	7	MSF	$43.97	$287
8.10	Place, Spread, and Compact Asphalt Base Course (12")	96	ECY	$9.35	$900
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2,600	SF	$2.27	$5,902
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	1,097	CY	$11.83	$12,978
8.14	Install Nonwoven Geotextile Fabric	633	SY	$2.21	$1,400
	Subtotal				**$52,654**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$279,573**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$16,774
10.2	Engineering and Design (12%)				$33,549
10.3	Construction management (8%)				$22,366
10.4	Location Adjustment (9%)				$25,162
10.5	Contingency (15%)				$41,936
TOTAL OTHER COSTS					**$139,786**
TOTAL CAPITAL COST FOR ALTERNATIVE 5					**$419,359**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Beacon Point AOC 1 Property.

[2] Excavation to water table at this property will achieve complete excavation of RW and will not require transactional fees due to deed management.

[3] Assume fencing and signage to be temporary and required during construction activities for site security only.

[4] Represents in situ estimate of RW to excavated to a depth of 6-ft below ground surface and additional soil that would be required to be removed to facilitate compliance with safety standards for benching/sloping.

[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[8] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[9] A conversion factor of 1.5 was used to convert CY to TON.

[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0	**Groundwater Monitoring (per event)**					
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0	**Ground Surface Inspections, Maintenance, and Repairs (per year)[2]**					
OM.2.1	Inspection	0	HR	$110.00	$0	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation	0	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	0	LS	$2,250.00	$0	see cost assumptions
OM.2.8	Contractor mobilizations	0	EA	$321.75	$0	see cost assumptions
	Subtotal				**$0**	
OM.3.0	**Deed Restrictions[2]**					
OM.3.1	Inspection (annual)	0	LS	$1,100.00	$0	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	0	EA	$5,000.00	$0	see cost assumptions
	Subtotal				**$0**	
ANNUAL O&M COST (YEARS 1-2)[4]					**$35,924**	
ANNUAL O&M COST (YEARS 3-30)[5]					**$0**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Beacon Point AOC 1 Property.

[2] Assume deed restrictions and O&M for ground surfaces would not be required following complete excavation of Raymark waste.

[3] O&M for Years 1 and 2 include quarterly groundwater monitoring with annual reporting.

[4] O&M for Years 3 - 30 will not be required pending analytical data and concurrence from the State following the first 2 years of groundwater data collection.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$1,254,031	$0	$0	$1,254,031	7.0%	$1,254,031
1	$0	$35,924	$0	$35,924	7.0%	$33,574
2	$0	$35,924	$0	$35,924	7.0%	$31,378
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$1,254,031**	**$71,848**	**$0**	**$1,325,880**		**$1,318,983**
					PV O&M	**$64,952**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal; not required for complete excavation of Raymark waste

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	600	LF	$27.57	$16,542
3.2	Signage	6	EA	$73.95	$444
	Subtotal				**$16,986**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	3	MONTH	$4,531	$13,593
	Subtotal				**$43,044**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	600	LF	$8.97	$5,380
	Subtotal				**$26,051**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[4]	1,520	CY	$2.12	$3,228
6.2	Haul RW/Soil to Stockpile Area[5]	1,824	CY	$4.00	$7,297
6.3	Perimeter Air Sampling	34	EA	$243.76	$8,337
6.4	Equipment Decontamination	76	HR	$54.56	$4,147
6.5	Stockpile Management	1,824	CY	$1.44	$2,621
6.6	Stockpile Characterization[6]	1	EA	$1,535.00	$1,535
	Subtotal				**$27,165**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	1,520	CY	$2.44	$3,712
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	76	HR	$54.56	$4,147
7.4	Out-of-Town Transportation of RW[8]	2,280	TON	$170.00	$387,600
7.5	Out-of-Town Disposal of RW (no treatment)[8, 9]	2,052	TON	$107.10	$219,769
7.6	Out-of-Town Disposal of RW (treatment)[8, 9]	228	TON	$192.00	$43,776
	Subtotal				**$659,004**

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	274	CY	$2.40	$657
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	133	CY	$34.65	$4,602
8.9	Hydroseeding with Mulch and Fertilizer	7	MSF	$43.97	$287
8.10	Place, Spread, and Compact Asphalt Base Course (12")	96	ECY	$9.35	$900
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2600	SF	$2.27	$5,902
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	1097	CY	$11.83	$12,978
8.14	Install Nonwoven Geotextile Fabric	633	SY	$2.21	$1,400
	Subtotal				**$52,654**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$836,021**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$50,161
10.2	Engineering and Design (12%)				$100,323
10.3	Construction management (8%)				$66,882
10.4	Location Adjustment (9%)				$75,242
10.5	Contingency (15%)				$125,403
TOTAL OTHER COSTS					**$418,010**
TOTAL CAPITAL COST FOR ALTERNATIVE 6					**$1,254,031**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Beacon Point AOC 1 Property.

[2] Excavation to water table at this property will achieve complete excavation of RW and will not require transactional fees due to deed management.

[3] Assume fencing and signage to be temporary and required during construction activities for site security only.

[4] Represents in situ estimate of RW to excavated to a depth of 6-ft below ground surface and additional soil that would be required to be removed to facilitate compliance with safety standards for benching/sloping.

[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[8] A conversion factor of 1.5 was used to convert CY to TON.

[9] Volume of RW for disposal assumes that 10% would be hazardous and require treatment prior to disposal.

[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation

PRESENT VALUE ANALYSIS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$343,476	$0	0	$343,476	7.0%	$343,476
1	$0	$59,044	$0	$59,044	7.0%	$55,181
2	$0	$59,044	$0	$59,044	7.0%	$51,571
3	$0	$32,101	$0	$32,101	7.0%	$26,204
4	$0	$32,101	$0	$32,101	7.0%	$24,490
5	$0	$32,101	$10,000	$42,101	7.0%	$30,017
6	$0	$32,101	$0	$32,101	7.0%	$21,390
7	$0	$32,101	$0	$32,101	7.0%	$19,991
8	$0	$32,101	$0	$32,101	7.0%	$18,683
9	$0	$32,101	$0	$32,101	7.0%	$17,461
10	$0	$32,101	$10,000	$42,101	7.0%	$21,402
11	$0	$32,101	$0	$32,101	7.0%	$15,251
12	$0	$32,101	$0	$32,101	7.0%	$14,253
13	$0	$32,101	$0	$32,101	7.0%	$13,321
14	$0	$32,101	$0	$32,101	7.0%	$12,449
15	$0	$32,101	$10,000	$42,101	7.0%	$15,259
16	$0	$32,101	$0	$32,101	7.0%	$10,874
17	$0	$32,101	$0	$32,101	7.0%	$10,162
18	$0	$32,101	$0	$32,101	7.0%	$9,498
19	$0	$32,101	$0	$32,101	7.0%	$8,876
20	$0	$32,101	$10,000	$42,101	7.0%	$10,880
21	$0	$32,101	$0	$32,101	7.0%	$7,753
22	$0	$32,101	$0	$32,101	7.0%	$7,246
23	$0	$32,101	$0	$32,101	7.0%	$6,772
24	$0	$32,101	$0	$32,101	7.0%	$6,329
25	$0	$32,101	$10,000	$42,101	7.0%	$7,757
26	$0	$32,101	$0	$32,101	7.0%	$5,528
27	$0	$32,101	$0	$32,101	7.0%	$5,166
28	$0	$32,101	$0	$32,101	7.0%	$4,828
29	$0	$32,101	$0	$32,101	7.0%	$4,512
30	$0	$32,101	$10,000	$42,101	7.0%	$5,531
TOTAL	**$343,476**	**$1,016,914**	**$60,000**	**$1,420,389**		**$812,109**
					PV O&M	**$468,633**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	600	LF	$27.57	$16,542
3.2	Signage	6	EA	$73.95	$444
	Subtotal				**$16,986**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	2	MONTH	$4,531	$9,062
	Subtotal				**$38,513**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	600	LF	$8.97	$5,380
	Subtotal				**$26,051**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	652	CY	$2.12	$1,384
6.2	Haul RW to Stockpile Area[4]	782	CY	$4.00	$3,129
6.3	Perimeter Air Sampling	15	EA	$243.76	$3,575
6.4	Equipment Decontamination	33	HR	$54.56	$1,778
6.5	Stockpile Management	782	CY	$1.44	$1,124
6.6	Stockpile Characterization[5]	2	EA	$1,535.00	$3,070
	Subtotal				**$14,061**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	782	CY	$2.44	$1,910
7.2	Transport RW to in-town consolidation[7]	704	CY	$5.52	$3,888
7.3	Equipment Decontamination	33	HR	$54.56	$1,778
7.4	Out-of-Town Transportation of Waste[7, 8]	117	TON	$170.00	$19,947
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	117	TON	$192.00	$22,528
	Subtotal				**$50,052**

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[9]	5,700	SF	$1.29	$7,353
8.8	Furnish, Place, and Spread Topsoil (6")[10]	63	CY	$34.65	$2,188
8.9	Hydroseeding with Mulch and Fertilizer	3	MSF	$43.97	$136
8.10	Place, Spread, and Compact Asphalt Base Course (12")	96	ECY	$9.35	$900
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2,600	SF	$2.27	$5,902
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	485	CY	$11.83	$5,742
8.14	Install Nonwoven Geotextile Fabric	633	SY	$2.21	$1,400
	Subtotal				**$49,549**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$228,984**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$13,739
10.2	Engineering and Design (12%)				$27,478
10.3	Construction management (8%)				$18,319
10.4	Location Adjustment (9%)				$20,609
10.5	Contingency (15%)				$34,348
TOTAL OTHER COSTS					**$114,492**
TOTAL CAPITAL COST FOR ALTERNATIVE 7					**$343,476**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Beacon Point AOC 1 Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 2 or 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal
[6] Volume includes all RW intended for disposal.
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	6	MSF	$7.34	$45	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.03	MSF	$56.31	$2	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	130	SF	$1.81	$236	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	4	EA	$321.75	$1,287	see cost assumptions
	Subtotal				**$17,020**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$59,044**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$32,101**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Beacon Point AOC 1 Property.

[2] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[3] Assumed 5% of asphalt surfaces will require repair annually.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$771,964	$0	0	$771,964	7.0%	$771,964
1	$0	$59,044	$0	$59,044	7.0%	$55,181
2	$0	$59,044	$0	$59,044	7.0%	$51,571
3	$0	$32,101	$0	$32,101	7.0%	$26,204
4	$0	$32,101	$0	$32,101	7.0%	$24,490
5	$0	$32,101	$10,000	$42,101	7.0%	$30,017
6	$0	$32,101	$0	$32,101	7.0%	$21,390
7	$0	$32,101	$0	$32,101	7.0%	$19,991
8	$0	$32,101	$0	$32,101	7.0%	$18,683
9	$0	$32,101	$0	$32,101	7.0%	$17,461
10	$0	$32,101	$10,000	$42,101	7.0%	$21,402
11	$0	$32,101	$0	$32,101	7.0%	$15,251
12	$0	$32,101	$0	$32,101	7.0%	$14,253
13	$0	$32,101	$0	$32,101	7.0%	$13,321
14	$0	$32,101	$0	$32,101	7.0%	$12,449
15	$0	$32,101	$10,000	$42,101	7.0%	$15,259
16	$0	$32,101	$0	$32,101	7.0%	$10,874
17	$0	$32,101	$0	$32,101	7.0%	$10,162
18	$0	$32,101	$0	$32,101	7.0%	$9,498
19	$0	$32,101	$0	$32,101	7.0%	$8,876
20	$0	$32,101	$10,000	$42,101	7.0%	$10,880
21	$0	$32,101	$0	$32,101	7.0%	$7,753
22	$0	$32,101	$0	$32,101	7.0%	$7,246
23	$0	$32,101	$0	$32,101	7.0%	$6,772
24	$0	$32,101	$0	$32,101	7.0%	$6,329
25	$0	$32,101	$10,000	$42,101	7.0%	$7,757
26	$0	$32,101	$0	$32,101	7.0%	$5,528
27	$0	$32,101	$0	$32,101	7.0%	$5,166
28	$0	$32,101	$0	$32,101	7.0%	$4,828
29	$0	$32,101	$0	$32,101	7.0%	$4,512
30	$0	$32,101	$10,000	$42,101	7.0%	$5,531
TOTAL	**$771,964**	**$1,016,914**	**$60,000**	**$1,848,878**		**$1,240,598**
					PV O&M	**$468,633**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	600	LF	$27.57	$16,542
3.2	Signage	6	EA	$73.95	$444
	Subtotal				**$16,986**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	2	MONTH	$4,531	$9,062
	Subtotal				**$38,513**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	600	LF	$8.97	$5,380
	Subtotal				**$26,051**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	652	CY	$2.12	$1,384
6.2	Haul RW to Stockpile Area[4]	782	CY	$4.00	$3,129
6.3	Perimeter Air Sampling	15	EA	$243.76	$3,575
6.4	Equipment Decontamination	33	HR	$54.56	$1,778
6.5	Stockpile Management	782	CY	$1.44	$1,124
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$10,991**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[5]	782	CY	$2.44	$1,910
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	33	HR	$54.56	$1,778
7.4	Out-of-Town Transportation of Waste[6]	1,173	TON	$170.00	$199,467
7.5	Out-of-Town Disposal of RW (no treatment)[6, 7]	1,056	TON	$107.10	$113,098
7.6	Out-of-Town Disposal of RW (treatment)[6, 7]	117	TON	$192.00	$22,528
	Subtotal				**$338,781**

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	5,700	SF	$1.29	$7,353
8.8	Furnish, Place, and Spread Topsoil (6")[9]	63	CY	$34.65	$2,188
8.9	Hydroseeding with Mulch and Fertilizer	3	MSF	$43.97	$136
8.10	Place, Spread, and Compact Asphalt Base Course (12")	96	ECY	$9.35	$900
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2,600	SF	$2.27	$5,902
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	485	CY	$11.83	$5,742
8.14	Install Nonwoven Geotextile Fabric	633	SY	$2.21	$1,400
	Subtotal				**$49,549**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$514,643**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$30,879
10.2	Engineering and Design (12%)				$61,757
10.3	Construction management (8%)				$41,171
10.4	Location Adjustment (9%)				$46,318
10.5	Contingency (15%)				$77,196
TOTAL OTHER COSTS					**$257,321**
TOTAL CAPITAL COST FOR ALTERNATIVE 8					**$771,964**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Beacon Point AOC 1 Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 2 or 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area for characterization includes a bulking factor of 1.2.
[5] Volume includes all RW intended for disposal.
[6] A conversion factor of 1.5 was used to convert CY to TON.
[7] Volume of RW for Out-of-Town disposal assumes that 10% would be hazardous requiring treatment prior to disposal.
[8] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[10] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$383,387	$0	0	$383,387	7.0%	$383,387
1	$0	$59,044	$0	$59,044	7.0%	$55,181
2	$0	$59,044	$0	$59,044	7.0%	$51,571
3	$0	$32,101	$0	$32,101	7.0%	$26,204
4	$0	$32,101	$0	$32,101	7.0%	$24,490
5	$0	$32,101	$10,000	$42,101	7.0%	$30,017
6	$0	$32,101	$0	$32,101	7.0%	$21,390
7	$0	$32,101	$0	$32,101	7.0%	$19,991
8	$0	$32,101	$0	$32,101	7.0%	$18,683
9	$0	$32,101	$0	$32,101	7.0%	$17,461
10	$0	$32,101	$10,000	$42,101	7.0%	$21,402
11	$0	$32,101	$0	$32,101	7.0%	$15,251
12	$0	$32,101	$0	$32,101	7.0%	$14,253
13	$0	$32,101	$0	$32,101	7.0%	$13,321
14	$0	$32,101	$0	$32,101	7.0%	$12,449
15	$0	$32,101	$10,000	$42,101	7.0%	$15,259
16	$0	$32,101	$0	$32,101	7.0%	$10,874
17	$0	$32,101	$0	$32,101	7.0%	$10,162
18	$0	$32,101	$0	$32,101	7.0%	$9,498
19	$0	$32,101	$0	$32,101	7.0%	$8,876
20	$0	$32,101	$10,000	$42,101	7.0%	$10,880
21	$0	$32,101	$0	$32,101	7.0%	$7,753
22	$0	$32,101	$0	$32,101	7.0%	$7,246
23	$0	$32,101	$0	$32,101	7.0%	$6,772
24	$0	$32,101	$0	$32,101	7.0%	$6,329
25	$0	$32,101	$10,000	$42,101	7.0%	$7,757
26	$0	$32,101	$0	$32,101	7.0%	$5,528
27	$0	$32,101	$0	$32,101	7.0%	$5,166
28	$0	$32,101	$0	$32,101	7.0%	$4,828
29	$0	$32,101	$0	$32,101	7.0%	$4,512
30	$0	$32,101	$10,000	$42,101	7.0%	$5,531
TOTAL	**$383,387**	**$1,016,914**	**$60,000**	**$1,460,301**		**$852,020**
					PV O&M	**$468,633**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	600	LF	$27.57	$16,542
3.2	Signage	6	EA	$73.95	$444
	Subtotal				**$16,986**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	3	MONTH	$4,531	$13,593
	Subtotal				**$43,044**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	600	LF	$8.97	$5,380
	Subtotal				**$26,051**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	844	CY	$2.12	$1,793
6.2	Haul RW to Stockpile Area[4]	1,013	CY	$4.00	$4,054
6.3	Perimeter Air Sampling	19	EA	$243.76	$4,632
6.4	Equipment Decontamination	42	HR	$54.56	$2,304
6.5	Stockpile Management	1,013	CY	$1.44	$1,456
6.6	Stockpile Characterization[5]	3	EA	$1,535.00	$4,605
	Subtotal				**$18,844**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	1,013	CY	$2.44	$2,475
7.2	Transport RW to in-town consolidation[7]	912	CY	$5.52	$5,037
7.3	Equipment Decontamination	42	HR	$54.56	$2,304
7.4	Out-of-Town Transportation of Waste[7, 8]	152	TON	$170.00	$25,840
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	152	TON	$192.00	$29,184
	Subtotal				**$64,840**

CAPITAL COSTS
ALTERNATIE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[9]	5,700	SF	$1.29	$7,353
8.8	Furnish, Place, and Spread Topsoil (6")[10]	63	CY	$34.65	$2,188
8.9	Hydroseeding with Mulch and Fertilizer	3	MSF	$43.97	$136
8.10	Place, Spread, and Compact Asphalt Base Course (12")	96	ECY	$9.35	$900
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2600	SF	$2.27	$5,902
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	697	CY	$11.83	$8,248
8.14	Install Nonwoven Geotextile Fabric	633	SY	$2.21	$1,400
	Subtotal				**$52,055**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$255,591**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$15,335
10.2	Engineering and Design (12%)				$30,671
10.3	Construction management (8%)				$20,447
10.4	Location Adjustment (9%)				$23,003
10.5	Contingency (15%)				$38,339
TOTAL OTHER COSTS					**$127,796**
TOTAL CAPITAL COST FOR ALTERNATIVE 9					**$383,387**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Beacon Point AOC 1 Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal.
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$937,533	$0	0	$937,533	7.0%	$937,533
1	$0	$59,044	$0	$59,044	7.0%	$55,181
2	$0	$59,044	$0	$59,044	7.0%	$51,571
3	$0	$32,101	$0	$32,101	7.0%	$26,204
4	$0	$32,101	$0	$32,101	7.0%	$24,490
5	$0	$32,101	$10,000	$42,101	7.0%	$30,017
6	$0	$32,101	$0	$32,101	7.0%	$21,390
7	$0	$32,101	$0	$32,101	7.0%	$19,991
8	$0	$32,101	$0	$32,101	7.0%	$18,683
9	$0	$32,101	$0	$32,101	7.0%	$17,461
10	$0	$32,101	$10,000	$42,101	7.0%	$21,402
11	$0	$32,101	$0	$32,101	7.0%	$15,251
12	$0	$32,101	$0	$32,101	7.0%	$14,253
13	$0	$32,101	$0	$32,101	7.0%	$13,321
14	$0	$32,101	$0	$32,101	7.0%	$12,449
15	$0	$32,101	$10,000	$42,101	7.0%	$15,259
16	$0	$32,101	$0	$32,101	7.0%	$10,874
17	$0	$32,101	$0	$32,101	7.0%	$10,162
18	$0	$32,101	$0	$32,101	7.0%	$9,498
19	$0	$32,101	$0	$32,101	7.0%	$8,876
20	$0	$32,101	$10,000	$42,101	7.0%	$10,880
21	$0	$32,101	$0	$32,101	7.0%	$7,753
22	$0	$32,101	$0	$32,101	7.0%	$7,246
23	$0	$32,101	$0	$32,101	7.0%	$6,772
24	$0	$32,101	$0	$32,101	7.0%	$6,329
25	$0	$32,101	$10,000	$42,101	7.0%	$7,757
26	$0	$32,101	$0	$32,101	7.0%	$5,528
27	$0	$32,101	$0	$32,101	7.0%	$5,166
28	$0	$32,101	$0	$32,101	7.0%	$4,828
29	$0	$32,101	$0	$32,101	7.0%	$4,512
30	$0	$32,101	$10,000	$42,101	7.0%	$5,531
TOTAL	**$937,533**	**$1,016,914**	**$60,000**	**$2,014,446**		**$1,406,166**
					PV O&M	**$468,633**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	600	LF	$27.57	$16,542
3.2	Signage	6	EA	$73.95	$444
	Subtotal				**$16,986**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	3	MONTH	$4,531	$13,593
	Subtotal				**$43,044**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	600	LF	$8.97	$5,380
	Subtotal				**$26,051**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	844	CY	$2.12	$1,793
6.2	Haul RW to Stockpile Area[4]	1,013	CY	$4.00	$4,054
6.3	Perimeter Air Sampling	19	EA	$243.76	$4,632
6.4	Equipment Decontamination	42	HR	$54.56	$2,304
6.5	Stockpile Management	1,013	CY	$1.44	$1,456
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$14,239**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[5]	1,013	CY	$2.44	$2,475
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	42	HR	$54.56	$2,304
7.4	Out-of-Town Transportation of Waste[6]	1,520	TON	$170.00	$258,400
7.5	Out-of-Town Disposal of RW (no treatment)[6, 7]	1,368	TON	$107.10	$146,513
7.6	Out-of-Town Disposal of RW (treatment)[6, 7]	152	TON	$192.00	$29,184
	Subtotal				**$438,875**

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 1
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	5,700	SF	$1.29	$7,353
8.8	Furnish, Place, and Spread Topsoil (6")[9]	63	CY	$34.65	$2,188
8.9	Hydroseeding with Mulch and Fertilizer	3	MSF	$43.97	$136
8.10	Place, Spread, and Compact Asphalt Base Course (12")	96	ECY	$9.35	$900
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2,600	SF	$2.27	$5,902
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	697	CY	$11.83	$8,248
8.14	Install Nonwoven Geotextile Fabric	633	SY	$2.21	$1,400
	Subtotal				**$52,055**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$625,022**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$37,501
10.2	Engineering and Design (12%)				$75,003
10.3	Construction management (8%)				$50,002
10.4	Location Adjustment (9%)				$56,252
10.5	Contingency (15%)				$93,753
TOTAL OTHER COSTS					**$312,511**
TOTAL CAPITAL COST FOR ALTERNATIVE 10					**$937,533**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Beacon Point AOC 1 Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Volume includes all RW intended for disposal.
[6] A conversion factor of 1.5 was used to convert CY to TON.
[7] Volume of RW for Out-of-Town disposal assumes that 10% would be hazardous requiring treatment prior to disposal.
[8] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[10] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

G-14

BEACON POINT AREA OF CONCERN 2

COST ESTIMATE BACKUP SHEETS

PRESENT VALUE ANALYSIS
ALTERNATIVE 1 - NO ACTION
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$10,000	$10,000	7.0%	$7,130
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$10,000	$10,000	7.0%	$5,083
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$10,000	$10,000	7.0%	$3,624
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$10,000	$10,000	7.0%	$2,584
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$10,000	$10,000	7.0%	$1,842
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$10,000	$10,000	7.0%	$1,314
TOTAL	**$0**	**$0**	**$60,000**	**$60,000**		**$21,578**
					PV O&M	**$21,578**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review [1]	Total	Discount Rate[2]	Present Value
0	$22,655	$0	$0	$22,655	7.0%	$22,655
1	$0	$11,312	$0	$11,312	7.0%	$10,572
2	$0	$11,312	$0	$11,312	7.0%	$9,881
3	$0	$11,312	$0	$11,312	7.0%	$9,234
4	$0	$11,312	$0	$11,312	7.0%	$8,630
5	$0	$11,312	$10,000	$21,312	7.0%	$15,195
6	$0	$11,312	$0	$11,312	7.0%	$7,538
7	$0	$11,312	$0	$11,312	7.0%	$7,045
8	$0	$11,312	$0	$11,312	7.0%	$6,584
9	$0	$11,312	$0	$11,312	7.0%	$6,153
10	$0	$11,312	$10,000	$21,312	7.0%	$10,834
11	$0	$11,312	$0	$11,312	7.0%	$5,374
12	$0	$11,312	$0	$11,312	7.0%	$5,023
13	$0	$11,312	$0	$11,312	7.0%	$4,694
14	$0	$11,312	$0	$11,312	7.0%	$4,387
15	$0	$11,312	$10,000	$21,312	7.0%	$7,725
16	$0	$11,312	$0	$11,312	7.0%	$3,832
17	$0	$11,312	$0	$11,312	7.0%	$3,581
18	$0	$11,312	$0	$11,312	7.0%	$3,347
19	$0	$11,312	$0	$11,312	7.0%	$3,128
20	$0	$11,312	$10,000	$21,312	7.0%	$5,508
21	$0	$11,312	$0	$11,312	7.0%	$2,732
22	$0	$11,312	$0	$11,312	7.0%	$2,553
23	$0	$11,312	$0	$11,312	7.0%	$2,386
24	$0	$11,312	$0	$11,312	7.0%	$2,230
25	$0	$11,312	$10,000	$21,312	7.0%	$3,927
26	$0	$11,312	$0	$11,312	7.0%	$1,948
27	$0	$11,312	$0	$11,312	7.0%	$1,821
28	$0	$11,312	$0	$11,312	7.0%	$1,701
29	$0	$11,312	$0	$11,312	7.0%	$1,590
30	$0	$11,312	$10,000	$21,312	7.0%	$2,800
TOTAL	**$22,655**	**$339,372**	**$60,000**	**$422,027**		**$184,609**
					PV O&M	**$161,954**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.10	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0	**Fencing and Signage**				
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.95	$0
	Subtotal				**$0**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction**				
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of Waste	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
8.0	**Construction of Low-Permeability Cap**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.3	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.4	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.5	Place, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[5]	0	SF	$1.29	$0
8.6	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.7	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.8	Place, Spread, and Compact Asphalt Base Course (12")	0	CY	$9.35	$0
8.9	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.10	Site Cleanup	0	HR	$405.12	$0
8.11	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$2.40	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$22,655**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 2					**$22,655**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Beacon Point AOC 2 Property.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour

EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
SY = square yard

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	0	LS	$1,073	$0	see cost assumptions
OM.1.2	Sampling Labor - FOL	0	HR	$110	$0	see cost assumptions
OM.1.3	Sampling Labor - Sampler	0	HR	$90	$0	see cost assumptions
OM.1.4	Analytical Costs	0	EA	$697	$0	see cost assumptions
OM.1.5	Data Validation	0	HR	$110	$0	see cost assumptions
OM.1.6	Report Preparation (annual)	0	LS	$2,200	$0	see cost assumptions
	Subtotal				**$0**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection (annual)	10	HR	$110.00	$1,100	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	see cost assumptions
OM.2.3	Revegetation[2]	0	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	850	SF	$1.81	$1,541	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[4]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	1	EA	$321.75	$322	see cost assumptions
	Subtotal				**$5,212**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-30)[5]					**$11,312**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Beacon Point (AOC) 2 Property.

[2] Assume no revegetation would be required as all RW is located below paved surfaces.

[3] Estimated 5% of asphalt surfaces will require repair annually (need for repair to be established during 5-Year Reviews).

[4] Assume no fencing or signage is required.

[5] O&M for Years 1 through 30 include annual inspections, repairs and reporting.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear feet
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.14 of the FS.

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.10	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0	**Fencing and Signage**				
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.95	$0
	Subtotal				**$0**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction**				
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of Waste	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
8.0	**Construction of Low-Permeability Cap**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.3	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.4	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.5	Place, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[5]	0	SF	$1.29	$0
8.6	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.7	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.8	Place, Spread, and Compact Asphalt Base Course (12")	0	CY	$9.35	$0
8.9	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.10	Site Cleanup	0	HR	$405.12	$0
8.11	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$2.40	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 3					**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.14 of the FS.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	0	LS	$1,073	$0	see cost assumptions
OM.1.2	Sampling Labor - FOL	0	HR	$110	$0	see cost assumptions
OM.1.3	Sampling Labor - Sampler	0	HR	$90	$0	see cost assumptions
OM.1.4	Analytical Costs	0	EA	$697	$0	see cost assumptions
OM.1.5	Data Validation	0	HR	$110	$0	see cost assumptions
OM.1.6	Report Preparation	0	LS	$2,200	$0	see cost assumptions
	Subtotal				**$0**	
OM.2.0 Repairs						
OM.2.1	Inspection (annual)	0	HR	$110.00	$0	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	see cost assumptions
OM.2.3	Revegetation	0	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair	0	LS	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement	0	EA	$73.95	$0	see cost assumptions
OM.2.5	Reporting (annual)	0	LS	$2,250.00	$0	see cost assumptions
OM.2.6	Contractor mobilizations	0	EA	$321.75	$0	see cost assumptions
	Subtotal				**$0**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	0	LS	$1,100.00	$0	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	0	EA	$5,000.00	$0	see cost assumptions
	Subtotal				**$0**	
ANNUAL O&M COST (YEARS 1-30)					**$0**	

Note:
These Alternatives are not applicable to this property group - see Section 4.14 of the FS.

PRESENT VALUE ANALYSIS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate	Present Value
0	$0	$0	0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.14 of the FS.

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.10	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0 Fencing and Signage					
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.95	$0
	Subtotal				**$0**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of Waste	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
8.0	**Construction of Low-Permeability Cap**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.3	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.4	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.5	Place, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[5]	0	SF	$1.29	$0
8.6	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.7	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.8	Place, Spread, and Compact Asphalt Base Course (12")	0	CY	$9.35	$0
8.9	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.10	Site Cleanup	0	HR	$405.12	$0
8.11	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$2.40	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 4					**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.14 of the FS.

PRESENT VALUE ANALYSIS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review	Total	Discount Rate	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.14 of the FS.

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.10	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0 Fencing and Signage					
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.95	$0
	Subtotal				**$0**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of Waste	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
8.0	**Construction of Low-Permeability Cap**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.3	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.4	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.5	Place, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[5]	0	SF	$1.29	$0
8.6	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.7	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.8	Place, Spread, and Compact Asphalt Base Course (12")	0	CY	$9.35	$0
8.9	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.10	Site Cleanup	0	HR	$405.12	$0
8.11	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$2.40	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 5					**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.14 of the FS.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	0	LS	$1,073	$0	see cost assumptions
OM.1.2	Sampling Labor - FOL	0	HR	$110	$0	see cost assumptions
OM.1.3	Sampling Labor - Sampler	0	HR	$90	$0	see cost assumptions
OM.1.4	Analytical Costs	0	EA	$697	$0	see cost assumptions
OM.1.5	Data Validation	0	HR	$110	$0	see cost assumptions
OM.1.6	Report Preparation	0	LS	$2,200	$0	see cost assumptions
	Subtotal				**$0**	
OM.2.0 Repairs						
OM.2.1	Inspection (annual)	0	HR	$110.00	$0	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	see cost assumptions
OM.2.3	Revegetation	0	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair	0	LS	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement	0	EA	$73.95	$0	see cost assumptions
OM.2.5	Reporting (annual)	0	LS	$2,250.00	$0	see cost assumptions
OM.2.6	Contractor mobilizations	0	EA	$321.75	$0	see cost assumptions
	Subtotal				**$0**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	0	LS	$1,100.00	$0	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	0	EA	$5,000.00	$0	see cost assumptions
	Subtotal				**$0**	
ANNUAL O&M COST (YEARS 1-30)					**$0**	

Note:
These Alternatives are not applicable to this property group - see Section 4.14 of the FS.

PRESENT VALUE ANALYSIS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review	Total	Discount Rate	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.14 of the FS.

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.10	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0 Fencing and Signage					
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.95	$0
	Subtotal				**$0**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of Waste	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
8.0	**Construction of Low-Permeability Cap**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.3	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.4	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.5	Place, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[5]	0	SF	$1.29	$0
8.6	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.7	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.8	Place, Spread, and Compact Asphalt Base Course (12")	0	CY	$9.35	$0
8.9	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.10	Site Cleanup	0	HR	$405.12	$0
8.11	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$2.40	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 6					**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.14 of the FS.

PRESENT VALUE ANALYSIS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate	Present Value
0	$0	$0	0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.14 of the FS.

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.10	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0 Fencing and Signage					
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.95	$0
	Subtotal				**$0**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of Waste	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
8.0	**Construction of Low-Permeability Cap**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.3	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.4	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.5	Place, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[5]	0	SF	$1.29	$0
8.6	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.7	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.8	Place, Spread, and Compact Asphalt Base Course (12")	0	CY	$9.35	$0
8.9	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.10	Site Cleanup	0	HR	$405.12	$0
8.11	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$2.40	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 7					**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.14 of the FS.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	0	LS	$1,073	$0	see cost assumptions
OM.1.2	Sampling Labor - FOL	0	HR	$110	$0	see cost assumptions
OM.1.3	Sampling Labor - Sampler	0	HR	$90	$0	see cost assumptions
OM.1.4	Analytical Costs	0	EA	$697	$0	see cost assumptions
OM.1.5	Data Validation	0	HR	$110	$0	see cost assumptions
OM.1.6	Report Preparation	0	LS	$2,200	$0	see cost assumptions
	Subtotal				**$0**	
OM.2.0 Repairs						
OM.2.1	Inspection (annual)	0	HR	$110.00	$0	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	see cost assumptions
OM.2.3	Revegetation	0	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement	0	EA	$73.95	$0	see cost assumptions
OM.2.5	Reporting (annual)	0	LS	$2,250.00	$0	see cost assumptions
OM.2.6	Contractor mobilizations	0	EA	$321.75	$0	see cost assumptions
	Subtotal				**$0**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	0	LS	$1,100.00	$0	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	0	EA	$5,000.00	$0	see cost assumptions
	Subtotal				**$0**	
ANNUAL O&M COST (YEARS 1-30)					**$0**	

Note:
These Alternatives are not applicable to this property group - see Section 4.14 of the FS.

PRESENT VALUE ANALYSIS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate	Present Value
0	$0	$0	0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.14 of the FS.

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.10	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0	**Fencing and Signage**				
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.95	$0
	Subtotal				**$0**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction**				
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of Waste	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
8.0	**Construction of Low-Permeability Cap**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.3	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.4	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.5	Place, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[5]	0	SF	$1.29	$0
8.6	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.7	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.8	Place, Spread, and Compact Asphalt Base Course (12")	0	CY	$9.35	$0
8.9	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.10	Site Cleanup	0	HR	$405.12	$0
8.11	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$2.40	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 8					**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.14 of the FS.

PRESENT VALUE ANALYSIS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate	Present Value
0	$0	$0	0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.14 of the FS.

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.10	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0 Fencing and Signage					
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.95	$0
	Subtotal				**$0**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of Waste	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
8.0	**Construction of Low-Permeability Cap**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.3	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.4	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.5	Place, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[5]	0	SF	$1.29	$0
8.6	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.7	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.8	Place, Spread, and Compact Asphalt Base Course (12")	0	CY	$9.35	$0
8.9	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.10	Site Cleanup	0	HR	$405.12	$0
8.11	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$2.40	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 9					**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.14 of the FS.

PRESENT VALUE ANALYSIS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review	Total	Discount Rate	Present Value
0	$0	$0	0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.14 of the FS.

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.10	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0 Fencing and Signage					
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.95	$0
	Subtotal				**$0**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of Waste	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 2
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
8.0	**Construction of Low-Permeability Cap**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Place, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[5]	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	CY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405.12	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$2.40	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 10					**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.14 of the FS.

G-15

BEACON POINT AREA OF CONCERN 3

BOST ESTIMATE BACKUP SHEETS

PRESENT VALUE ANALYSIS
ALTERNATIVE 1 - NO ACTION
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$10,000	$10,000	7.0%	$7,130
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$10,000	$10,000	7.0%	$5,083
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$10,000	$10,000	7.0%	$3,624
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$10,000	$10,000	7.0%	$2,584
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$10,000	$10,000	7.0%	$1,842
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$10,000	$10,000	7.0%	$1,314
TOTAL	**$0**	**$0**	**$60,000**	**$60,000**		**$21,578**
					PV O&M	**$21,578**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review [1]	Total	Discount Rate[2]	Present Value
0	$53,546	$0	$0	$53,546	7.0%	$53,546
1	$0	$59,246	$0	$59,246	7.0%	$55,370
2	$0	$59,246	$0	$59,246	7.0%	$51,748
3	$0	$34,621	$0	$34,621	7.0%	$28,261
4	$0	$34,621	$0	$34,621	7.0%	$26,412
5	$0	$34,621	$10,000	$44,621	7.0%	$31,814
6	$0	$34,621	$0	$34,621	7.0%	$23,070
7	$0	$34,621	$0	$34,621	7.0%	$21,560
8	$0	$34,621	$0	$34,621	7.0%	$20,150
9	$0	$34,621	$0	$34,621	7.0%	$18,832
10	$0	$34,621	$10,000	$44,621	7.0%	$22,683
11	$0	$34,621	$0	$34,621	7.0%	$16,448
12	$0	$34,621	$0	$34,621	7.0%	$15,372
13	$0	$34,621	$0	$34,621	7.0%	$14,367
14	$0	$34,621	$0	$34,621	7.0%	$13,427
15	$0	$34,621	$10,000	$44,621	7.0%	$16,173
16	$0	$34,621	$0	$34,621	7.0%	$11,727
17	$0	$34,621	$0	$34,621	7.0%	$10,960
18	$0	$34,621	$0	$34,621	7.0%	$10,243
19	$0	$34,621	$0	$34,621	7.0%	$9,573
20	$0	$34,621	$10,000	$44,621	7.0%	$11,531
21	$0	$34,621	$0	$34,621	7.0%	$8,362
22	$0	$34,621	$0	$34,621	7.0%	$7,814
23	$0	$34,621	$0	$34,621	7.0%	$7,303
24	$0	$34,621	$0	$34,621	7.0%	$6,825
25	$0	$34,621	$10,000	$44,621	7.0%	$8,221
26	$0	$34,621	$0	$34,621	7.0%	$5,962
27	$0	$34,621	$0	$34,621	7.0%	$5,572
28	$0	$34,621	$0	$34,621	7.0%	$5,207
29	$0	$34,621	$0	$34,621	7.0%	$4,866
30	$0	$34,621	$10,000	$44,621	7.0%	$5,862
TOTAL	**$53,546**	**$1,087,889**	**$60,000**	**$1,201,435**		**$549,264**
					PV O&M	**$495,717**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	60	LF	$35.79	$2,147
2.3	Install PVC Well Screens (2" diameter)	40	LF	$19.69	$788
2.4	Install PVC Well Casing (2" diameter)	20	LF	$14.79	$296
2.5	Install Filter Pack	48	LF	$15.52	$745
2.6	Install Bentonite Seal	4	EA	$57.23	$229
2.7	Install Annular Seal	8	LF	$69.04	$552
2.8	PVC Well Plugs	4	EA	$27.86	$111
2.9	Flush-Mount Protective Cover with Locking Cap	4	EA	$451.55	$1,806
2.10	Surface Pad, Concrete 2' x 2'	4	EA	$154.79	$619
2.11	Well Development (2 HR/WELL)	8	EA	$228.23	$1,826
2.12	IDW Transportation/Disposal (drums)	4	EA	$508.52	$2,034
	Subtotal				**$13,906**
3.0 Fencing and Signage					
3.1	Chain Link Fence	600	LF	$27.57	$16,542
3.2	Signage	6	EA	$73.93	$444
	Subtotal				**$16,986**
TOTAL DIRECT COSTS					**$53,546**
TOTAL CAPITAL COST FOR ALTERNATIVE 2					**$53,546**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Beacon Point AOC 3 Property.

PVC = polyvinyl chloride
IDW = investigation derived waste
LS = lump sum
HR = hour
EA = each
LF = linear foot

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	20	HR	$110	$2,200	see cost assumptions
OM.1.3	Sampling Labor - Sampler	10	HR	$90	$900	see cost assumptions
OM.1.4	Analytical Costs	5	EA	$697	$3,486	see cost assumptions
OM.1.5	Data Validation	5	HR	$110	$550	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$10,408**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.27	MSF	$56.31	$15	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	20	LF	$27.57	$551	see cost assumptions
OM 2.6	Sign Replacement[5]	24	EA	$73.95	$1,775	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	1	EA	$321.75	$322	see cost assumptions
	Subtotal				**$18,113**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$59,246**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$34,621**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Beacon Point AOC 3 Property.

[2] Assumed that 1% of vegetated surfaces would require repair annually (need for repair to be established during 5-Year Reviews).

[3] Assumed that there is no Raymark waste below paved surfaces at this property group.

[4] Estimated that 100% of fencing would require replacement over the period of O&M (need for repair to be established during 5-Year Reviews).

[5] Estimated that signage would require replacement 4 times over the period of O&M (need for repair to be established during 5-Year Reviews).

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review [1]	Total	Discount Rate[2]	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.15 of the FS.

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.10	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0	**Fencing and Signage**				
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.93	$0
	Subtotal				**$0**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction**				
6.1	Excavate and Load RW/Soil[2]	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area[3]	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization[4]	0	EA	$1,535.00	$0
	Subtotal	0			**$0**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks[5]	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidation[6]	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of Waste[6, 7]	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)[6, 7]	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[8, 9]	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[9]	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")[8, 9]	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[9]	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 3" binder, 3" topping)[10]	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405.12	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management[12]**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$171,602	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 3					**$0**

Notes:
This Alternative is not applicable to this property group - see Section 4.15 of the FS.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	0	LS	$1,073	$0	see cost assumptions
OM.1.2	Sampling Labor - FOL	0	HR	$110	$0	see cost assumptions
OM.1.3	Sampling Labor - Sampler	0	HR	$90	$0	see cost assumptions
OM.1.4	Analytical Costs	0	EA	$697	$0	see cost assumptions
OM.1.5	Data Validation	0	HR	$110	$0	see cost assumptions
OM.1.6	Report Preparation	0	LS	$2,200	$0	see cost assumptions
	Subtotal				**$0**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	0	HR	$110.00	$0	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation	0.00	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	0	LS	$2,250.00	$0	see cost assumptions
OM.2.8	Contractor mobilizations	0	EA	$321.75	$0	see cost assumptions
	Subtotal				**$0**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	0	LS	$1,100.00	$0	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	0	EA	$5,000.00	$0	see cost assumptions
	Subtotal				**$0**	
ANNUAL O&M COST (YEARS 1-2)					**$0**	
ANNUAL O&M COST (YEARS 3-30)					**$0**	

Notes:
Alternatives 3 and 4 are not applicable to this property group - see Section 4.15 of the FS.

PRESENT VALUE ANALYSIS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$0	$0	0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.15 of the FS.

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.10	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0 Fencing and Signage					
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.93	$0
	Subtotal				**$0**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil[2]	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area[3]	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization[4]	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load Raymark Waste into Trucks [5]	0	CY	$2.44	$0
7.2	Transport Raymark Waste to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of Waste[6]	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of Waste (no treatment)[6, 7]	0	TON	$107.10	$0
7.6	Out-of-Town Treatment of Raymark Waste[6, 7]	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[8, 9]	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[9]	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")[8, 9]	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[9]	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 3" binder, 3" topping)[10]	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405.12	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management[12]**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$171,602	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 4					**$0**

Notes:
This Alternative is not applicable to this property group - see Section 4.15 of the FS.

PRESENT VALUE ANALYSIS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$1,157,506	$0	$0	$1,157,506	7.0%	$1,157,506
1	$0	$51,424	$0	$51,424	7.0%	$48,060
2	$0	$51,424	$0	$51,424	7.0%	$44,916
3	$0	$9,791	$0	$9,791	7.0%	$7,993
4	$0	$9,791	$0	$9,791	7.0%	$7,470
5	$0	$9,791	$10,000	$19,791	7.0%	$14,111
6	$0	$9,791	$0	$9,791	7.0%	$6,524
7	$0	$9,791	$0	$9,791	7.0%	$6,097
8	$0	$9,791	$0	$9,791	7.0%	$5,699
9	$0	$9,791	$0	$9,791	7.0%	$5,326
10	$0	$9,791	$10,000	$19,791	7.0%	$10,061
11	$0	$9,791	$0	$9,791	7.0%	$4,652
12	$0	$9,791	$0	$9,791	7.0%	$4,347
13	$0	$9,791	$0	$9,791	7.0%	$4,063
14	$0	$9,791	$0	$9,791	7.0%	$3,797
15	$0	$9,791	$10,000	$19,791	7.0%	$7,173
16	$0	$9,791	$0	$9,791	7.0%	$3,317
17	$0	$9,791	$0	$9,791	7.0%	$3,100
18	$0	$9,791	$0	$9,791	7.0%	$2,897
19	$0	$9,791	$0	$9,791	7.0%	$2,707
20	$0	$9,791	$10,000	$19,791	7.0%	$5,114
21	$0	$9,791	$0	$9,791	7.0%	$2,365
22	$0	$9,791	$0	$9,791	7.0%	$2,210
23	$0	$9,791	$0	$9,791	7.0%	$2,065
24	$0	$9,791	$0	$9,791	7.0%	$1,930
25	$0	$9,791	$10,000	$19,791	7.0%	$3,647
26	$0	$9,791	$0	$9,791	7.0%	$1,686
27	$0	$9,791	$0	$9,791	7.0%	$1,576
28	$0	$9,791	$0	$9,791	7.0%	$1,473
29	$0	$9,791	$0	$9,791	7.0%	$1,376
30	$0	$9,791	$10,000	$19,791	7.0%	$2,600
TOTAL	**$1,157,506**	**$377,002**	**$60,000**	**$1,594,508**		**$1,375,857**
					PV O&M	**$218,350**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	60	LF	$35.79	$2,147
2.3	Install PVC Well Screens (2" diameter)	40	LF	$19.69	$788
2.4	Install PVC Well Casing (2" diameter)	20	LF	$14.79	$296
2.5	Install Filter Pack	48	LF	$15.52	$745
2.6	Install Bentonite Seal	4	EA	$57.23	$229
2.7	Install Annular Seal	8	LF	$69.04	$552
2.8	PVC Well Plugs	4	EA	$27.86	$111
2.9	Flush-Mount Protective Cover with Locking Cap	4	EA	$451.55	$1,806
2.10	Surface Pad, Concrete 2' x 2'	4	EA	$154.79	$619
2.11	Well Development (2 HR/WELL)	8	EA	$228.23	$1,826
2.12	IDW Transportation/Disposal (drums)	4	EA	$508.52	$2,034
	Subtotal				**$13,906**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	600	LF	$27.57	$16,542
3.2	Signage	6	EA	$73.93	$444
	Subtotal				**$16,986**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	4	MONTH	$4,531	$18,124
	Subtotal				**$47,574**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	600	LF	$8.97	$5,380
	Subtotal				**$26,051**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[3]	5,280	CY	$2.12	$11,212
6.2	Haul RW/Soil to Stockpile Area[4]	6,336	CY	$4.00	$25,347
6.3	Perimeter Air Sampling	119	EA	$243.76	$28,961
6.4	Equipment Decontamination	264	HR	$54.56	$14,405
6.5	Stockpile Management	6,336	CY	$1.44	$9,106
6.6	Stockpile Characterization[5]	13	EA	$1,535.00	$19,955
	Subtotal				**$108,986**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	6,000	CY	$2.44	$14,653
7.2	Transport RW to in-town consolidation[7]	5,400	CY	$5.52	$29,827
7.3	Equipment Decontamination	264	HR	$54.56	$14,405
7.4	Out-of-Town Transportation of Waste[7, 8]	900	TON	$170.00	$153,000
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)[7, 8]	900	TON	$192.00	$172,800
	Subtotal				**$384,684**

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[9]	302	CY	$2.40	$726
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[10]	27,000	SF	$1.29	$34,830
8.8	Furnish, Place, and Spread Topsoil (6")[9]	704	CY	$34.65	$24,393
8.9	Hydroseeding with Mulch and Fertilizer	35	MSF	$43.97	$1,520
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	4,802	CY	$11.83	$56,802
8.14	Install Nonwoven Geotextile Fabric	3,000	SY	$2.21	$6,630
	Subtotal				**$150,829**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$171,602	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$771,671**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$46,300
10.2	Engineering and Design (12%)				$92,601
10.3	Construction management (8%)				$61,734
10.4	Location Adjustment (9%)				$69,450
10.5	Contingency (15%)				$115,751
TOTAL OTHER COSTS					**$385,835**
TOTAL CAPITAL COST FOR ALTERNATIVE 5					**$1,157,506**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Beacon Point AOC 3 Property.

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to excavated to a depth of 5-ft below ground surface and additional soil that would be required to be removed to facilitate compliance with safety standards for benching/sloping.

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[8] A conversion factor of 1.5 was used to convert CY to TON.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[10] Delineation ("warning") layer included for excavation area where waste is left-in-place.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	20	HR	$110	$2,200	see cost assumptions
OM.1.3	Sampling Labor - Sampler	10	HR	$90	$900	see cost assumptions
OM.1.4	Analytical Costs	5	EA	$697	$3,486	see cost assumptions
OM.1.5	Data Validation	5	HR	$110	$550	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$10,408**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	10	HR	$110.00	$1,100	see cost assumptions
OM.2.2	Mowing (twice per year)[2]	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[3]	0.35	MSF	$56.31	$19	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[4]	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[5]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[6]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	1	EA	$321.75	$322	see cost assumptions
	Subtotal				**$3,691**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[7]					**$51,424**	
ANNUAL O&M COST (YEARS 3-30)[8]					**$9,791**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Beacon Point AOC 3 Property.

[2] Assume no mowing required due to excavation of Raymark waste to the groundwater table elevation.

[3] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[4] Assumed that there is no Raymark waste below paved surfaces at this property group.

[5] Assume fencing will not be required following remedial action.

[6] Assume signage will not be required following remedial action.

[7] O&M for Years 1 and 2 include quarterly groundwater monitoring with annual inspection/repairs of ground surface and annual deed inspection, with one annual report for all O&M activities.

[8] O&M for Years 3 - 30 include annual inspection and repairs to ground surface and annual deed inspection, but may not require additional groundwater sampling pending analytical data and concurrence from the State following the first 2 years of data collection, therefore additional groundwater sampling is not included.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$4,451,901	$0	$0	$4,451,901	7.0%	$4,451,901
1	$0	$51,424	$0	$51,424	7.0%	$48,060
2	$0	$51,424	$0	$51,424	7.0%	$44,916
3	$0	$9,791	$0	$9,791	7.0%	$7,993
4	$0	$9,791	$0	$9,791	7.0%	$7,470
5	$0	$9,791	$10,000	$19,791	7.0%	$14,111
6	$0	$9,791	$0	$9,791	7.0%	$6,524
7	$0	$9,791	$0	$9,791	7.0%	$6,097
8	$0	$9,791	$0	$9,791	7.0%	$5,699
9	$0	$9,791	$0	$9,791	7.0%	$5,326
10	$0	$9,791	$10,000	$19,791	7.0%	$10,061
11	$0	$9,791	$0	$9,791	7.0%	$4,652
12	$0	$9,791	$0	$9,791	7.0%	$4,347
13	$0	$9,791	$0	$9,791	7.0%	$4,063
14	$0	$9,791	$0	$9,791	7.0%	$3,797
15	$0	$9,791	$10,000	$19,791	7.0%	$7,173
16	$0	$9,791	$0	$9,791	7.0%	$3,317
17	$0	$9,791	$0	$9,791	7.0%	$3,100
18	$0	$9,791	$0	$9,791	7.0%	$2,897
19	$0	$9,791	$0	$9,791	7.0%	$2,707
20	$0	$9,791	$10,000	$19,791	7.0%	$5,114
21	$0	$9,791	$0	$9,791	7.0%	$2,365
22	$0	$9,791	$0	$9,791	7.0%	$2,210
23	$0	$9,791	$0	$9,791	7.0%	$2,065
24	$0	$9,791	$0	$9,791	7.0%	$1,930
25	$0	$9,791	$10,000	$19,791	7.0%	$3,647
26	$0	$9,791	$0	$9,791	7.0%	$1,686
27	$0	$9,791	$0	$9,791	7.0%	$1,576
28	$0	$9,791	$0	$9,791	7.0%	$1,473
29	$0	$9,791	$0	$9,791	7.0%	$1,376
30	$0	$9,791	$10,000	$19,791	7.0%	$2,600
TOTAL	**$4,451,901**	**$377,002**	**$60,000**	**$4,888,903**		**$4,670,252**
					PV O&M	**$218,350**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	60	LF	$35.79	$2,147
2.3	Install PVC Well Screens (2" diameter)	40	LF	$19.69	$788
2.4	Install PVC Well Casing (2" diameter)	20	LF	$14.79	$296
2.5	Install Filter Pack	48	LF	$15.52	$745
2.6	Install Bentonite Seal	4	EA	$57.23	$229
2.7	Install Annular Seal	8	LF	$69.04	$552
2.8	PVC Well Plugs	4	EA	$27.86	$111
2.9	Flush-Mount Protective Cover with Locking Cap	4	EA	$451.55	$1,806
2.10	Surface Pad, Concrete 2' x 2'	4	EA	$154.79	$619
2.11	Well Development (2 HR/WELL)	8	EA	$228.23	$1,826
2.12	IDW Transportation/Disposal (drums)	4	EA	$508.52	$2,034
	Subtotal				**$13,906**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	600	LF	$27.57	$16,542
3.2	Signage	6	EA	$73.93	$444
	Subtotal				**$16,986**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	4	MONTH	$4,531	$18,124
	Subtotal				**$47,574**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	600	LF	$8.97	$5,380
	Subtotal				**$26,051**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[3]	5,280	CY	$2.12	$11,212
6.2	Haul RW/Soil to Stockpile Area[4]	6,336	CY	$4.00	$25,347
6.3	Perimeter Air Sampling	119	EA	$243.76	$28,961
6.4	Equipment Decontamination	264	HR	$54.56	$14,405
6.5	Stockpile Management	6,336	CY	$1.44	$9,106
6.6	Stockpile Characterization[5]	1	EA	$1,535.00	$1,535
	Subtotal				**$90,566**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load Raymark Waste into Trucks[6]	6,000	CY	$2.44	$14,653
7.2	Transport Raymark Waste to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	264	HR	$54.56	$14,405
7.4	Out-of-Town Transportation of Waste[7]	9,000	TON	$170.00	$1,530,000
7.5	Out-of-Town Disposal of Waste (no treatment)[7, 8]	8,100	TON	$107.10	$867,510
7.6	Out-of-Town Treatment of Raymark Waste[7, 8]	900	TON	$192.00	$172,800
	Subtotal				**$2,599,368**

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[9]	302	CY	$2.40	$726
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[10]	27000	SF	$1.29	$34,830
8.8	Furnish, Place, and Spread Topsoil (6")[9]	704	CY	$34.65	$24,393
8.9	Hydroseeding with Mulch and Fertilizer	35	MSF	$43.97	$1,520
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	4802	CY	$11.83	$56,802
8.14	Install Nonwoven Geotextile Fabric	3000	SY	$2.21	$6,630
	Subtotal				**$150,829**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$171,602	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$2,967,934**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$178,076
10.2	Engineering and Design (12%)				$356,152
10.3	Construction management (8%)				$237,435
10.4	Location Adjustment (9%)				$267,114
10.5	Contingency (15%)				$445,190
TOTAL OTHER COSTS					**$1,483,967**
TOTAL CAPITAL COST FOR ALTERNATIVE 6					**$4,451,901**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Beacon Point AOC 3 Property.

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to excavated to a depth of 5-ft below ground surface and additional soil that would be required to be removed to facilitate compliance with safety standards for benching/sloping.

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[7] A conversion factor of 1.5 was used to convert CY to TON.

[8] Volume of RW for disposal assumes 10% would be hazardous requiring treatment prior to disposal.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[10] Delineation ("warning") layer included for excavation area where waste is left-in-place.

11 All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate	Present Value
0	$0	$0	0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.15 of the FS.

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.10	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0	**Fencing and Signage**				
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.93	$0
	Subtotal				**$0**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load Raymark Waste into Trucks	0	CY	$2.44	$0
7.2	Transport Raymark Waste to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of Waste	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Treatment of Raymark Waste	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[8]	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 3" binder, 3" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405.12	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$171,602	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 7					**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.15 of the FS.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0	**Groundwater Monitoring (per event)**					
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	20	HR	$110	$2,200	see cost assumptions
OM.1.3	Sampling Labor - Sampler	10	HR	$90	$900	see cost assumptions
OM.1.4	Analytical Costs	5	EA	$697	$3,486	see cost assumptions
OM.1.5	Data Validation	5	HR	$110	$550	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$10,408**	
OM.2.0	**Ground Surface Inspections, Maintenance, and Repairs (per year)**					
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	54	MSF	$7.34	$396	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.27	MSF	$56.31	$15	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	3	EA	$321.75	$965	see cost assumptions
	Subtotal				**$16,827**	
OM.3.0	**Deed Restrictions**					
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$64,559**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$33,335**	

Notes:

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum

HR = hour

EA = each

MSF = thousand square feet

SF = square feet

LF = linear foot

FOL = field operations leader

O&M = operations and maintenance

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Beacon Point AOC 3 Property

[2] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future

[3] Assumed 5% of asphalt surfaces will require repair annually

[4] Assume fencing will not be required following remedial action

[5] Assume signage will not be required following remedial action

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities

PRESENT VALUE ANALYSIS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review	Total	Discount Rate	Present Value
0	$0	$0	0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.15 of the FS.

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.10	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0	**Fencing and Signage**				
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.93	$0
	Subtotal				**$0**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load Raymark Waste into Trucks	0	CY	$2.44	$0
7.2	Transport Raymark Waste to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of Waste	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Treatment of Raymark Waste	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[8]	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 3" binder, 3" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405.12	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$171,602	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 8					**$0**

Note:
This Alternative is not applicable to this property group - see Section 4.15 of the FS.

PRESENT VALUE ANALYSIS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$1,232,826	$0	0	$1,232,826	7.0%	$1,232,826
1	$0	$64,559	$0	$64,559	7.0%	$60,336
2	$0	$64,559	$0	$64,559	7.0%	$56,389
3	$0	$33,335	$0	$33,335	7.0%	$27,211
4	$0	$33,335	$0	$33,335	7.0%	$25,431
5	$0	$33,335	$10,000	$43,335	7.0%	$30,897
6	$0	$33,335	$0	$33,335	7.0%	$22,212
7	$0	$33,335	$0	$33,335	7.0%	$20,759
8	$0	$33,335	$0	$33,335	7.0%	$19,401
9	$0	$33,335	$0	$33,335	7.0%	$18,132
10	$0	$33,335	$10,000	$43,335	7.0%	$22,029
11	$0	$33,335	$0	$33,335	7.0%	$15,837
12	$0	$33,335	$0	$33,335	7.0%	$14,801
13	$0	$33,335	$0	$33,335	7.0%	$13,833
14	$0	$33,335	$0	$33,335	7.0%	$12,928
15	$0	$33,335	$10,000	$43,335	7.0%	$15,707
16	$0	$33,335	$0	$33,335	7.0%	$11,292
17	$0	$33,335	$0	$33,335	7.0%	$10,553
18	$0	$33,335	$0	$33,335	7.0%	$9,863
19	$0	$33,335	$0	$33,335	7.0%	$9,217
20	$0	$33,335	$10,000	$43,335	7.0%	$11,199
21	$0	$33,335	$0	$33,335	7.0%	$8,051
22	$0	$33,335	$0	$33,335	7.0%	$7,524
23	$0	$33,335	$0	$33,335	7.0%	$7,032
24	$0	$33,335	$0	$33,335	7.0%	$6,572
25	$0	$33,335	$10,000	$43,335	7.0%	$7,984
26	$0	$33,335	$0	$33,335	7.0%	$5,740
27	$0	$33,335	$0	$33,335	7.0%	$5,365
28	$0	$33,335	$0	$33,335	7.0%	$5,014
29	$0	$33,335	$0	$33,335	7.0%	$4,686
30	$0	$33,335	$10,000	$43,335	7.0%	$5,693
TOTAL	**$1,232,826**	**$1,062,492**	**$60,000**	**$2,355,319**		**$1,724,512**
					PV O&M	**$491,685**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	60	LF	$35.79	$2,147
2.3	Install PVC Well Screens (2" diameter)	40	LF	$19.69	$788
2.4	Install PVC Well Casing (2" diameter)	20	LF	$14.79	$296
2.5	Install Filter Pack	48	LF	$15.52	$745
2.6	Install Bentonite Seal	4	EA	$57.23	$229
2.7	Install Annular Seal	8	LF	$69.04	$552
2.8	PVC Well Plugs	4	EA	$27.86	$111
2.9	Flush-Mount Protective Cover with Locking Cap	4	EA	$451.55	$1,806
2.10	Surface Pad, Concrete 2' x 2'	4	EA	$154.79	$619
2.11	Well Development (2 HR/WELL)	8	EA	$228.23	$1,826
2.12	IDW Transportation/Disposal (drums)	4	EA	$508.52	$2,034
	Subtotal				**$13,906**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	600	LF	$27.57	$16,542
3.2	Signage	6	EA	$73.93	$444
	Subtotal				**$16,986**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	4	MONTH	$4,531	$18,124
	Subtotal				**$47,574**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	600	LF	$8.97	$5,380
	Subtotal				**$26,051**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	4,000	CY	$2.12	$8,494
6.2	Haul RW to Stockpile Area[4]	4,800	CY	$4.00	$19,202
6.3	Perimeter Air Sampling	90	EA	$243.76	$21,940
6.4	Equipment Decontamination	200	HR	$54.56	$10,913
6.5	Stockpile Management	4,800	CY	$1.44	$6,898
6.6	Stockpile Characterization[5]	10	EA	$1,535.00	$15,350
	Subtotal				**$82,798**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	4,800	CY	$2.44	$11,722
7.2	Transport RW to in-town consolidation[7]	4,320	CY	$5.52	$23,861
7.3	Equipment Decontamination	200	HR	$54.56	$10,913
7.4	Out-of-Town Transportation of Waste[7, 8]	720	TON	$170.00	$122,400
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	720	TON	$192.00	$138,240
	Subtotal				**$307,136**

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[9]	27,000	SF	$1.29	$34,830
8.8	Furnish, Place, and Spread Topsoil (6")[10]	550	CY	$34.65	$19,057
8.9	Hydroseeding with Mulch and Fertilizer	27	MSF	$43.97	$1,187
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	3850	CY	$11.83	$45,545
8.14	Install Nonwoven Geotextile Fabric	3,000	SY	$2.21	$6,630
	Subtotal				**$133,177**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	1	LS	$171,602	$171,602
	Subtotal				**$171,602**
TOTAL DIRECT COSTS					**$821,884**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$49,313
10.2	Engineering and Design (12%)				$98,626
10.3	Construction management (8%)				$65,751
10.4	Location Adjustment (9%)				$73,970
10.5	Contingency (15%)				$123,283
TOTAL OTHER COSTS					**$410,942**
TOTAL CAPITAL COST FOR ALTERNATIVE 9					**$1,232,826**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Beacon Point AOC 3 Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal.
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$3,867,421	$0	0	$3,867,421	7.0%	$3,867,421
1	$0	$64,559	$0	$64,559	7.0%	$60,336
2	$0	$64,559	$0	$64,559	7.0%	$56,389
3	$0	$33,335	$0	$33,335	7.0%	$27,211
4	$0	$33,335	$0	$33,335	7.0%	$25,431
5	$0	$33,335	$10,000	$43,335	7.0%	$30,897
6	$0	$33,335	$0	$33,335	7.0%	$22,212
7	$0	$33,335	$0	$33,335	7.0%	$20,759
8	$0	$33,335	$0	$33,335	7.0%	$19,401
9	$0	$33,335	$0	$33,335	7.0%	$18,132
10	$0	$33,335	$10,000	$43,335	7.0%	$22,029
11	$0	$33,335	$0	$33,335	7.0%	$15,837
12	$0	$33,335	$0	$33,335	7.0%	$14,801
13	$0	$33,335	$0	$33,335	7.0%	$13,833
14	$0	$33,335	$0	$33,335	7.0%	$12,928
15	$0	$33,335	$10,000	$43,335	7.0%	$15,707
16	$0	$33,335	$0	$33,335	7.0%	$11,292
17	$0	$33,335	$0	$33,335	7.0%	$10,553
18	$0	$33,335	$0	$33,335	7.0%	$9,863
19	$0	$33,335	$0	$33,335	7.0%	$9,217
20	$0	$33,335	$10,000	$43,335	7.0%	$11,199
21	$0	$33,335	$0	$33,335	7.0%	$8,051
22	$0	$33,335	$0	$33,335	7.0%	$7,524
23	$0	$33,335	$0	$33,335	7.0%	$7,032
24	$0	$33,335	$0	$33,335	7.0%	$6,572
25	$0	$33,335	$10,000	$43,335	7.0%	$7,984
26	$0	$33,335	$0	$33,335	7.0%	$5,740
27	$0	$33,335	$0	$33,335	7.0%	$5,365
28	$0	$33,335	$0	$33,335	7.0%	$5,014
29	$0	$33,335	$0	$33,335	7.0%	$4,686
30	$0	$33,335	$10,000	$43,335	7.0%	$5,693
TOTAL	**$3,867,421**	**$1,062,492**	**$60,000**	**$4,989,914**		**$4,359,107**
					PV O&M	**$491,685**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	60	LF	$35.79	$2,147
2.3	Install PVC Well Screens (2" diameter)	40	LF	$19.69	$788
2.4	Install PVC Well Casing (2" diameter)	20	LF	$14.79	$296
2.5	Install Filter Pack	48	LF	$15.52	$745
2.6	Install Bentonite Seal	4	EA	$57.23	$229
2.7	Install Annular Seal	8	LF	$69.04	$552
2.8	PVC Well Plugs	4	EA	$27.86	$111
2.9	Flush-Mount Protective Cover with Locking Cap	4	EA	$451.55	$1,806
2.10	Surface Pad, Concrete 2' x 2'	4	EA	$154.79	$619
2.11	Well Development (2 HR/WELL)	8	EA	$228.23	$1,826
2.12	IDW Transportation/Disposal (drums)	4	EA	$508.52	$2,034
	Subtotal				**$13,906**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	600	LF	$27.57	$16,542
3.2	Signage	6	EA	$73.93	$444
	Subtotal				**$16,986**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	4	MONTH	$4,531	$18,124
	Subtotal				**$47,574**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	600	LF	$8.97	$5,380
	Subtotal				**$26,051**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	4,000	CY	$2.12	$8,494
6.2	Haul RW to Stockpile Area[4]	4,800	CY	$4.00	$19,202
6.3	Perimeter Air Sampling	90	EA	$243.76	$21,940
6.4	Equipment Decontamination	200	HR	$54.56	$10,913
6.5	Stockpile Management	4,800	CY	$1.44	$6,898
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$67,448**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[5]	4,800	CY	$2.44	$11,722
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	200	HR	$54.56	$10,913
7.4	Out-of-Town Transportation of Waste[6]	7,200	TON	$170.00	$1,224,000
7.5	Out-of-Town Disposal of RW (no treatment)[6, 7]	6,480	TON	$107.10	$694,008
7.6	Out-of-Town Disposal of RW (treatment)[6, 7]	720	TON	$192.00	$138,240
	Subtotal				**$2,078,883**

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	27,000	SF	$1.29	$34,830
8.8	Furnish, Place, and Spread Topsoil (6")[9]	550	CY	$34.65	$19,057
8.9	Hydroseeding with Mulch and Fertilizer	27	MSF	$43.97	$1,187
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	3,850	CY	$11.83	$45,545
8.14	Install Nonwoven Geotextile Fabric	3,000	SY	$2.21	$6,630
	Subtotal				**$133,177**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	1	LS	$171,602	$171,602
	Subtotal				**$171,602**
TOTAL DIRECT COSTS					**$2,578,281**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$154,697
10.2	Engineering and Design (12%)				$309,394
10.3	Construction management (8%)				$206,262
10.4	Location Adjustment (9%)				$232,045
10.5	Contingency (15%)				$386,742
TOTAL OTHER COSTS					**$1,289,140**
TOTAL CAPITAL COST FOR ALTERNATIVE 10					**$3,867,421**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Beacon Point AOC 3 Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Volume includes all RW intended for disposal.
[6] A conversion factor of 1.5 was used to convert CY to TON.
[7] Volume of RW for Out-of-Town disposal assumes that 10% would be hazardous requiring treatment prior to disposal.
[8] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[10] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

G-16

AIRPORT PROPERTY NORTH OF MARINE BASIN

COST ESTIMATE BACKUP SHEETS

PRESENT VALUE ANALYSIS
ALTERNATIVE 1 - NO ACTION
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$10,000	$10,000	7.0%	$7,130
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$10,000	$10,000	7.0%	$5,083
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$10,000	$10,000	7.0%	$3,624
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$10,000	$10,000	7.0%	$2,584
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$10,000	$10,000	7.0%	$1,842
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$10,000	$10,000	7.0%	$1,314
TOTAL	**$0**	**$0**	**$60,000**	**$60,000**		**$21,578**
					PV O&M	**$21,578**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review [1]	Total	Discount Rate[2]	Present Value
0	$77,965	$0	$0	$77,965	7.0%	$77,965
1	$0	$63,989	$0	$63,989	7.0%	$59,803
2	$0	$63,989	$0	$63,989	7.0%	$55,890
3	$0	$37,046	$0	$37,046	7.0%	$30,240
4	$0	$37,046	$0	$37,046	7.0%	$28,262
5	$0	$37,046	$10,000	$47,046	7.0%	$33,543
6	$0	$37,046	$0	$37,046	7.0%	$24,685
7	$0	$37,046	$0	$37,046	7.0%	$23,070
8	$0	$37,046	$0	$37,046	7.0%	$21,561
9	$0	$37,046	$0	$37,046	7.0%	$20,150
10	$0	$37,046	$10,000	$47,046	7.0%	$23,916
11	$0	$37,046	$0	$37,046	7.0%	$17,600
12	$0	$37,046	$0	$37,046	7.0%	$16,449
13	$0	$37,046	$0	$37,046	7.0%	$15,373
14	$0	$37,046	$0	$37,046	7.0%	$14,367
15	$0	$37,046	$10,000	$47,046	7.0%	$17,052
16	$0	$37,046	$0	$37,046	7.0%	$12,549
17	$0	$37,046	$0	$37,046	7.0%	$11,728
18	$0	$37,046	$0	$37,046	7.0%	$10,960
19	$0	$37,046	$0	$37,046	7.0%	$10,243
20	$0	$37,046	$10,000	$47,046	7.0%	$12,158
21	$0	$37,046	$0	$37,046	7.0%	$8,947
22	$0	$37,046	$0	$37,046	7.0%	$8,362
23	$0	$37,046	$0	$37,046	7.0%	$7,815
24	$0	$37,046	$0	$37,046	7.0%	$7,303
25	$0	$37,046	$10,000	$47,046	7.0%	$8,668
26	$0	$37,046	$0	$37,046	7.0%	$6,379
27	$0	$37,046	$0	$37,046	7.0%	$5,962
28	$0	$37,046	$0	$37,046	7.0%	$5,572
29	$0	$37,046	$0	$37,046	7.0%	$5,207
30	$0	$37,046	$10,000	$47,046	7.0%	$6,180
TOTAL	**$77,965**	**$1,165,257**	**$60,000**	**$1,303,222**		**$607,958**
					PV O&M	**$529,993**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.1	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage					
3.1	Chain Link Fence	1,560	LF	$27.57	$43,009
3.2	Signage	16	EA	$73.93	$1,183
	Subtotal				**$44,192**
TOTAL DIRECT COSTS					**$77,965**
TOTAL CAPITAL COST FOR ALTERNATIVE 2					**$77,965**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Airport Property North of

PVC = polyvinyl chloride
IDW = investigation derived waste
LS = lump sum
HR = hour
EA = each
LF = linear foot

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.47	MSF	$56.31	$26	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	52	LF	$27.57	$1,434	see cost assumptions
OM 2.6	Sign Replacement[5]	64	EA	$73.95	$4,733	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	1	EA	$321.75	$322	see cost assumptions
	Subtotal				**$21,965**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$63,989**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$37,046**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Airport Property North of Marine Basin Property.

[2] Assumed that 1% of vegetated surfaces would require repair annually (need for repair to be established during 5-Year Reviews).

[3] Assumed that there is no Raymark waste below paved surfaces at this property group.

[4] Estimated that 100% of fencing would require replacement over the period of O&M (need for repair to be established during 5-Year Reviews).

[5] Estimated that signage would require replacement 4 times over the period of O&M (need for repair to be established during 5-Year Reviews).

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum

HR = hour

EA = each

MSF = thousand square feet

SF = square feet

LF = linear foot

FOL = field operations leader

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review [1]	Total	Discount Rate[2]	Present Value
0	$2,738,768	$0	$0	$2,738,768	7.0%	$2,738,768
1	$0	$59,963	$0	$59,963	7.0%	$56,040
2	$0	$59,963	$0	$59,963	7.0%	$52,374
3	$0	$33,020	$0	$33,020	7.0%	$26,954
4	$0	$33,020	$0	$33,020	7.0%	$25,191
5	$0	$33,020	$10,000	$43,020	7.0%	$30,673
6	$0	$33,020	$0	$33,020	7.0%	$22,002
7	$0	$33,020	$0	$33,020	7.0%	$20,563
8	$0	$33,020	$0	$33,020	7.0%	$19,218
9	$0	$33,020	$0	$33,020	7.0%	$17,961
10	$0	$33,020	$10,000	$43,020	7.0%	$21,869
11	$0	$33,020	$0	$33,020	7.0%	$15,687
12	$0	$33,020	$0	$33,020	7.0%	$14,661
13	$0	$33,020	$0	$33,020	7.0%	$13,702
14	$0	$33,020	$0	$33,020	7.0%	$12,806
15	$0	$33,020	$10,000	$43,020	7.0%	$15,592
16	$0	$33,020	$0	$33,020	7.0%	$11,185
17	$0	$33,020	$0	$33,020	7.0%	$10,453
18	$0	$33,020	$0	$33,020	7.0%	$9,769
19	$0	$33,020	$0	$33,020	7.0%	$9,130
20	$0	$33,020	$10,000	$43,020	7.0%	$11,117
21	$0	$33,020	$0	$33,020	7.0%	$7,975
22	$0	$33,020	$0	$33,020	7.0%	$7,453
23	$0	$33,020	$0	$33,020	7.0%	$6,965
24	$0	$33,020	$0	$33,020	7.0%	$6,510
25	$0	$33,020	$10,000	$43,020	7.0%	$7,926
26	$0	$33,020	$0	$33,020	7.0%	$5,686
27	$0	$33,020	$0	$33,020	7.0%	$5,314
28	$0	$33,020	$0	$33,020	7.0%	$4,966
29	$0	$33,020	$0	$33,020	7.0%	$4,641
30	$0	$33,020	$10,000	$43,020	7.0%	$5,651
TOTAL	**$2,738,768**	**$1,044,480**	**$60,000**	**$3,843,248**		**$3,218,804**
					PV O&M	**$480,036**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.1	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	1,560	LF	$27.57	$43,009
3.2	Signage	16	EA	$73.93	$1,183
	Subtotal				**$44,192**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	8	MONTH	$4,531	$36,247
	Subtotal				**$65,698**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	1,560	LF	$8.97	$13,987
	Subtotal				**$34,658**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil[3]	11,111	CY	$2.12	$23,595
6.2	Haul RW/Soil to Stockpile Area[4]	13,333	CY	$4.00	$53,340
6.3	Perimeter Air Sampling	250	EA	$243.76	$60,944
6.4	Equipment Decontamination	556	HR	$54.56	$30,314
6.5	Stockpile Management	13,333	CY	$1.44	$19,162
6.6	Stockpile Characterization[5]	40	EA	$1,535.00	$61,400
	Subtotal				**$248,755**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load Raymark Waste into Trucks[6]	6,267	CY	$2.44	$15,304
7.2	Transport Raymark Waste to in-town consolidation[7]	5,640	CY	$5.52	$31,152
7.3	Equipment Decontamination	556	HR	$54.56	$30,314
7.4	Out-of-Town Transportation of Waste[7, 8]	940	TON	$170.00	$159,800
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Treatment of Raymark Waste[7, 8]	940	TON	$192.00	$180,480
	Subtotal				**$417,050**

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[9]	6,360	CY	$2.40	$15,279
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[9]	2,037	CY	$27.00	$54,990
8.3	Install Geosynthetic Clay Liner (bottom layer)	100,000	SF	$2.86	$286,246
8.4	Install 60 mil HDPE liner	100,000	SF	$2.84	$284,189
8.5	Install Geosynthetic Drainage Layer	100,000	SF	$0.65	$65,399
8.6	Furnish, Spread, and Compact Soil Layer (24")[9]	1,788	CY	$11.83	$21,153
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	100,000	SF	$1.29	$129,000
8.8	Furnish, Place, and Spread Topsoil (6")[9]	2,037	CY	$34.65	$70,583
8.9	Hydroseeding with Mulch and Fertilizer	100	MSF	$43.97	$4,397
8.1	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	11,111	SY	$2.21	$24,556
	Subtotal				**$981,720**
9.0	**Flood Storage Mitigation/Stormwater Managemen[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$1,825,845**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$109,551
10.2	Engineering and Design (12%)				$219,101
10.3	Construction management (8%)				$146,068
10.4	Location Adjustment (9%)				$164,326
10.5	Contingency (15%)				$273,877
TOTAL OTHER COSTS					**$912,923**
TOTAL CAPITAL COST FOR ALTERNATIVE 3					**$2,738,768**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Airport Property North of Marine Basin Property.

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to excavated to a depth of 3-ft below ground surface and additional soil that requires excavation to faciliate cap construction.

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less additionally excavated soil).

[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[8] A conversion factor of 1.5 was used to convert CY to TON.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates for construction of the 24-inch protective barrier.

[10] Impacts to floodplains will be evaluated during Remedial Design and will require compensation via backfill material selection to ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	200	MSF	$7.34	$1,467	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	1.00	MSF	$56.31	$56	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	3	EA	$321.75	$965	see cost assumptions
	Subtotal				**$17,939**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$59,963**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$33,020**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Airport Property North of Marine Basin Property.

[2] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[3] Assumed that there is no Raymark waste below paved surfaces at this property group.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum

HR = hour

EA = each

MSF = thousand square feet

SF = square feet

LF = linear foot

FOL = field operations leader

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$6,171,599	$0	$0	$6,171,599	7.0%	$6,171,599
1	$0	$59,963	$0	$59,963	7.0%	$56,040
2	$0	$59,963	$0	$59,963	7.0%	$52,374
3	$0	$33,020	$0	$33,020	7.0%	$26,954
4	$0	$33,020	$0	$33,020	7.0%	$25,191
5	$0	$33,020	$10,000	$43,020	7.0%	$30,673
6	$0	$33,020	$0	$33,020	7.0%	$22,002
7	$0	$33,020	$0	$33,020	7.0%	$20,563
8	$0	$33,020	$0	$33,020	7.0%	$19,218
9	$0	$33,020	$0	$33,020	7.0%	$17,961
10	$0	$33,020	$10,000	$43,020	7.0%	$21,869
11	$0	$33,020	$0	$33,020	7.0%	$15,687
12	$0	$33,020	$0	$33,020	7.0%	$14,661
13	$0	$33,020	$0	$33,020	7.0%	$13,702
14	$0	$33,020	$0	$33,020	7.0%	$12,806
15	$0	$33,020	$10,000	$43,020	7.0%	$15,592
16	$0	$33,020	$0	$33,020	7.0%	$11,185
17	$0	$33,020	$0	$33,020	7.0%	$10,453
18	$0	$33,020	$0	$33,020	7.0%	$9,769
19	$0	$33,020	$0	$33,020	7.0%	$9,130
20	$0	$33,020	$10,000	$43,020	7.0%	$11,117
21	$0	$33,020	$0	$33,020	7.0%	$7,975
22	$0	$33,020	$0	$33,020	7.0%	$7,453
23	$0	$33,020	$0	$33,020	7.0%	$6,965
24	$0	$33,020	$0	$33,020	7.0%	$6,510
25	$0	$33,020	$10,000	$43,020	7.0%	$7,926
26	$0	$33,020	$0	$33,020	7.0%	$5,686
27	$0	$33,020	$0	$33,020	7.0%	$5,314
28	$0	$33,020	$0	$33,020	7.0%	$4,966
29	$0	$33,020	$0	$33,020	7.0%	$4,641
30	$0	$33,020	$10,000	$43,020	7.0%	$5,651
TOTAL	**$6,171,599**	**$1,044,480**	**$60,000**	**$7,276,079**		**$6,651,635**
					PV O&M	**$480,036**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.1	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	1,560	LF	$27.57	$43,009
3.2	Signage	16	EA	$73.93	$1,183
	Subtotal				**$44,192**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	8	MONTH	$4,531	$36,247
	Subtotal				**$65,698**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	1,560	LF	$8.97	$13,987
	Subtotal				**$34,658**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil[3]	11,111	CY	$2.12	$23,595
6.2	Haul RW/Soil to Stockpile Area[4]	13,333	CY	$4.00	$53,340
6.3	Perimeter Air Sampling	250	EA	$243.76	$60,944
6.4	Equipment Decontamination	556	HR	$54.56	$30,314
6.5	Stockpile Management	13,333	CY	$1.44	$19,162
6.6	Stockpile Characterization[5]	24	EA	$1,535.00	$36,840
	Subtotal				**$224,195**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load Raymark Waste into Trucks[6]	6,267	CY	$2.44	$15,304
7.2	Transport Raymark Waste to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	556	HR	$54.56	$30,314
7.4	Out-of-Town Transportation of Waste[7]	9,400	TON	$170.00	$1,598,000
7.5	Out-of-Town Disposal of Waste (no treatment)[7, 8]	8,460	TON	$107.10	$906,066
7.6	Out-of-Town Treatment of Raymark Waste[7, 8]	940	TON	$192.00	$180,480
	Subtotal				**$2,730,164**

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[9]	6,360	CY	$2.40	$15,279
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[9]	2,037	CY	$27.00	$54,990
8.3	Install Geosynthetic Clay Liner (bottom layer)	100,000	SF	$2.86	$286,246
8.4	Install 60 mil HDPE liner	100,000	SF	$2.84	$284,189
8.5	Install Geosynthetic Drainage Layer	100,000	SF	$0.65	$65,399
8.6	Furnish, Spread, and Compact Soil Layer (24")[9]	1,788	CY	$11.83	$21,153
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	100,000	SF	$1.29	$129,000
8.8	Furnish, Place, and Spread Topsoil (6")[9]	2,037	CY	$34.65	$70,583
8.9	Hydroseeding with Mulch and Fertilizer	100	MSF	$43.97	$4,397
8.1	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	11,111	SY	$2.21	$24,556
	Subtotal				**$981,720**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$4,114,399**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$246,864
10.2	Engineering and Design (12%)				$493,728
10.3	Construction management (8%)				$329,152
10.4	Location Adjustment (9%)				$370,296
10.5	Contingency (15%)				$617,160
TOTAL OTHER COSTS					**$2,057,200**
TOTAL CAPITAL COST FOR ALTERNATIVE 4					**$6,171,599**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Airport Property North of Marine Basin Property.

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to excavated to a depth of 3-ft below ground surface and additional soil that requires excavation to faciliate cap construction.

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500).

[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less additionally excavated soil).

[7] A conversion factor of 1.5 was used to convert CY to TON.

[8] Volume of RW for disposal assumes 10% would be hazardous requiring treatment prior to disposal.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates for construction of the 24-inch protective barrier.

[10] Impacts to floodplains will be evaluated during Remedial Design and will require compensation via backfill material selection to ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$1,727,312	$0	$0	$1,727,312	7.0%	$1,727,312
1	$0	$45,728	$0	$45,728	7.0%	$42,737
2	$0	$45,728	$0	$45,728	7.0%	$39,941
3	$0	$9,804	$0	$9,804	7.0%	$8,003
4	$0	$9,804	$0	$9,804	7.0%	$7,479
5	$0	$9,804	$10,000	$19,804	7.0%	$14,120
6	$0	$9,804	$0	$9,804	7.0%	$6,533
7	$0	$9,804	$0	$9,804	7.0%	$6,105
8	$0	$9,804	$0	$9,804	7.0%	$5,706
9	$0	$9,804	$0	$9,804	7.0%	$5,333
10	$0	$9,804	$10,000	$19,804	7.0%	$10,067
11	$0	$9,804	$0	$9,804	7.0%	$4,658
12	$0	$9,804	$0	$9,804	7.0%	$4,353
13	$0	$9,804	$0	$9,804	7.0%	$4,068
14	$0	$9,804	$0	$9,804	7.0%	$3,802
15	$0	$9,804	$10,000	$19,804	7.0%	$7,178
16	$0	$9,804	$0	$9,804	7.0%	$3,321
17	$0	$9,804	$0	$9,804	7.0%	$3,104
18	$0	$9,804	$0	$9,804	7.0%	$2,901
19	$0	$9,804	$0	$9,804	7.0%	$2,711
20	$0	$9,804	$10,000	$19,804	7.0%	$5,118
21	$0	$9,804	$0	$9,804	7.0%	$2,368
22	$0	$9,804	$0	$9,804	7.0%	$2,213
23	$0	$9,804	$0	$9,804	7.0%	$2,068
24	$0	$9,804	$0	$9,804	7.0%	$1,933
25	$0	$9,804	$10,000	$19,804	7.0%	$3,649
26	$0	$9,804	$0	$9,804	7.0%	$1,688
27	$0	$9,804	$0	$9,804	7.0%	$1,578
28	$0	$9,804	$0	$9,804	7.0%	$1,475
29	$0	$9,804	$0	$9,804	7.0%	$1,378
30	$0	$9,804	$10,000	$19,804	7.0%	$2,602
TOTAL	**$1,727,312**	**$365,967**	**$60,000**	**$2,153,279**		**$1,935,499**
					PV O&M	**$208,187**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.1	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	1,560	LF	$27.57	$43,009
3.2	Signage	16	EA	$73.93	$1,183
	Subtotal				**$44,192**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	6	MONTH	$4,531	$27,185
	Subtotal				**$56,636**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	1,560	LF	$8.97	$13,987
	Subtotal				**$34,658**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[3]	8,022	CY	$2.12	$17,036
6.2	Haul RW/Soil to Stockpile Area[4]	9,627	CY	$4.00	$38,511
6.3	Perimeter Air Sampling	181	EA	$243.76	$44,001
6.4	Equipment Decontamination	401	HR	$54.56	$21,886
6.5	Stockpile Management	9,627	CY	$1.44	$13,835
6.6	Stockpile Characterization[5]	10	EA	$1,535.00	$15,350
	Subtotal				**$150,620**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	9,400	CY	$2.44	$22,956
7.2	Transport RW to in-town consolidation[7]	8,460	CY	$5.52	$46,728
7.3	Equipment Decontamination	401	HR	$54.56	$21,886
7.4	Out-of-Town Transportation of Waste[7, 8]	1,410	TON	$170.00	$239,700
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)[7, 8]	1,410	TON	$192.00	$270,720
	Subtotal				**$601,991**

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[9]	204	CY	$2.40	$490
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[10]	47,000	SF	$1.29	$60,630
8.8	Furnish, Place, and Spread Topsoil (6")[9]	1,165	CY	$34.65	$40,373
8.9	Hydroseeding with Mulch and Fertilizer	57	MSF	$43.97	$2,515
8.1	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	7,455	CY	$11.83	$88,194
8.14	Install Nonwoven Geotextile Fabric	5,222	SY	$2.21	$11,541
	Subtotal				**$229,672**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$1,151,541**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$69,092
10.2	Engineering and Design (12%)				$138,185
10.3	Construction management (8%)				$92,123
10.4	Location Adjustment (9%)				$103,639
10.5	Contingency (15%)				$172,731
TOTAL OTHER COSTS					**$575,771**
TOTAL CAPITAL COST FOR ALTERNATIVE 5					**$1,727,312**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Airport Property North of Marine Basin Property.

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to excavated to a depth of 4.5-ft below ground surface and additional soil that would be required to be removed to

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[8] A conversion factor of 1.5 was used to convert CY to TON.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[10] Delineation ("warning") layer included for excavation area where waste is left-in-place.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	10	HR	$110.00	$1,100	see cost assumptions
OM.2.2	Mowing (twice per year)[2]	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[3]	0.57	MSF	$56.31	$32	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[4]	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[5]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[6]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	1	EA	$321.75	$322	see cost assumptions
	Subtotal				**$3,704**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[7]					**$45,728**	
ANNUAL O&M COST (YEARS 3-30)[8]					**$9,804**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Airport Property North of Marine Basin Property.

[2] Assume no mowing required due to excavation of Raymark waste to the groundwater table elevation.

[3] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[4] Assumed that there is no Raymark waste below paved surfaces at this property group.

[5] Assume fencing will not be required following remedial action.

[6] Assume signage will not be required following remedial action.

[7] O&M for Years 1 and 2 include quarterly groundwater monitoring with annual inspection/repairs of ground surface and annual deed inspection, with one annual report for all O&M activities.

[8] O&M for Years 3 - 30 include annual inspection and repairs to ground surface and annual deed inspection, but may not require additional groundwater sampling pending analytical data and concurrence from the State following the first 2 years of data collection, therefore additional groundwater sampling is not included.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum

HR = hour

EA = each

MSF = thousand square feet

SF = square feet

LF = linear foot

FOL = field operations leader

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$6,911,095	$0	$0	$6,911,095	7.0%	$6,911,095
1	$0	$45,728	$0	$45,728	7.0%	$42,737
2	$0	$45,728	$0	$45,728	7.0%	$39,941
3	$0	$9,804	$0	$9,804	7.0%	$8,003
4	$0	$9,804	$0	$9,804	7.0%	$7,479
5	$0	$9,804	$10,000	$19,804	7.0%	$14,120
6	$0	$9,804	$0	$9,804	7.0%	$6,533
7	$0	$9,804	$0	$9,804	7.0%	$6,105
8	$0	$9,804	$0	$9,804	7.0%	$5,706
9	$0	$9,804	$0	$9,804	7.0%	$5,333
10	$0	$9,804	$10,000	$19,804	7.0%	$10,067
11	$0	$9,804	$0	$9,804	7.0%	$4,658
12	$0	$9,804	$0	$9,804	7.0%	$4,353
13	$0	$9,804	$0	$9,804	7.0%	$4,068
14	$0	$9,804	$0	$9,804	7.0%	$3,802
15	$0	$9,804	$10,000	$19,804	7.0%	$7,178
16	$0	$9,804	$0	$9,804	7.0%	$3,321
17	$0	$9,804	$0	$9,804	7.0%	$3,104
18	$0	$9,804	$0	$9,804	7.0%	$2,901
19	$0	$9,804	$0	$9,804	7.0%	$2,711
20	$0	$9,804	$10,000	$19,804	7.0%	$5,118
21	$0	$9,804	$0	$9,804	7.0%	$2,368
22	$0	$9,804	$0	$9,804	7.0%	$2,213
23	$0	$9,804	$0	$9,804	7.0%	$2,068
24	$0	$9,804	$0	$9,804	7.0%	$1,933
25	$0	$9,804	$10,000	$19,804	7.0%	$3,649
26	$0	$9,804	$0	$9,804	7.0%	$1,688
27	$0	$9,804	$0	$9,804	7.0%	$1,578
28	$0	$9,804	$0	$9,804	7.0%	$1,475
29	$0	$9,804	$0	$9,804	7.0%	$1,378
30	$0	$9,804	$10,000	$19,804	7.0%	$2,602
TOTAL	**$6,911,095**	**$365,967**	**$60,000**	**$7,337,062**		**$7,119,283**
					PV O&M	**$208,187**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.1	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	1,560	LF	$27.57	$43,009
3.2	Signage	16	EA	$73.93	$1,183
	Subtotal				**$44,192**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	6	MONTH	$4,531	$27,185
	Subtotal				**$56,636**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	1560	LF	$8.97	$13,987
	Subtotal				**$34,658**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[3]	8,022	CY	$2.12	$17,036
6.2	Haul RW/Soil to Stockpile Area[4]	9,627	CY	$4.00	$38,511
6.3	Perimeter Air Sampling	181	EA	$243.76	$44,001
6.4	Equipment Decontamination	401	HR	$54.56	$21,886
6.5	Stockpile Management	9,627	CY	$1.44	$13,835
6.6	Stockpile Characterization[5]	1	EA	$1,535.00	$1,535
	Subtotal				**$136,805**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load Raymark Waste into Trucks[6]	9,400	CY	$2.44	$22,956
7.2	Transport Raymark Waste to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	401	HR	$54.56	$21,886
7.4	Out-of-Town Transportation of Waste[7]	14,100	TON	$170.00	$2,397,000
7.5	Out-of-Town Disposal of Waste (no treatment)[7, 8]	12,690	TON	$107.10	$1,359,099
7.6	Out-of-Town Treatment of Raymark Waste[7, 8]	1,410	TON	$192.00	$270,720
	Subtotal				**$4,071,661**

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[9]	204	CY	$2.40	$490
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[10]	47000	SF	$1.29	$60,630
8.8	Furnish, Place, and Spread Topsoil (6")[9]	1165	CY	$34.65	$40,373
8.9	Hydroseeding with Mulch and Fertilizer	57	MSF	$43.97	$2,515
8.1	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	7455	CY	$11.83	$88,194
8.14	Install Nonwoven Geotextile Fabric	5222	SY	$2.21	$11,541
	Subtotal				**$229,672**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$4,607,397**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$276,444
10.2	Engineering and Design (12%)				$552,888
10.3	Construction management (8%)				$368,592
10.4	Location Adjustment (9%)				$414,666
10.5	Contingency (15%)				$691,110
TOTAL OTHER COSTS					**$2,303,698**
TOTAL CAPITAL COST FOR ALTERNATIVE 6					**$6,911,095**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Airport Property North of Marine Basin Property

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to excavated to a depth of 4.5-ft below ground surface and additional soil that would be required to be removed to

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[7] A conversion factor of 1.5 was used to convert CY to TON.

[8] Volume of RW for disposal assumes 10% would be hazardous requiring treatment prior to disposal.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[10] Delineation ("warning") layer included for excavation area where waste is left-in-place.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review	Total	Discount Rate	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Notes:
This Alternative is not applicable to this property - see Section 4.16 of the FS.

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.1	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0 Fencing and Signage					
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.93	$0
	Subtotal				**$0**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load Raymark Waste into Trucks	0	CY	$2.44	$0
7.2	Transport Raymark Waste to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of Waste	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Treatment of Raymark Waste	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[8]	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.1	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 3" binder, 3" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405.12	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 7					**$0**

Notes:
This Alternative is not applicable to this property - see Section 4.16 of the FS.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	94	MSF	$7.34	$690	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.47	MSF	$56.31	$26	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[5]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[6]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	3	EA	$321.75	$965	see cost assumptions
	Subtotal				**$17,131**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[7]					**$59,155**	
ANNUAL O&M COST (YEARS 3-30)[8]					**$32,212**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Airport Property North of Marine Basin Property.

[2] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[3] Assumed that there is no Raymark waste below paved surfaces at this property group.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum

HR = hour

EA = each

MSF = thousand square feet

SF = square feet

LF = linear foot

FOL = field operations leader

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review	Total	Discount Rate	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Notes:
This Alternative is not applicable to this property - see Section 4.16 of the FS.

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.1	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0 Fencing and Signage					
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.93	$0
	Subtotal				**$0**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load Raymark Waste into Trucks	0	CY	$2.44	$0
7.2	Transport Raymark Waste to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of Waste	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Treatment of Raymark Waste	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[8]	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.1	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 3" binder, 3" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405.12	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 8					**$0**

Notes:
This Alternative is not applicable to this property - see Section 4.16 of the FS.

PRESENT VALUE ANALYSIS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$1,590,043	$0	$0	$1,590,043	7.0%	$1,590,043
1	$0	$59,155	$0	$59,155	7.0%	$55,285
2	$0	$59,155	$0	$59,155	7.0%	$51,669
3	$0	$32,212	$0	$32,212	7.0%	$26,295
4	$0	$32,212	$0	$32,212	7.0%	$24,575
5	$0	$32,212	$10,000	$42,212	7.0%	$30,097
6	$0	$32,212	$0	$32,212	7.0%	$21,464
7	$0	$32,212	$0	$32,212	7.0%	$20,060
8	$0	$32,212	$0	$32,212	7.0%	$18,748
9	$0	$32,212	$0	$32,212	7.0%	$17,521
10	$0	$32,212	$10,000	$42,212	7.0%	$21,459
11	$0	$32,212	$0	$32,212	7.0%	$15,304
12	$0	$32,212	$0	$32,212	7.0%	$14,303
13	$0	$32,212	$0	$32,212	7.0%	$13,367
14	$0	$32,212	$0	$32,212	7.0%	$12,493
15	$0	$32,212	$10,000	$42,212	7.0%	$15,300
16	$0	$32,212	$0	$32,212	7.0%	$10,911
17	$0	$32,212	$0	$32,212	7.0%	$10,198
18	$0	$32,212	$0	$32,212	7.0%	$9,530
19	$0	$32,212	$0	$32,212	7.0%	$8,907
20	$0	$32,212	$10,000	$42,212	7.0%	$10,908
21	$0	$32,212	$0	$32,212	7.0%	$7,780
22	$0	$32,212	$0	$32,212	7.0%	$7,271
23	$0	$32,212	$0	$32,212	7.0%	$6,795
24	$0	$32,212	$0	$32,212	7.0%	$6,351
25	$0	$32,212	$10,000	$42,212	7.0%	$7,778
26	$0	$32,212	$0	$32,212	7.0%	$5,547
27	$0	$32,212	$0	$32,212	7.0%	$5,184
28	$0	$32,212	$0	$32,212	7.0%	$4,845
29	$0	$32,212	$0	$32,212	7.0%	$4,528
30	$0	$32,212	$10,000	$42,212	7.0%	$5,545
TOTAL	**$1,590,043**	**$1,020,257**	**$60,000**	**$2,670,299**		**$2,060,059**
					PV O&M	**$470,016**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.1	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	1,560	LF	$27.57	$43,009
3.2	Signage	16	EA	$73.93	$1,183
	Subtotal				**$44,192**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	6	MONTH	$4,531	$27,185
	Subtotal				**$56,636**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	1,560	LF	$8.97	$13,987
	Subtotal				**$34,658**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	6,963	CY	$2.12	$14,786
6.2	Haul RW to Stockpile Area[4]	8,356	CY	$4.00	$33,426
6.3	Perimeter Air Sampling	157	EA	$243.76	$38,192
6.4	Equipment Decontamination	348	HR	$54.56	$18,997
6.5	Stockpile Management	8,356	CY	$1.44	$12,008
6.6	Stockpile Characterization[5]	17	EA	$1,535.00	$26,095
	Subtotal				**$143,504**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	8,356	CY	$2.44	$20,405
7.2	Transport RW to in-town consolidation[7]	7,520	CY	$5.52	$41,536
7.3	Equipment Decontamination	348	HR	$54.56	$18,997
7.4	Out-of-Town Transportation of Waste[7, 8]	1,253	TON	$170.00	$213,067
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	1,253	TON	$192.00	$240,640
	Subtotal				**$534,645**

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[9]	47,000	SF	$1.29	$60,630
8.8	Furnish, Place, and Spread Topsoil (6")[10]	957	CY	$34.65	$33,174
8.9	Hydroseeding with Mulch and Fertilizer	47	MSF	$43.97	$2,067
8.1	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	6702	CY	$11.83	$79,282
8.14	Install Nonwoven Geotextile Fabric	5,222	SY	$2.21	$11,541
	Subtotal				**$212,621**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$1,060,028**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$63,602
10.2	Engineering and Design (12%)				$127,203
10.3	Construction management (8%)				$84,802
10.4	Location Adjustment (9%)				$95,403
10.5	Contingency (15%)				$159,004
TOTAL OTHER COSTS					**$530,014**
TOTAL CAPITAL COST FOR ALTERNATIVE 9					**$1,590,043**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Airport Property North of Marine Basin Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal.
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$6,177,128	$0	$0	$6,177,128	7.0%	$6,177,128
1	$0	$59,155	$0	$59,155	7.0%	$55,285
2	$0	$59,155	$0	$59,155	7.0%	$51,669
3	$0	$32,212	$0	$32,212	7.0%	$26,295
4	$0	$32,212	$0	$32,212	7.0%	$24,575
5	$0	$32,212	$10,000	$42,212	7.0%	$30,097
6	$0	$32,212	$0	$32,212	7.0%	$21,464
7	$0	$32,212	$0	$32,212	7.0%	$20,060
8	$0	$32,212	$0	$32,212	7.0%	$18,748
9	$0	$32,212	$0	$32,212	7.0%	$17,521
10	$0	$32,212	$10,000	$42,212	7.0%	$21,459
11	$0	$32,212	$0	$32,212	7.0%	$15,304
12	$0	$32,212	$0	$32,212	7.0%	$14,303
13	$0	$32,212	$0	$32,212	7.0%	$13,367
14	$0	$32,212	$0	$32,212	7.0%	$12,493
15	$0	$32,212	$10,000	$42,212	7.0%	$15,300
16	$0	$32,212	$0	$32,212	7.0%	$10,911
17	$0	$32,212	$0	$32,212	7.0%	$10,198
18	$0	$32,212	$0	$32,212	7.0%	$9,530
19	$0	$32,212	$0	$32,212	7.0%	$8,907
20	$0	$32,212	$10,000	$42,212	7.0%	$10,908
21	$0	$32,212	$0	$32,212	7.0%	$7,780
22	$0	$32,212	$0	$32,212	7.0%	$7,271
23	$0	$32,212	$0	$32,212	7.0%	$6,795
24	$0	$32,212	$0	$32,212	7.0%	$6,351
25	$0	$32,212	$10,000	$42,212	7.0%	$7,778
26	$0	$32,212	$0	$32,212	7.0%	$5,547
27	$0	$32,212	$0	$32,212	7.0%	$5,184
28	$0	$32,212	$0	$32,212	7.0%	$4,845
29	$0	$32,212	$0	$32,212	7.0%	$4,528
30	$0	$32,212	$10,000	$42,212	7.0%	$5,545
TOTAL	**$6,177,128**	**$1,020,257**	**$60,000**	**$7,257,384**		**$6,647,144**
					PV O&M	**$470,016**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.1	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	1,560	LF	$27.57	$43,009
3.2	Signage	16	EA	$73.93	$1,183
	Subtotal				**$44,192**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	6	MONTH	$4,531	$27,185
	Subtotal				**$56,636**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	1,560	LF	$8.97	$13,987
	Subtotal				**$34,658**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	6,963	CY	$2.12	$14,786
6.2	Haul RW to Stockpile Area[4]	8,356	CY	$4.00	$33,426
6.3	Perimeter Air Sampling	157	EA	$243.76	$38,192
6.4	Equipment Decontamination	348	HR	$54.56	$18,997
6.5	Stockpile Management	8,356	CY	$1.44	$12,008
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$117,409**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[5]	8,356	CY	$2.44	$20,405
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	348	HR	$54.56	$18,997
7.4	Out-of-Town Transportation of Waste[6]	12,533	TON	$170.00	$2,130,667
7.5	Out-of-Town Disposal of RW (no treatment)[6, 7]	11,280	TON	$107.10	$1,208,088
7.6	Out-of-Town Disposal of RW (treatment)[6, 7]	1,253	TON	$192.00	$240,640
	Subtotal				**$3,618,796**

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	47,000	SF	$1.29	$60,630
8.8	Furnish, Place, and Spread Topsoil (6")[9]	957	CY	$34.65	$33,174
8.9	Hydroseeding with Mulch and Fertilizer	47	MSF	$43.97	$2,067
8.1	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	6,702	CY	$11.83	$79,282
8.14	Install Nonwoven Geotextile Fabric	5,222	SY	$2.21	$11,541
	Subtotal				**$212,621**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$4,118,085**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$247,085
10.2	Engineering and Design (12%)				$494,170
10.3	Construction management (8%)				$329,447
10.4	Location Adjustment (9%)				$370,628
10.5	Contingency (15%)				$617,713
TOTAL OTHER COSTS					**$2,059,043**
TOTAL CAPITAL COST FOR ALTERNATIVE 10					**$6,177,128**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Airport Property North of Marine Basin Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Volume includes all RW intended for disposal.
[6] A conversion factor of 1.5 was used to convert CY to TON.
[7] Volume of RW for Out-of-Town disposal assumes that 10% would be hazardous requiring treatment prior to disposal.
[8] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[10] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

G-17

WOOSTER PARK

COST ESTIMATE BACKUP SHEETS

PRESENT VALUE ANALYSIS
ALTERNATIVE 1 - NO ACTION
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$10,000	$10,000	7.0%	$7,130
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$10,000	$10,000	7.0%	$5,083
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$10,000	$10,000	7.0%	$3,624
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$10,000	$10,000	7.0%	$2,584
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$10,000	$10,000	7.0%	$1,842
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$10,000	$10,000	7.0%	$1,314
TOTAL	**$0**	**$0**	**$60,000**	**$60,000**		**$21,578**
					PV O&M	**$21,578**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[4] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review [1]	Total	Discount Rate[2]	Present Value
0	$54,498	$0	$0	$54,498	7.0%	$54,498
1	$0	$60,837	$0	$60,837	7.0%	$56,857
2	$0	$60,837	$0	$60,837	7.0%	$53,138
3	$0	$33,894	$0	$33,894	7.0%	$27,668
4	$0	$33,894	$0	$33,894	7.0%	$25,858
5	$0	$33,894	$10,000	$43,894	7.0%	$31,296
6	$0	$33,894	$0	$33,894	7.0%	$22,585
7	$0	$33,894	$0	$33,894	7.0%	$21,108
8	$0	$33,894	$0	$33,894	7.0%	$19,727
9	$0	$33,894	$0	$33,894	7.0%	$18,436
10	$0	$33,894	$10,000	$43,894	7.0%	$22,314
11	$0	$33,894	$0	$33,894	7.0%	$16,103
12	$0	$33,894	$0	$33,894	7.0%	$15,049
13	$0	$33,894	$0	$33,894	7.0%	$14,065
14	$0	$33,894	$0	$33,894	7.0%	$13,145
15	$0	$33,894	$10,000	$43,894	7.0%	$15,909
16	$0	$33,894	$0	$33,894	7.0%	$11,481
17	$0	$33,894	$0	$33,894	7.0%	$10,730
18	$0	$33,894	$0	$33,894	7.0%	$10,028
19	$0	$33,894	$0	$33,894	7.0%	$9,372
20	$0	$33,894	$10,000	$43,894	7.0%	$11,343
21	$0	$33,894	$0	$33,894	7.0%	$8,186
22	$0	$33,894	$0	$33,894	7.0%	$7,650
23	$0	$33,894	$0	$33,894	7.0%	$7,150
24	$0	$33,894	$0	$33,894	7.0%	$6,682
25	$0	$33,894	$10,000	$43,894	7.0%	$8,087
26	$0	$33,894	$0	$33,894	7.0%	$5,836
27	$0	$33,894	$0	$33,894	7.0%	$5,455
28	$0	$33,894	$0	$33,894	7.0%	$5,098
29	$0	$33,894	$0	$33,894	7.0%	$4,764
30	$0	$33,894	$10,000	$43,894	7.0%	$5,766
TOTAL	**$54,498**	**$1,070,716**	**$60,000**	**$1,185,214**		**$545,386**
					PV O&M	**$490,888**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage					
3.1	Chain Link Fence	730	LF	$27.57	$20,134
3.2	Signage	8	EA	$73.93	$591
	Subtotal				**$20,725**
TOTAL DIRECT COSTS					**$54,498**
TOTAL CAPITAL COST FOR ALTERNATIVE 2					**$54,498**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Wooster Park Property.

PVC = polyvinyl chloride
IDW = investigation derived waste
LS = lump sum
EA = each
LF = linear foot
HR = hour

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0	**Groundwater Monitoring (per event)**					
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0	**Ground Surface Inspections, Maintenance, and Repairs (per year)**					
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.07	MSF	$56.31	$4	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	24	LF	$27.57	$671	see cost assumptions
OM 2.6	Sign Replacement[5]	32	EA	$73.95	$2,366	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	1	EA	$321.75	$322	see cost assumptions
	Subtotal				**$18,813**	
OM.3.0	**Deed Restrictions**					
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$60,837**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$33,894**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Wooster Park Property.

[2] Assumed that 1% of vegetated surfaces would require repair annually (need for repair to be established during 5-Year Reviews).

[3] Assumed that there is no Raymark waste below paved surfaces at this property group.

[4] Estimated that 100% of fencing would require replacement over the period of O&M (need for repair to be established during 5-Year Reviews).

[5] Estimated that signage would require replacement 4 times over the period of O&M (need for repair to be established during 5-Year Reviews).

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum

HR = hour

EA = each

MSF = thousand square feet

SF = square feet

LF = linear foot

FOL = field operations leader

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$738,583	$0	$0	$738,583	7.0%	$738,583
1	$0	$58,790	$0	$58,790	7.0%	$54,944
2	$0	$58,790	$0	$58,790	7.0%	$51,349
3	$0	$31,847	$0	$31,847	7.0%	$25,996
4	$0	$31,847	$0	$31,847	7.0%	$24,296
5	$0	$31,847	$10,000	$41,847	7.0%	$29,836
6	$0	$31,847	$0	$31,847	7.0%	$21,221
7	$0	$31,847	$0	$31,847	7.0%	$19,833
8	$0	$31,847	$0	$31,847	7.0%	$18,535
9	$0	$31,847	$0	$31,847	7.0%	$17,322
10	$0	$31,847	$10,000	$41,847	7.0%	$21,273
11	$0	$31,847	$0	$31,847	7.0%	$15,130
12	$0	$31,847	$0	$31,847	7.0%	$14,140
13	$0	$31,847	$0	$31,847	7.0%	$13,215
14	$0	$31,847	$0	$31,847	7.0%	$12,351
15	$0	$31,847	$10,000	$41,847	7.0%	$15,167
16	$0	$31,847	$0	$31,847	7.0%	$10,788
17	$0	$31,847	$0	$31,847	7.0%	$10,082
18	$0	$31,847	$0	$31,847	7.0%	$9,422
19	$0	$31,847	$0	$31,847	7.0%	$8,806
20	$0	$31,847	$10,000	$41,847	7.0%	$10,814
21	$0	$31,847	$0	$31,847	7.0%	$7,691
22	$0	$31,847	$0	$31,847	7.0%	$7,188
23	$0	$31,847	$0	$31,847	7.0%	$6,718
24	$0	$31,847	$0	$31,847	7.0%	$6,278
25	$0	$31,847	$10,000	$41,847	7.0%	$7,710
26	$0	$31,847	$0	$31,847	7.0%	$5,484
27	$0	$31,847	$0	$31,847	7.0%	$5,125
28	$0	$31,847	$0	$31,847	7.0%	$4,790
29	$0	$31,847	$0	$31,847	7.0%	$4,476
30	$0	$31,847	$10,000	$41,847	7.0%	$5,497
TOTAL	**$738,583**	**$1,009,287**	**$60,000**	**$1,807,870**		**$1,204,061**
					PV O&M	**$465,479**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	730	LF	$27.57	$20,134
3.2	Signage	8	EA	$73.93	$591
	Subtotal				**$20,725**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	4	MONTH	$4,531	$18,124
	Subtotal				**$47,574**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0.5	ACRE	$3,968.29	$1,984
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	730	LF	$8.97	$6,548
	Subtotal				**$29,203**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil[3]	2,556	CY	$2.12	$5,427
6.2	Haul RW/Soil to Stockpile Area[4]	3,067	CY	$4.00	$12,268
6.3	Perimeter Air Sampling	58	EA	$243.76	$14,017
6.4	Equipment Decontamination	128	HR	$54.56	$6,972
6.5	Stockpile Management	3,067	CY	$1.44	$4,407
6.6	Stockpile Characterization[5]	7	EA	$1,535.00	$10,745
	Subtotal				**$53,837**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	947	CY	$2.44	$2,312
7.2	Transport RW to in-town consolidation[7]	852	CY	$5.52	$4,706
7.3	Equipment Decontamination	128	HR	$54.56	$6,972
7.4	Out-of-Town Transportation of Waste[7, 8]	142	TON	$170.00	$24,140
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of Waste (treatment)[7, 8]	142	TON	$192.00	$27,264
	Subtotal				**$65,394**

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[9]	1,874	CY	$2.40	$4,502
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[9]	469	CY	$27.00	$12,648
8.3	Install Geosynthetic Clay Liner (bottom layer)	23,000	SF	$2.86	$65,837
8.4	Install 60 mil HDPE liner	23,000	SF	$2.84	$65,363
8.5	Install Geosynthetic Drainage Layer	23,000	SF	$0.65	$15,042
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	23,000	SF	$1.29	$29,670
8.8	Furnish, Place, and Spread Topsoil (6")	469	CY	$34.65	$16,234
8.9	Hydroseeding with Mulch and Fertilizer	23	MSF	$43.97	$1,011
8.10	Place, Spread, and Compact Asphalt Base Course (12")[9]	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	2,556	SY	$2.21	$5,648
	Subtotal				**$241,883**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$492,388**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$29,543
10.2	Engineering and Design (12%)				$59,087
10.3	Construction management (8%)				$39,391
10.4	Location Adjustment (9%)				$44,315
10.5	Contingency (15%)				$73,858
TOTAL OTHER COSTS					**$246,194**
TOTAL CAPITAL COST FOR ALTERNATIVE 3					**$738,583**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Wooster Park Property.

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to excavated to a depth of 3-ft below ground surface and additional soil that requires excavation to faciliate cap construction.

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential

[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less additionally excavated soil).

[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[8] A conversion factor of 1.5 was used to convert CY to TON.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates for construction of the 24-inch protective barrier and may provide up to an additional 34 CY of soil for use within OU6.

[10] Impacts to floodplains will be evaluated during Remedial Design and will require compensation via backfill material selection to ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0	**Groundwater Monitoring (per event)**					
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0	**Ground Surface Inspections, Maintenance, and Repairs (per year)**					
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	46	MSF	$7.34	$337	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.23	MSF	$56.31	$13	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	3	EA	$321.75	$965	see cost assumptions
	Subtotal				**$16,766**	
OM.3.0	**Deed Restrictions**					
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$58,790**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$31,847**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Wooster Park Property.

[2] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[3] Assumed that there is no Raymark waste below paved surfaces at this property group.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum

HR = hour

EA = each

MSF = thousand square feet

SF = square feet

LF = linear foot

FOL = field operations leader

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$1,255,817	$0	0	$1,255,817	7.0%	$1,255,817
1	$0	$58,790	$0	$58,790	7.0%	$54,944
2	$0	$58,790	$0	$58,790	7.0%	$51,349
3	$0	$31,847	$0	$31,847	7.0%	$25,996
4	$0	$31,847	$0	$31,847	7.0%	$24,296
5	$0	$31,847	$10,000	$41,847	7.0%	$29,836
6	$0	$31,847	$0	$31,847	7.0%	$21,221
7	$0	$31,847	$0	$31,847	7.0%	$19,833
8	$0	$31,847	$0	$31,847	7.0%	$18,535
9	$0	$31,847	$0	$31,847	7.0%	$17,322
10	$0	$31,847	$10,000	$41,847	7.0%	$21,273
11	$0	$31,847	$0	$31,847	7.0%	$15,130
12	$0	$31,847	$0	$31,847	7.0%	$14,140
13	$0	$31,847	$0	$31,847	7.0%	$13,215
14	$0	$31,847	$0	$31,847	7.0%	$12,351
15	$0	$31,847	$10,000	$41,847	7.0%	$15,167
16	$0	$31,847	$0	$31,847	7.0%	$10,788
17	$0	$31,847	$0	$31,847	7.0%	$10,082
18	$0	$31,847	$0	$31,847	7.0%	$9,422
19	$0	$31,847	$0	$31,847	7.0%	$8,806
20	$0	$31,847	$10,000	$41,847	7.0%	$10,814
21	$0	$31,847	$0	$31,847	7.0%	$7,691
22	$0	$31,847	$0	$31,847	7.0%	$7,188
23	$0	$31,847	$0	$31,847	7.0%	$6,718
24	$0	$31,847	$0	$31,847	7.0%	$6,278
25	$0	$31,847	$10,000	$41,847	7.0%	$7,710
26	$0	$31,847	$0	$31,847	7.0%	$5,484
27	$0	$31,847	$0	$31,847	7.0%	$5,125
28	$0	$31,847	$0	$31,847	7.0%	$4,790
29	$0	$31,847	$0	$31,847	7.0%	$4,476
30	$0	$31,847	$10,000	$41,847	7.0%	$5,497
TOTAL	**$1,255,817**	**$1,009,287**	**$60,000**	**$2,325,104**		**$1,721,296**
					PV O&M	**$465,479**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	730	LF	$27.57	$20,134
3.2	Signage	8	EA	$73.93	$591
	Subtotal				**$20,725**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	4	MONTH	$4,531	$18,124
	Subtotal				**$47,574**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0.5	ACRE	$3,968.29	$1,984
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	730	LF	$8.97	$6,548
	Subtotal				**$29,203**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil[3]	2,556	CY	$2.12	$5,427
6.2	Haul RW/Soil to Stockpile Area[4]	3,067	CY	$4.00	$12,268
6.3	Perimeter Air Sampling	58	EA	$243.76	$14,017
6.4	Equipment Decontamination	128	HR	$54.56	$6,972
6.5	Stockpile Management	3,067	CY	$1.44	$4,407
6.6	Stockpile Characterization[5]	4	EA	$1,535.00	$6,140
	Subtotal				**$49,232**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load Raymark Waste into Trucks[6]	947	CY	$2.44	$2,312
7.2	Transport Raymark Waste to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	128	HR	$54.56	$6,972
7.4	Out-of-Town Transportation of Waste[7]	1,420	TON	$170.00	$241,400
7.5	Out-of-Town Disposal of Waste (no treatment)[7, 8]	1,278	TON	$107.10	$136,874
7.6	Out-of-Town Treatment of Raymark Waste[7, 8]	142	TON	$192.00	$27,264
	Subtotal				**$414,822**

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[9]	1,874	CY	$2.40	$4,502
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[9]	469	CY	$27.00	$12,648
8.3	Install Geosynthetic Clay Liner (bottom layer)	23,000	SF	$2.86	$65,837
8.4	Install 60 mil HDPE liner	23,000	SF	$2.84	$65,363
8.5	Install Geosynthetic Drainage Layer	23,000	SF	$0.65	$15,042
8.6	Furnish, Spread, and Compact Soil Layer (24")[9]	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	23,000	SF	$1.29	$29,670
8.8	Furnish, Place, and Spread Topsoil (6")[9]	469	CY	$34.65	$16,234
8.9	Hydroseeding with Mulch and Fertilizer	23	MSF	$43.97	$1,011
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	2,556	SY	$2.21	$5,648
	Subtotal				**$241,883**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$837,211**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$50,233
10.2	Engineering and Design (12%)				$100,465
10.3	Construction management (8%)				$66,977
10.4	Location Adjustment (9%)				$75,349
10.5	Contingency (15%)				$125,582
TOTAL OTHER COSTS					**$418,606**
TOTAL CAPITAL COST FOR ALTERNATIVE 4					**$1,255,817**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Wooster Park Property.

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to excavated to a depth of 3-ft below ground surface and additional soil that requires excavation to faciliate cap construction.

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500).

[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less additionally excavated soil).

[7] A conversion factor of 1.5 was used to convert CY to TON.

[8] Volume of RW for disposal assumes 10% would be hazardous requiring treatment prior to disposal.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates for construction of the 24-inch protective barrier and may provide up to an additional 34 CY of soil for use within OU6.

[10] Impacts to floodplains will be evaluated during Remedial Design and will require compensation via backfill material selection to ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$496,313	$0	$0	$496,313	7.0%	$496,313
1	$0	$35,924	$0	$35,924	7.0%	$33,574
2	$0	$35,924	$0	$35,924	7.0%	$31,378
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$496,313**	**$71,848**	**$0**	**$568,162**		**$561,265**
					PV O&M	**$64,952**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal; not required for complete excavation of Raymark waste

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	730	LF	$27.57	$20,134
3.2	Signage	8	EA	$73.93	$591
	Subtotal				**$20,725**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	3	MONTH	$4,531	$13,593
	Subtotal				**$43,044**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0.5	ACRE	$3,968.29	$1,984
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	730	LF	$8.97	$6,548
	Subtotal				**$29,203**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[4]	2,193	CY	$2.12	$4,656
6.2	Haul RW/Soil to Stockpile Area[5]	2,631	CY	$4.00	$10,526
6.3	Perimeter Air Sampling	49	EA	$243.76	$12,026
6.4	Equipment Decontamination	110	HR	$54.56	$5,982
6.5	Stockpile Management	2,631	CY	$1.44	$3,781
6.6	Stockpile Characterization[6]	6	EA	$1,535.00	$9,210
	Subtotal				**$46,181**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	1,893	CY	$2.44	$4,624
7.2	Transport RW to in-town consolidation[8]	1,704	CY	$5.52	$9,412
7.3	Equipment Decontamination	110	HR	$54.56	$5,982
7.4	Out-of-Town Transportation of RW[8, 9]	284	TON	$170.00	$48,280
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[8, 9]	284	TON	$192.00	$54,528
	Subtotal				**$122,826**

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	664	CY	$2.40	$1,595
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	314	CY	$34.65	$10,870
8.9	Hydroseeding with Mulch and Fertilizer	15	MSF	$43.97	$677
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	1,434	CY	$11.83	$16,966
8.14	Install Nonwoven Geotextile Fabric	789	SY	$2.21	$1,743
	Subtotal				**$57,779**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$330,876**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$19,853
10.2	Engineering and Design (12%)				$39,705
10.3	Construction management (8%)				$26,470
10.4	Location Adjustment (9%)				$29,779
10.5	Contingency (15%)				$49,631
TOTAL OTHER COSTS					**$165,438**
TOTAL CAPITAL COST FOR ALTERNATIVE 5					**$496,313**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Wooster Park Property.

[2] Excavation to water table at this property will achieve complete excavation of RW and will not require transactional fees due to deed management.

[3] Assume fencing and signage to be temporary and required during construction activities for site security only.

[4] Represents in situ estimate of RW to excavated to a depth of 6-ft below ground surface and additional soil that would be required to be removed to facilitate compliance with safety standards for benching/sloping.

[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[8] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[9] A conversion factor of 1.5 was used to convert CY to TON.

[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)[2]						
OM.2.1	Inspection	0	HR	$110.00	$0	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation	0	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	0	LS	$2,250.00	$0	see cost assumptions
OM.2.8	Contractor mobilizations	0	EA	$321.75	$0	see cost assumptions
	Subtotal				**$0**	
OM.3.0 Deed Restrictions[2]						
OM.3.1	Inspection (annual)	0	LS	$1,100.00	$0	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	0	EA	$5,000.00	$0	see cost assumptions
	Subtotal				**$0**	
ANNUAL O&M COST (YEARS 1-2)[3]					**$35,924**	
ANNUAL O&M COST (YEARS 3-30)[4]					**$0**	

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Wooster Park Property.
[2] Assume deed restrictions and O&M for ground surfaces would not be required following complete excavation of Raymark waste.
[3] O&M for Years 1 and 2 include quarterly groundwater monitoring with annual reporting.
[4] O&M for Years 3 - 30 will not be required pending analytical data and concurrence from the State following the first 2 years of groundwater data collection.
Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$1,535,387	$0	$0	$1,535,387	7.0%	$1,535,387
1	$0	$35,924	$0	$35,924	7.0%	$33,574
2	$0	$35,924	$0	$35,924	7.0%	$31,378
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$1,535,387**	**$71,848**	**$0**	**$1,607,235**		**$1,600,339**
					PV O&M	**$64,952**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal; not required for complete excavation of Raymark waste

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	730	LF	$27.57	$20,134
3.2	Signage	8	EA	$73.93	$591
	Subtotal				**$20,725**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	3	MONTH	$4,531	$13,593
	Subtotal				**$43,044**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0.5	ACRE	$3,968.29	$1,984
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	730	LF	$8.97	$6,548
	Subtotal				**$29,203**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[4]	2,193	CY	$2.12	$4,656
6.2	Haul RW/Soil to Stockpile Area[5]	2,631	CY	$4.00	$10,526
6.3	Perimeter Air Sampling	49	EA	$243.76	$12,026
6.4	Equipment Decontamination	110	HR	$54.56	$5,982
6.5	Stockpile Management	2,631	CY	$1.44	$3,781
6.6	Stockpile Characterization[6]	2	EA	$1,535.00	$3,070
	Subtotal				**$40,041**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	1,893	CY	$2.44	$4,624
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	110	HR	$54.56	$5,982
7.4	Out-of-Town Transportation of RW[8]	2,840	TON	$170.00	$482,800
7.5	Out-of-Town Disposal of RW (no treatment)[8, 9]	2,556	TON	$107.10	$273,748
7.6	Out-of-Town Disposal of RW (treatment)[8, 9]	284	TON	$192.00	$54,528
	Subtotal				**$821,681**

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	664	CY	$2.40	$1,595
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	314	CY	$34.65	$10,870
8.9	Hydroseeding with Mulch and Fertilizer	15	MSF	$43.97	$677
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	1434	CY	$11.83	$16,966
8.14	Install Nonwoven Geotextile Fabric	789	SY	$2.21	$1,743
	Subtotal				**$57,779**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$1,023,591**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$61,415
10.2	Engineering and Design (12%)				$122,831
10.3	Construction management (8%)				$81,887
10.4	Location Adjustment (9%)				$92,123
10.5	Contingency (15%)				$153,539
TOTAL OTHER COSTS					**$511,796**
TOTAL CAPITAL COST FOR ALTERNATIVE 6					**$1,535,387**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Wooster Park Property.
[2] Excavation to water table at this property will achieve complete excavation of RW and will not require transactional fees due to deed management.
[3] Assume fencing and signage to be temporary and required during construction activities for site security only.
[4] Represents in situ estimate of RW to excavated to a depth of 6-ft below ground surface and additional soil that would be required to be removed to facilitate compliance with safety standards for benching/sloping.
[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.
[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).
[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Volume of RW for disposal assumes that 10% would be hazardous and require treatment prior to disposal.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.
[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review	Total	Discount Rate	Present Value
0	$0	$0	0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Notes:

This Alternative is not applicable to this property - see Section 4.17 of the FS.

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.10	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0 Fencing and Signage					
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.93	$0
	Subtotal				**$0**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load Raymark Waste into Trucks	0	CY	$2.44	$0
7.2	Transport Raymark Waste to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of Waste	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Treatment of Raymark Waste	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[8]	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 3" binder, 3" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405.12	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 7					**$0**

Notes:
This Alternative is not applicable to this property - see Section 4.17 of the FS.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	14	MSF	$7.34	$104	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.07	MSF	$56.31	$4	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	3	EA	$321.75	$965	see cost assumptions
	Subtotal				**$16,523**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$58,548**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$31,604**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Wooster Park Property.

[2] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[3] Assumed that there is no Raymark waste below paved surfaces at this property group.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum

HR = hour

EA = each

MSF = thousand square feet

SF = square feet

LF = linear foot

FOL = field operations leader

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review	Total	Discount Rate	Present Value
0	$0	$0	0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$0**	**$0**	**$0**	**$0**		**$0**
					PV O&M	**$0**

Notes:

This Alternative is not applicable to this property - see Section 4.17 of the FS.

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	0	LS	$2,752.75	$0
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	0	LF	$35.79	$0
2.3	Install PVC Well Screens (2" diameter)	0	LF	$19.69	$0
2.4	Install PVC Well Casing (2" diameter)	0	LF	$14.79	$0
2.5	Install Filter Pack	0	LF	$15.52	$0
2.6	Install Bentonite Seal	0	EA	$57.23	$0
2.7	Install Annular Seal	0	LF	$69.04	$0
2.8	PVC Well Plugs	0	EA	$27.86	$0
2.9	Flush-Mount Protective Cover with Locking Cap	0	EA	$451.55	$0
2.10	Surface Pad, Concrete 2' x 2'	0	EA	$154.79	$0
2.11	Well Development (2 HR/WELL)	0	EA	$228.23	$0
2.12	IDW Transportation/Disposal (drums)	0	EA	$508.52	$0
	Subtotal				**$0**
3.0 Fencing and Signage					
3.1	Chain Link Fence	0	LF	$27.57	$0
3.2	Signage	0	EA	$73.93	$0
	Subtotal				**$0**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load Raymark Waste into Trucks	0	CY	$2.44	$0
7.2	Transport Raymark Waste to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of Waste	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of Waste (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Treatment of Raymark Waste	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[8]	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 3" binder, 3" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405.12	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management**				
9.1	Flood Storage Mitigation	0	LS	$0	$0
9.2	Wetland Mitigation	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$0**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$0
10.2	Engineering and Design (12%)				$0
10.3	Construction management (8%)				$0
10.4	Location Adjustment (9%)				$0
10.5	Contingency (15%)				$0
TOTAL OTHER COSTS					**$0**
TOTAL CAPITAL COST FOR ALTERNATIVE 8					**$0**

Notes:
This Alternative is not applicable to this property - see Section 4.17 of the FS.

PRESENT VALUE ANALYSIS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$425,972	$0	0	$425,972	7.0%	$425,972
1	$0	$58,548	$0	$58,548	7.0%	$54,717
2	$0	$58,548	$0	$58,548	7.0%	$51,138
3	$0	$31,604	$0	$31,604	7.0%	$25,799
4	$0	$31,604	$0	$31,604	7.0%	$24,111
5	$0	$31,604	$10,000	$41,604	7.0%	$29,663
6	$0	$31,604	$0	$31,604	7.0%	$21,059
7	$0	$31,604	$0	$31,604	7.0%	$19,682
8	$0	$31,604	$0	$31,604	7.0%	$18,394
9	$0	$31,604	$0	$31,604	7.0%	$17,191
10	$0	$31,604	$10,000	$41,604	7.0%	$21,150
11	$0	$31,604	$0	$31,604	7.0%	$15,015
12	$0	$31,604	$0	$31,604	7.0%	$14,033
13	$0	$31,604	$0	$31,604	7.0%	$13,115
14	$0	$31,604	$0	$31,604	7.0%	$12,257
15	$0	$31,604	$10,000	$41,604	7.0%	$15,079
16	$0	$31,604	$0	$31,604	7.0%	$10,706
17	$0	$31,604	$0	$31,604	7.0%	$10,005
18	$0	$31,604	$0	$31,604	7.0%	$9,351
19	$0	$31,604	$0	$31,604	7.0%	$8,739
20	$0	$31,604	$10,000	$41,604	7.0%	$10,751
21	$0	$31,604	$0	$31,604	7.0%	$7,633
22	$0	$31,604	$0	$31,604	7.0%	$7,134
23	$0	$31,604	$0	$31,604	7.0%	$6,667
24	$0	$31,604	$0	$31,604	7.0%	$6,231
25	$0	$31,604	$10,000	$41,604	7.0%	$7,666
26	$0	$31,604	$0	$31,604	7.0%	$5,442
27	$0	$31,604	$0	$31,604	7.0%	$5,086
28	$0	$31,604	$0	$31,604	7.0%	$4,753
29	$0	$31,604	$0	$31,604	7.0%	$4,442
30	$0	$31,604	$10,000	$41,604	7.0%	$5,465
TOTAL	**$425,972**	**$1,002,020**	**$60,000**	**$1,487,992**		**$888,445**
					PV O&M	**$462,473**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	730	LF	$27.57	$20,134
3.2	Signage	8	EA	$73.93	$591
	Subtotal				**$20,725**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	3	MONTH	$4,531	$13,593
	Subtotal				**$43,044**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0.5	ACRE	$3,968.29	$1,984
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	730	LF	$8.97	$6,548
	Subtotal				**$29,203**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	1,052	CY	$2.12	$2,234
6.2	Haul RW to Stockpile Area[4]	1,262	CY	$4.00	$5,049
6.3	Perimeter Air Sampling	24	EA	$243.76	$5,769
6.4	Equipment Decontamination	53	HR	$54.56	$2,870
6.5	Stockpile Management	1,262	CY	$1.44	$1,814
6.6	Stockpile Characterization[5]	3	EA	$1,535.00	$4,605
	Subtotal				**$22,341**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	1,262	CY	$2.44	$3,082
7.2	Transport RW to in-town consolidation[7]	1,136	CY	$5.52	$6,275
7.3	Equipment Decontamination	53	HR	$54.56	$2,870
7.4	Out-of-Town Transportation of Waste[7, 8]	189	TON	$170.00	$32,187
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	189	TON	$192.00	$36,352
	Subtotal				**$80,765**

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[9]	7,100	SF	$1.29	$9,159
8.8	Furnish, Place, and Spread Topsoil (6")[10]	145	CY	$34.65	$5,011
8.9	Hydroseeding with Mulch and Fertilizer	7	MSF	$43.97	$312
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	1012	CY	$11.83	$11,977
8.14	Install Nonwoven Geotextile Fabric	789	SY	$2.21	$1,743
	Subtotal				**$54,130**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$283,981**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$17,039
10.2	Engineering and Design (12%)				$34,078
10.3	Construction management (8%)				$22,719
10.4	Location Adjustment (9%)				$25,558
10.5	Contingency (15%)				$42,597
TOTAL OTHER COSTS					**$141,991**
TOTAL CAPITAL COST FOR ALTERNATIVE 9					**$425,972**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Wooster Park Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal.
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement;
Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain
[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
WOOSTER PARK PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$1,117,920	$0	0	$1,117,920	7.0%	$1,117,920
1	$0	$58,548	$0	$58,548	7.0%	$54,717
2	$0	$58,548	$0	$58,548	7.0%	$51,138
3	$0	$31,604	$0	$31,604	7.0%	$25,799
4	$0	$31,604	$0	$31,604	7.0%	$24,111
5	$0	$31,604	$10,000	$41,604	7.0%	$29,663
6	$0	$31,604	$0	$31,604	7.0%	$21,059
7	$0	$31,604	$0	$31,604	7.0%	$19,682
8	$0	$31,604	$0	$31,604	7.0%	$18,394
9	$0	$31,604	$0	$31,604	7.0%	$17,191
10	$0	$31,604	$10,000	$41,604	7.0%	$21,150
11	$0	$31,604	$0	$31,604	7.0%	$15,015
12	$0	$31,604	$0	$31,604	7.0%	$14,033
13	$0	$31,604	$0	$31,604	7.0%	$13,115
14	$0	$31,604	$0	$31,604	7.0%	$12,257
15	$0	$31,604	$10,000	$41,604	7.0%	$15,079
16	$0	$31,604	$0	$31,604	7.0%	$10,706
17	$0	$31,604	$0	$31,604	7.0%	$10,005
18	$0	$31,604	$0	$31,604	7.0%	$9,351
19	$0	$31,604	$0	$31,604	7.0%	$8,739
20	$0	$31,604	$10,000	$41,604	7.0%	$10,751
21	$0	$31,604	$0	$31,604	7.0%	$7,633
22	$0	$31,604	$0	$31,604	7.0%	$7,134
23	$0	$31,604	$0	$31,604	7.0%	$6,667
24	$0	$31,604	$0	$31,604	7.0%	$6,231
25	$0	$31,604	$10,000	$41,604	7.0%	$7,666
26	$0	$31,604	$0	$31,604	7.0%	$5,442
27	$0	$31,604	$0	$31,604	7.0%	$5,086
28	$0	$31,604	$0	$31,604	7.0%	$4,753
29	$0	$31,604	$0	$31,604	7.0%	$4,442
30	$0	$31,604	$10,000	$41,604	7.0%	$5,465
TOTAL	**$1,117,920**	**$1,002,020**	**$60,000**	**$2,179,941**		**$1,580,393**
					PV O&M	**$462,473**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
WOOSTER PART PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0	**Fencing and Signage[2]**				
3.1	Chain Link Fence	730	LF	$27.57	$20,134
3.2	Signage	8	EA	$73.93	$591
	Subtotal				**$20,725**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	3	MONTH	$4,531	$13,593
	Subtotal				**$43,044**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0.5	ACRE	$3,968.29	$1,984
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	730	LF	$8.97	$6,548
	Subtotal				**$29,203**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
6.1	Excavate and Load RW[3]	1,052	CY	$2.12	$2,234
6.2	Haul RW to Stockpile Area[4]	1,262	CY	$4.00	$5,049
6.3	Perimeter Air Sampling	24	EA	$243.76	$5,769
6.4	Equipment Decontamination	53	HR	$54.56	$2,870
6.5	Stockpile Management	1,262	CY	$1.44	$1,814
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$17,736**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks[5]	1,262	CY	$2.44	$3,082
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	53	HR	$54.56	$2,870
7.4	Out-of-Town Transportation of Waste[6]	1,893	TON	$170.00	$321,867
7.5	Out-of-Town Disposal of RW (no treatment)[6, 7]	1,704	TON	$107.10	$182,498
7.6	Out-of-Town Disposal of RW (treatment)[6, 7]	189	TON	$192.00	$36,352
	Subtotal				**$546,669**

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
WOOSTER PART PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	7,100	SF	$1.29	$9,159
8.8	Furnish, Place, and Spread Topsoil (6")[9]	145	CY	$34.65	$5,011
8.9	Hydroseeding with Mulch and Fertilizer	7	MSF	$43.97	$312
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	1,012	CY	$11.83	$11,977
8.14	Install Nonwoven Geotextile Fabric	789	SY	$2.21	$1,743
	Subtotal				**$54,130**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$745,280**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$44,717
10.2	Engineering and Design (12%)				$89,434
10.3	Construction management (8%)				$59,622
10.4	Location Adjustment (9%)				$67,075
10.5	Contingency (15%)				$111,792
TOTAL OTHER COSTS					**$372,640**
TOTAL CAPITAL COST FOR ALTERNATIVE 10					**$1,117,920**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Wooster Park Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Volume includes all RW intended for disposal.
[6] A conversion factor of 1.5 was used to convert CY to TON.
[7] Volume of RW for Out-of-Town disposal assumes that 10% would be hazardous requiring treatment prior to disposal.
[8] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement;
Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[10] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

G-18

THIRD AVENUE PROPERTY

COST ESTIMATE BACKUP SHEETS

PRESENT VALUE ANALYSIS
ALTERNATIVE 1 - NO ACTION
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$10,000	$10,000	7.0%	$7,130
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$10,000	$10,000	7.0%	$5,083
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$10,000	$10,000	7.0%	$3,624
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$10,000	$10,000	7.0%	$2,584
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$10,000	$10,000	7.0%	$1,842
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$10,000	$10,000	7.0%	$1,314
TOTAL	**$0**	**$0**	**$60,000**	**$60,000**		**$21,578**
					PV O&M	**$21,578**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review [1]	Total	Discount Rate[2]	Present Value
0	$42,670	$0	$0	$42,670	7.0%	$42,670
1	$0	$59,619	$0	$59,619	7.0%	$55,719
2	$0	$59,619	$0	$59,619	7.0%	$52,074
3	$0	$32,676	$0	$32,676	7.0%	$26,673
4	$0	$32,676	$0	$32,676	7.0%	$24,928
5	$0	$32,676	$10,000	$42,676	7.0%	$30,427
6	$0	$32,676	$0	$32,676	7.0%	$21,773
7	$0	$32,676	$0	$32,676	7.0%	$20,349
8	$0	$32,676	$0	$32,676	7.0%	$19,018
9	$0	$32,676	$0	$32,676	7.0%	$17,774
10	$0	$32,676	$10,000	$42,676	7.0%	$21,694
11	$0	$32,676	$0	$32,676	7.0%	$15,524
12	$0	$32,676	$0	$32,676	7.0%	$14,509
13	$0	$32,676	$0	$32,676	7.0%	$13,559
14	$0	$32,676	$0	$32,676	7.0%	$12,672
15	$0	$32,676	$10,000	$42,676	7.0%	$15,468
16	$0	$32,676	$0	$32,676	7.0%	$11,069
17	$0	$32,676	$0	$32,676	7.0%	$10,344
18	$0	$32,676	$0	$32,676	7.0%	$9,668
19	$0	$32,676	$0	$32,676	7.0%	$9,035
20	$0	$32,676	$10,000	$42,676	7.0%	$11,028
21	$0	$32,676	$0	$32,676	7.0%	$7,892
22	$0	$32,676	$0	$32,676	7.0%	$7,375
23	$0	$32,676	$0	$32,676	7.0%	$6,893
24	$0	$32,676	$0	$32,676	7.0%	$6,442
25	$0	$32,676	$10,000	$42,676	7.0%	$7,863
26	$0	$32,676	$0	$32,676	7.0%	$5,627
27	$0	$32,676	$0	$32,676	7.0%	$5,259
28	$0	$32,676	$0	$32,676	7.0%	$4,915
29	$0	$32,676	$0	$32,676	7.0%	$4,593
30	$0	$32,676	$10,000	$42,676	7.0%	$5,606
TOTAL	**$42,670**	**$1,034,168**	**$60,000**	**$1,136,838**		**$518,440**
					PV O&M	**$475,770**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage					
3.1	Chain Link Fence	312	LF	$27.57	$8,602
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$8,898**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	0	LS	$11,327	$0
4.2	Field Support Facilities	0	LS	$6,796	$0
4.3	Monthly Costs associated with Field Support	0	MONTH	$4,531	$0
	Subtotal				**$0**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	0	EA	$5,945.37	$0
5.4	Construct Equipment Decontamination Pad	0	LS	$8,495.44	$0
5.5	Construct Soil Stockpiling/Staging Areas	0	LS	$6,229.99	$0
5.6	Install Erosion and Sedimentation Controls	0	LF	$8.97	$0
	Subtotal				**$0**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil	0	CY	$2.12	$0
6.2	Haul RW/Soil to Stockpile Area	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	0	EA	$243.76	$0
6.4	Equipment Decontamination	0	HR	$54.56	$0
6.5	Stockpile Management	0	CY	$1.44	$0
6.6	Stockpile Characterization[4]	0	EA	$1,535.00	$0
	Subtotal				**$0**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks	0	CY	$2.44	$0
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of RW	0	TON	$170.00	$0
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)	0	TON	$192.00	$0
	Subtotal				**$0**

CAPITAL COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Funish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	CY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	0	SY	$2.21	$0
	Subtotal				**$0**
9.0	**Flood Storage Mitigation/Stormwater Management**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$42,670**
TOTAL CAPITAL COST FOR ALTERNATIVE 2					**$42,670**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Third Avenue Property

RW = Raymark Waste
PVC = polyvinyl chloride
IDW = investigation derived waste
LS = lump sum
EA = each
SF = square feet
LF = linear foot
MSL = thousand square feet
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 2 - RESTRICTIONS WITH LONG-TERM MONITORING
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	see cost assumptions
OM.2.3	Revegetation[2]	0.01	MSF	$56.31	$0.77	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	17.0	SF	$1.81	$31	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	10	LF	$27.57	$287	see cost assumptions
OM 2.6	Sign Replacement[5]	16	EA	$73.95	$1,183	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	2	EA	$321.75	$644	see cost assumptions
	Subtotal				**$17,595**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$59,619**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$32,676**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Third Avenue Property.

[2] Estimated that 1% of vegetated surfaces would require repair annually (need for repair to be established during 5-Year Reviews).

[3] Estimated 5% of asphalt surfaces will require repair annually (need for repair to be established during 5-Year Reviews).

[4] Estimated that 100% of fencing would require replacement over the period of O&M (need for repair to be established during 5-Year Reviews).

[5] Estimated that signage would require replacement 4 times over the period of O&M (need for repair to be established during 5-Year Reviews).

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum

HR = hour

EA = each

MSF = thousand square feet

SF = square feet

LF = linear feet

FOL = field operations leader

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$275,610	$0	$0	$275,610	7.0%	$275,610
1	$0	$58,858	$0	$58,858	7.0%	$55,008
2	$0	$58,858	$0	$58,858	7.0%	$51,409
3	$0	$31,915	$0	$31,915	7.0%	$26,052
4	$0	$31,915	$0	$31,915	7.0%	$24,348
5	$0	$31,915	$10,000	$41,915	7.0%	$29,885
6	$0	$31,915	$0	$31,915	7.0%	$21,267
7	$0	$31,915	$0	$31,915	7.0%	$19,875
8	$0	$31,915	$0	$31,915	7.0%	$18,575
9	$0	$31,915	$0	$31,915	7.0%	$17,360
10	$0	$31,915	$10,000	$41,915	7.0%	$21,308
11	$0	$31,915	$0	$31,915	7.0%	$15,163
12	$0	$31,915	$0	$31,915	7.0%	$14,171
13	$0	$31,915	$0	$31,915	7.0%	$13,244
14	$0	$31,915	$0	$31,915	7.0%	$12,377
15	$0	$31,915	$10,000	$41,915	7.0%	$15,192
16	$0	$31,915	$0	$31,915	7.0%	$10,811
17	$0	$31,915	$0	$31,915	7.0%	$10,104
18	$0	$31,915	$0	$31,915	7.0%	$9,443
19	$0	$31,915	$0	$31,915	7.0%	$8,825
20	$0	$31,915	$10,000	$41,915	7.0%	$10,832
21	$0	$31,915	$0	$31,915	7.0%	$7,708
22	$0	$31,915	$0	$31,915	7.0%	$7,204
23	$0	$31,915	$0	$31,915	7.0%	$6,732
24	$0	$31,915	$0	$31,915	7.0%	$6,292
25	$0	$31,915	$10,000	$41,915	7.0%	$7,723
26	$0	$31,915	$0	$31,915	7.0%	$5,496
27	$0	$31,915	$0	$31,915	7.0%	$5,136
28	$0	$31,915	$0	$31,915	7.0%	$4,800
29	$0	$31,915	$0	$31,915	7.0%	$4,486
30	$0	$31,915	$10,000	$41,915	7.0%	$5,506
TOTAL	**$275,610**	**$1,011,345**	**$60,000**	**$1,346,955**		**$741,940**
					PV O&M	**$466,330**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Well, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	312	LF	$27.57	$8,602
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$8,898**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	2	MONTH	$4,531	$9,062
	Subtotal				**$38,513**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0.3	ACRE	$3,968.29	$1,190
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	312	LF	$8.97	$2,797
	Subtotal				**$24,659**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil[3]	327	CY	$2.12	$694
6.2	Haul RW/Soil to Stockpile Area[4]	392	CY	$4.00	$1,570
6.3	Perimeter Air Sampling	12	EA	$243.76	$2,925
6.4	Equipment Decontamination	16	HR	$54.56	$892
6.5	Stockpile Management	392	CY	$1.44	$564
6.6	Stockpile Characterization[5]	1	EA	$1,535.00	$1,535
	Subtotal				**$8,181**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	219	CY	$2.44	$535
7.2	Transport RW to in-town consolidation[7]	197	CY	$5.52	$1,089
7.3	Equipment Decontamination	16	HR	$54.56	$892
7.4	Out-of-Town Transportation of RW[7, 8]	33	TON	$170.00	$5,587
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	33	TON	$192.00	$6,310
	Subtotal				**$14,414**

CAPITAL COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material[9]	156	CY	$2.40	$375
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[9]	61	CY	$27.00	$1,650
8.3	Install Geosynthetic Clay Liner (bottom layer)	3,000	SF	$2.86	$8,587
8.4	Install 60 mil HDPE liner	3,000	SF	$2.84	$8,526
8.5	Install Geosynthetic Drainage Layer	3,000	SF	$0.65	$1,962
8.6	Furnish, Spread, and Compact Soil Layer (24")[9]	66	CY	$11.83	$786
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	3,000	SF	$1.29	$3,870
8.8	Furnish, Place, and Spread Topsoil (6")[9]	54	CY	$34.65	$1,877
8.9	Hydroseeding with Mulch and Fertilizer	3	MSF	$43.97	$117
8.10	Place, Spread, and Compact Asphalt Base Course (12")	13	ECY	$9.35	$118
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	340	SF	$2.27	$772
8.12	Site Cleanup	64	HR	$405	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	333	SY	$2.21	$737
	Subtotal				**$55,304**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$183,740**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$11,024
10.2	Engineering and Design (12%)				$22,049
10.3	Construction management (8%)				$14,699
10.4	Location Adjustment (9%)				$16,537
10.5	Contingency (15%)				$27,561
TOTAL OTHER COSTS					**$91,870**
TOTAL CAPITAL COST FOR ALTERNATIVE 3					**$275,610**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Third Avenue Property.

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to be excavated to a depth of 3 or 2.5 ft below ground surface and additional non-RW soil required to faciliate cap construction.

[4] Volume for hauling RW/Soil includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (.PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[6] Volume includes all RW intended for disposal.

[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[8] A conversion factor of 1.5 was used to convert CY to TON.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[10] Impacts to floodplains will be evaluated during Remedial Design and will require compensation via backfill material selection to ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 3 - LOW-PERMEABILITY CAP WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0	**Groundwater Monitoring (per event)**					
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0	**Ground Surface Inspections, Maintenance, and Repairs (per year)**					
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	9	MSF	$7.34	$64	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.04	MSF	$56.31	$2	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	17	SF	$1.81	$31	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	4	EA	$321.75	$1,287	see cost assumptions
	Subtotal				**$16,834**	
OM.3.0	**Deed Restrictions**					
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$58,858**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$31,915**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Third Avenue Property.

[2] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[3] Assumed 5% of asphalt surfaces will require repair annually.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum

HR = hour

EA = each

MSF = thousand square feet

SF = square feet

LF = linear feet

FOL = field operations leader

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$396,926	$0	0	$396,926	7.0%	$396,926
1	$0	$58,858	$0	$58,858	7.0%	$55,008
2	$0	$58,858	$0	$58,858	7.0%	$51,409
3	$0	$31,915	$0	$31,915	7.0%	$26,052
4	$0	$31,915	$0	$31,915	7.0%	$24,348
5	$0	$31,915	$10,000	$41,915	7.0%	$29,885
6	$0	$31,915	$0	$31,915	7.0%	$21,267
7	$0	$31,915	$0	$31,915	7.0%	$19,875
8	$0	$31,915	$0	$31,915	7.0%	$18,575
9	$0	$31,915	$0	$31,915	7.0%	$17,360
10	$0	$31,915	$10,000	$41,915	7.0%	$21,308
11	$0	$31,915	$0	$31,915	7.0%	$15,163
12	$0	$31,915	$0	$31,915	7.0%	$14,171
13	$0	$31,915	$0	$31,915	7.0%	$13,244
14	$0	$31,915	$0	$31,915	7.0%	$12,377
15	$0	$31,915	$10,000	$41,915	7.0%	$15,192
16	$0	$31,915	$0	$31,915	7.0%	$10,811
17	$0	$31,915	$0	$31,915	7.0%	$10,104
18	$0	$31,915	$0	$31,915	7.0%	$9,443
19	$0	$31,915	$0	$31,915	7.0%	$8,825
20	$0	$31,915	$10,000	$41,915	7.0%	$10,832
21	$0	$31,915	$0	$31,915	7.0%	$7,708
22	$0	$31,915	$0	$31,915	7.0%	$7,204
23	$0	$31,915	$0	$31,915	7.0%	$6,732
24	$0	$31,915	$0	$31,915	7.0%	$6,292
25	$0	$31,915	$10,000	$41,915	7.0%	$7,723
26	$0	$31,915	$0	$31,915	7.0%	$5,496
27	$0	$31,915	$0	$31,915	7.0%	$5,136
28	$0	$31,915	$0	$31,915	7.0%	$4,800
29	$0	$31,915	$0	$31,915	7.0%	$4,486
30	$0	$31,915	$10,000	$41,915	7.0%	$5,506
TOTAL	**$396,926**	**$1,011,345**	**$60,000**	**$1,468,271**		**$863,256**
					PV O&M	**$466,330**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	312	LF	$27.57	$8,602
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$8,898**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	2	MONTH	$4,531	$9,062
	Subtotal				**$38,513**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0.3	ACRE	$3,968.29	$1,190
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	312	LF	$8.97	$2,797
	Subtotal				**$24,659**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction					
6.1	Excavate and Load RW/Soil[3]	327	CY	$2.12	$694
6.2	Haul RW/Soil to Stockpile Area[4]	392	CY	$4.00	$1,570
6.3	Perimeter Air Sampling	12	EA	$243.76	$2,925
6.4	Equipment Decontamination	16	HR	$54.56	$892
6.5	Stockpile Management	392	CY	$1.44	$564
6.6	Stockpile Characterization[5]	1	EA	$1,535.00	$1,535
	Subtotal				**$8,181**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	219	CY	$2.44	$535
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	16	HR	$54.56	$892
7.4	Out-of-Town Transportation of RW[7]	329	TON	$170.00	$55,873
7.5	Out-of-Town Disposal of RW (no treatment)[7, 8]	296	TON	$107.10	$31,680
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	33	TON	$192.00	$6,310
	Subtotal				**$95,291**

CAPITAL COSTS
ALTERNATIVE 4 - LOW-PERMEABILITY CAP WITH OUT-OF-TOWN DISPOSAL
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material[9]	156	CY	$2.40	$375
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")[9]	61	CY	$27.00	$1,650
8.3	Install Geosynthetic Clay Liner (bottom layer)	3,000	SF	$2.86	$8,587
8.4	Install 60 mil HDPE liner	3,000	SF	$2.84	$8,526
8.5	Install Geosynthetic Drainage Layer	3,000	SF	$0.65	$1,962
8.6	Furnish, Spread, and Compact Soil Layer (24")[9]	66	CY	$11.83	$786
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	3,000	SF	$1.29	$3,870
8.8	Furnish, Place, and Spread Topsoil (6")[9]	54	CY	$34.65	$1,877
8.9	Hydroseeding with Mulch and Fertilizer	3	MSF	$43.97	$117
8.10	Place, Spread, and Compact Asphalt Base Course (12")	13	ECY	$9.35	$118
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	340	SF	$2.27	$772
8.12	Site Cleanup	64	HR	$405	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted	0	CY	$11.83	$0
8.14	Install Nonwoven Geotextile Fabric	333	SY	$2.21	$737
	Subtotal				**$55,304**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$264,617**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$15,877
10.2	Engineering and Design (12%)				$31,754
10.3	Construction management (8%)				$21,169
10.4	Location Adjustment (9%)				$23,816
10.5	Contingency (15%)				$39,693
TOTAL OTHER COSTS					**$132,309**
TOTAL CAPITAL COST FOR ALTERNATIVE 4					**$396,926**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Third Avenue Property.

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW to be excavated to a depth of 3 or 2.5 ft below ground surface and additional non-RW soil required to faciliate cap construction.

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500).

[6] Volume includes all RW intended for disposal.

[7] A conversion factor of 1.5 was used to convert CY to TON.

[8] Volume of RW for disposal assumes that 10% would be hazardous requiring treatment prior to disposal.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[10] Impacts to floodplains will be evaluated during Remedial Design and will require compensation via backfill material selection to ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review	Total	Discount Rate[2]	Present Value
0	$292,575	$0	$0	$292,575	7.0%	$292,575
1	$0	$46,049	$0	$46,049	7.0%	$43,037
2	$0	$46,049	$0	$46,049	7.0%	$40,221
3	$0	$10,125	$0	$10,125	7.0%	$8,265
4	$0	$10,125	$0	$10,125	7.0%	$7,724
5	$0	$10,125	$10,000	$20,125	7.0%	$14,349
6	$0	$10,125	$0	$10,125	7.0%	$6,747
7	$0	$10,125	$0	$10,125	7.0%	$6,305
8	$0	$10,125	$0	$10,125	7.0%	$5,893
9	$0	$10,125	$0	$10,125	7.0%	$5,507
10	$0	$10,125	$10,000	$20,125	7.0%	$10,231
11	$0	$10,125	$0	$10,125	7.0%	$4,810
12	$0	$10,125	$0	$10,125	7.0%	$4,496
13	$0	$10,125	$0	$10,125	7.0%	$4,202
14	$0	$10,125	$0	$10,125	7.0%	$3,927
15	$0	$10,125	$10,000	$20,125	7.0%	$7,294
16	$0	$10,125	$0	$10,125	7.0%	$3,430
17	$0	$10,125	$0	$10,125	7.0%	$3,205
18	$0	$10,125	$0	$10,125	7.0%	$2,996
19	$0	$10,125	$0	$10,125	7.0%	$2,800
20	$0	$10,125	$10,000	$20,125	7.0%	$5,201
21	$0	$10,125	$0	$10,125	7.0%	$2,445
22	$0	$10,125	$0	$10,125	7.0%	$2,285
23	$0	$10,125	$0	$10,125	7.0%	$2,136
24	$0	$10,125	$0	$10,125	7.0%	$1,996
25	$0	$10,125	$10,000	$20,125	7.0%	$3,708
26	$0	$10,125	$0	$10,125	7.0%	$1,743
27	$0	$10,125	$0	$10,125	7.0%	$1,629
28	$0	$10,125	$0	$10,125	7.0%	$1,523
29	$0	$10,125	$0	$10,125	7.0%	$1,423
30	$0	$10,125	$10,000	$20,125	7.0%	$2,644
TOTAL	**$292,575**	**$375,601**	**$60,000**	**$728,176**		**$504,748**
					PV O&M	**$212,172**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	312	LF	$27.57	$8,602
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$8,898**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	3	MONTH	$4,531	$13,593
	Subtotal				**$43,044**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0.3	ACRE	$3,968.29	$1,190
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	312	LF	$8.97	$2,797
	Subtotal				**$24,659**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[3]	622	CY	$2.12	$1,321
6.2	Haul RW/Soil to Stockpile Area[4]	747	CY	$4.00	$2,987
6.3	Perimeter Air Sampling	23	EA	$243.76	$5,565
6.4	Equipment Decontamination	31	HR	$54.56	$1,698
6.5	Stockpile Management	747	CY	$1.44	$1,073
6.6	Stockpile Characterization[5]	2	EA	$1,535.00	$3,070
	Subtotal				**$15,714**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	491	CY	$2.44	$1,199
7.2	Transport RW to in-town consolidation[7]	442	CY	$5.52	$2,441
7.3	Equipment Decontamination	31	HR	$54.56	$1,698
7.4	Out-of-Town Transportation of Waste[7, 8]	74	TON	$170.00	$12,523
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Diposal of RW (treatment)[7, 8]	74	TON	$192.00	$14,144
	Subtotal				**$32,006**

CAPITAL COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material[9]	230	CY	$2.40	$553
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[10]	1,700	SF	$1.29	$2,193
8.8	Furnish, Place, and Spread Topsoil (6")[9]	75	CY	$34.65	$2,583
8.9	Hydroseeding with Mulch and Fertilizer	4	MSF	$43.97	$161
8.10	Place, Spread, and Compact Asphalt Base Course (12")	13	ECY	$9.35	$118
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	340	SF	$2.27	$772
8.12	Site Cleanup	64	HR	$405	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	358	CY	$11.83	$4,233
8.14	Install Nonwoven Geotextile Fabric	189	SY	$2.21	$417
	Subtotal				**$36,958**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$195,050**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$11,703
10.2	Engineering and Design (12%)				$23,406
10.3	Construction management (8%)				$15,604
10.4	Location Adjustment (9%)				$17,555
10.5	Contingency (15%)				$29,258
TOTAL OTHER COSTS					**$97,525**
TOTAL CAPITAL COST FOR ALTERNATIVE 5					**$292,575**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Third Avenue Property.

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW and additional soil (to be excavated for safety benching/sloping) to be excavated to a depth of 6.5 ft below ground surface.

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[8] A conversion factor of 1.5 was used to convert CY to TON.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[10] Delineation ("warning") layer included for excavation area where waste is left-in-place.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 5 - EXCAVATION TO THE WATER TABLE WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0	**Groundwater Monitoring (per event)**					
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0	**Ground Surface Inspections, Maintenance, and Repairs (per year)**					
OM.2.1	Inspection	10	HR	$110.00	$1,100	see cost assumptions
OM.2.2	Mowing (twice per year)[2]	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[3]	0.01	MSF	$56.31	$1	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[4]	17.00	SF	$1.81	$31	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[5]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[6]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	2	EA	$321.75	$644	see cost assumptions
	Subtotal				**$4,025**	
OM.3.0	**Deed Restrictions**					
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[7]					**$46,049**	
ANNUAL O&M COST (YEARS 3-30)[8]					**$10,125**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Third Avenue Property.

[2] Mowing would not be required for excavation of Raymark waste to the seasonal high groundwater table.

[3] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[4] Assumed 5% of asphalt surfaces will require repair annually.

[5] Assume fencing will not be required following remedial action.

[6] Assume signage will not be required following remedial action.

[7] O&M for Years 1 and 2 include quarterly groundwater monitoring with annual inspection/repairs of ground surface and annual deed inspection, with one annual report for all O&M activities.

[8] O&M for Years 3 - 30 include annual inspection and repairs to ground surface and annual deed inspection, but may not require additional groundwater sampling pending analytical data and concurrence from the State following the first 2 years of data collection, therefore additional groundwater sampling is not included.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum

HR = hour

EA = each

MSF = thousand square feet

SF = square feet

LF = linear feet

FOL = field operations leader

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review	Total	Discount Rate[2]	Present Value
0	$562,187	$0	$0	$562,187	7.0%	$562,187
1	$0	$46,049	$0	$46,049	7.0%	$43,037
2	$0	$46,049	$0	$46,049	7.0%	$40,221
3	$0	$10,125	$0	$10,125	7.0%	$8,265
4	$0	$10,125	$0	$10,125	7.0%	$7,724
5	$0	$10,125	$10,000	$20,125	7.0%	$14,349
6	$0	$10,125	$0	$10,125	7.0%	$6,747
7	$0	$10,125	$0	$10,125	7.0%	$6,305
8	$0	$10,125	$0	$10,125	7.0%	$5,893
9	$0	$10,125	$0	$10,125	7.0%	$5,507
10	$0	$10,125	$10,000	$20,125	7.0%	$10,231
11	$0	$10,125	$0	$10,125	7.0%	$4,810
12	$0	$10,125	$0	$10,125	7.0%	$4,496
13	$0	$10,125	$0	$10,125	7.0%	$4,202
14	$0	$10,125	$0	$10,125	7.0%	$3,927
15	$0	$10,125	$10,000	$20,125	7.0%	$7,294
16	$0	$10,125	$0	$10,125	7.0%	$3,430
17	$0	$10,125	$0	$10,125	7.0%	$3,205
18	$0	$10,125	$0	$10,125	7.0%	$2,996
19	$0	$10,125	$0	$10,125	7.0%	$2,800
20	$0	$10,125	$10,000	$20,125	7.0%	$5,201
21	$0	$10,125	$0	$10,125	7.0%	$2,445
22	$0	$10,125	$0	$10,125	7.0%	$2,285
23	$0	$10,125	$0	$10,125	7.0%	$2,136
24	$0	$10,125	$0	$10,125	7.0%	$1,996
25	$0	$10,125	$10,000	$20,125	7.0%	$3,708
26	$0	$10,125	$0	$10,125	7.0%	$1,743
27	$0	$10,125	$0	$10,125	7.0%	$1,629
28	$0	$10,125	$0	$10,125	7.0%	$1,523
29	$0	$10,125	$0	$10,125	7.0%	$1,423
30	$0	$10,125	$10,000	$20,125	7.0%	$2,644
TOTAL	**$562,187**	**$375,601**	**$60,000**	**$997,788**		**$774,359**
					PV O&M	**$212,172**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	312	LF	$27.57	$8,602
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$8,898**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	3	MONTH	$4,531	$13,593
	Subtotal				**$43,044**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0.3	ACRE	$3,968.29	$1,190
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	312	LF	$8.97	$2,797
	Subtotal				**$24,659**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[3]	622	CY	$2.12	$1,321
6.2	Haul RW/Soil to Stockpile Area[4]	747	CY	$4.00	$2,987
6.3	Perimeter Air Sampling	23	EA	$243.76	$5,565
6.4	Equipment Decontamination	31	HR	$54.56	$1,698
6.5	Stockpile Management	747	CY	$1.44	$1,073
6.6	Stockpile Characterization[5]	1	EA	$1,535.00	$1,535
	Subtotal				**$14,179**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	491	CY	$2.44	$1,199
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	31	HR	$54.56	$1,698
7.4	Out-of-Town Transportation of Waste[7]	737	TON	$170.00	$125,233
7.5	Out-of-Town Disposal of RW (no treatment)[7, 8]	663	TON	$107.10	$71,007
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	74	TON	$192.00	$14,144
	Subtotal				**$213,282**

CAPITAL COSTS
ALTERNATIVE 6 - EXCAVATION TO THE WATER TABLE WITH OUT-OF-TOWN DISPOSAL
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material[9]	230	CY	$2.40	$553
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[10]	1700	SF	$1.29	$2,193
8.8	Furnish, Place, and Spread Topsoil (6")[9]	75	CY	$34.65	$2,583
8.9	Hydroseeding with Mulch and Fertilizer	4	MSF	$43.97	$161
8.10	Place, Spread, and Compact Asphalt Base Course (12")	13	ECY	$9.35	$118
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	340	SF	$2.27	$772
8.12	Site Cleanup	64	HR	$405	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	358	CY	$11.83	$4,233
8.14	Install Nonwoven Geotextile Fabric	189	SY	$2.21	$417
	Subtotal				**$36,958**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$374,791**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$22,487
10.2	Engineering and Design (12%)				$44,975
10.3	Construction management (8%)				$29,983
10.4	Location Adjustment (9%)				$33,731
10.5	Contingency (15%)				$56,219
TOTAL OTHER COSTS					**$187,396**
TOTAL CAPITAL COST FOR ALTERNATIVE 6					**$562,187**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Third Avenue Property.

[2] Assume fencing and signage to be temporary and required during construction activities for site security only.

[3] Represents in situ estimate of RW and additional soil (to be excavated for safety benching/sloping) to be excavated to a depth of 6.5 ft below ground surface.

[4] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500).

[6] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[7] A conversion factor of 1.5 was used to convert CY to TON.

[8] Volume of RW for Out-of-Town assumes that 10% would be hazardous requiring treatment prior to disposal.

[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[10] Delineation ("warning") layer included for excavation area where waste is left-in-place.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$236,497	$0	0	$236,497	7.0%	$236,497
1	$0	$58,813	$0	$58,813	7.0%	$54,965
2	$0	$58,813	$0	$58,813	7.0%	$51,369
3	$0	$31,870	$0	$31,870	7.0%	$26,015
4	$0	$31,870	$0	$31,870	7.0%	$24,313
5	$0	$31,870	$10,000	$41,870	7.0%	$29,852
6	$0	$31,870	$0	$31,870	7.0%	$21,236
7	$0	$31,870	$0	$31,870	7.0%	$19,847
8	$0	$31,870	$0	$31,870	7.0%	$18,548
9	$0	$31,870	$0	$31,870	7.0%	$17,335
10	$0	$31,870	$10,000	$41,870	7.0%	$21,284
11	$0	$31,870	$0	$31,870	7.0%	$15,141
12	$0	$31,870	$0	$31,870	7.0%	$14,150
13	$0	$31,870	$0	$31,870	7.0%	$13,225
14	$0	$31,870	$0	$31,870	7.0%	$12,360
15	$0	$31,870	$10,000	$41,870	7.0%	$15,175
16	$0	$31,870	$0	$31,870	7.0%	$10,795
17	$0	$31,870	$0	$31,870	7.0%	$10,089
18	$0	$31,870	$0	$31,870	7.0%	$9,429
19	$0	$31,870	$0	$31,870	7.0%	$8,812
20	$0	$31,870	$10,000	$41,870	7.0%	$10,820
21	$0	$31,870	$0	$31,870	7.0%	$7,697
22	$0	$31,870	$0	$31,870	7.0%	$7,193
23	$0	$31,870	$0	$31,870	7.0%	$6,723
24	$0	$31,870	$0	$31,870	7.0%	$6,283
25	$0	$31,870	$10,000	$41,870	7.0%	$7,714
26	$0	$31,870	$0	$31,870	7.0%	$5,488
27	$0	$31,870	$0	$31,870	7.0%	$5,129
28	$0	$31,870	$0	$31,870	7.0%	$4,793
29	$0	$31,870	$0	$31,870	7.0%	$4,480
30	$0	$31,870	$10,000	$41,870	7.0%	$5,500
TOTAL	**$236,497**	**$1,009,974**	**$60,000**	**$1,306,471**		**$702,260**
					PV O&M	**$465,763**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	312	LF	$27.57	$8,602
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$8,898**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	1	MONTH	$4,531	$4,531
	Subtotal				**$33,982**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0.3	ACRE	$3,968.29	$1,190
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	312	LF	$8.97	$2,797
	Subtotal				**$24,659**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	227	CY	$2.12	$481
6.2	Haul RW to Stockpile Area[4]	272	CY	$4.00	$1,088
6.3	Perimeter Air Sampling	8	EA	$243.76	$2,027
6.4	Equipment Decontamination	11	HR	$54.56	$618
6.5	Stockpile Management	272	CY	$1.44	$391
6.6	Stockpile Characterization[5]	1	EA	$1,535.00	$1,535
	Subtotal				**$6,141**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	272	CY	$2.44	$664
7.2	Transport RW to in-town consolidation[7]	245	CY	$5.52	$1,352
7.3	Equipment Decontamination	11	HR	$54.56	$618
7.4	Out-of-Town Transportation of Waste[7, 8]	41	TON	$170.00	$6,936
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	41	TON	$192.00	$7,834
	Subtotal				**$17,404**

CAPITAL COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[9]	1,700	SF	$1.29	$2,193
8.8	Furnish, Place, and Spread Topsoil (6")[10]	28	CY	$34.65	$960
8.9	Hydroseeding with Mulch and Fertilizer	1	MSF	$43.97	$60
8.10	Place, Spread, and Compact Asphalt Base Course (12")	13	ECY	$9.35	$118
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	340	SF	$2.27	$772
8.12	Site Cleanup	64	HR	$405	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	200	CY	$11.83	$2,361
8.14	Install Nonwoven Geotextile Fabric	189	SY	$2.21	$417
	Subtotal				**$32,809**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$157,665**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$9,460
10.2	Engineering and Design (12%)				$18,920
10.3	Construction management (8%)				$12,613
10.4	Location Adjustment (9%)				$14,190
10.5	Contingency (15%)				$23,650
TOTAL OTHER COSTS					**$78,832**
TOTAL CAPITAL COST FOR ALTERNATIVE 7					**$236,497**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Third Avenue Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 2 or 4 ft below ground surface.
[4] Volume for hauling RW includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal.
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement;
Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 7 - EXCAVATION TO EITHER 2 OR 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)						
OM.2.1	Inspection	120	HR	$110.00	$13,200	see cost assumptions
OM.2.2	Mowing (twice per year)	3	MSF	$7.34	$20	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation[2]	0.01	MSF	$56.31	$1	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs[3]	17	SF	$1.81	$31	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair[4]	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement[5]	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	1	LS	$2,250.00	$2,250	see cost assumptions
OM.2.8	Contractor mobilizations	4	EA	$321.75	$1,287	see cost assumptions
	Subtotal				**$16,789**	
OM.3.0 Deed Restrictions						
OM.3.1	Inspection (annual)	1	LS	$1,100.00	$1,100	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	1	EA	$5,000.00	$5,000	see cost assumptions
	Subtotal				**$6,100**	
ANNUAL O&M COST (YEARS 1-2)[6]					**$58,813**	
ANNUAL O&M COST (YEARS 3-30)[7]					**$31,870**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Third Avenue Property.

[2] Assumed that 1% of vegetated surfaces will require repair annually; however, the actual rate of revegetation required would likely be increased during the establishment period (i.e.; first 3 growing seasons) and then be reduced and potentially eliminated in the future.

[3] Assumed 5% of asphalt surfaces will require repair annually.

[4] Assume fencing will not be required following remedial action.

[5] Assume signage will not be required following remedial action.

[6] O&M for Years 1 and 2 include quarterly groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

[7] O&M for Years 3 - 30 include annual groundwater monitoring, monthly ground surface inspections with annual repairs, annual deed inspections and one annual report for all O&M activities.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum

HR = hour

EA = each

MSF = thousand square feet

SF = square feet

LF = linear feet

FOL = field operations leader

O&M = operations and maintenance

PRESENT VALUE ANALYSIS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$383,161	$0	0	$383,161	7.0%	$383,161
1	$0	$58,813	$0	$58,813	7.0%	$54,965
2	$0	$58,813	$0	$58,813	7.0%	$51,369
3	$0	$31,870	$0	$31,870	7.0%	$26,015
4	$0	$31,870	$0	$31,870	7.0%	$24,313
5	$0	$31,870	$10,000	$41,870	7.0%	$29,852
6	$0	$31,870	$0	$31,870	7.0%	$21,236
7	$0	$31,870	$0	$31,870	7.0%	$19,847
8	$0	$31,870	$0	$31,870	7.0%	$18,548
9	$0	$31,870	$0	$31,870	7.0%	$17,335
10	$0	$31,870	$10,000	$41,870	7.0%	$21,284
11	$0	$31,870	$0	$31,870	7.0%	$15,141
12	$0	$31,870	$0	$31,870	7.0%	$14,150
13	$0	$31,870	$0	$31,870	7.0%	$13,225
14	$0	$31,870	$0	$31,870	7.0%	$12,360
15	$0	$31,870	$10,000	$41,870	7.0%	$15,175
16	$0	$31,870	$0	$31,870	7.0%	$10,795
17	$0	$31,870	$0	$31,870	7.0%	$10,089
18	$0	$31,870	$0	$31,870	7.0%	$9,429
19	$0	$31,870	$0	$31,870	7.0%	$8,812
20	$0	$31,870	$10,000	$41,870	7.0%	$10,820
21	$0	$31,870	$0	$31,870	7.0%	$7,697
22	$0	$31,870	$0	$31,870	7.0%	$7,193
23	$0	$31,870	$0	$31,870	7.0%	$6,723
24	$0	$31,870	$0	$31,870	7.0%	$6,283
25	$0	$31,870	$10,000	$41,870	7.0%	$7,714
26	$0	$31,870	$0	$31,870	7.0%	$5,488
27	$0	$31,870	$0	$31,870	7.0%	$5,129
28	$0	$31,870	$0	$31,870	7.0%	$4,793
29	$0	$31,870	$0	$31,870	7.0%	$4,480
30	$0	$31,870	$10,000	$41,870	7.0%	$5,500
TOTAL	**$383,161**	**$1,009,974**	**$60,000**	**$1,453,135**		**$848,924**
					PV O&M	**$465,763**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	312	LF	$27.57	$8,602
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$8,898**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	1	MONTH	$4,531	$4,531
	Subtotal				**$33,982**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0.3	ACRE	$3,968.29	$1,190
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	312	LF	$8.97	$2,797
	Subtotal				**$24,659**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	227	CY	$2.12	$481
6.2	Haul RW to Stockpile Area[4]	0	CY	$4.00	$0
6.3	Perimeter Air Sampling	8	EA	$243.76	$2,027
6.4	Equipment Decontamination	11	HR	$54.56	$618
6.5	Stockpile Management	272	CY	$1.44	$391
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$3,518**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[5]	272	CY	$2.44	$664
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	11	HR	$54.56	$618
7.4	Out-of-Town Transportation of Waste[6]	408	TON	$170.00	$69,360
7.5	Out-of-Town Disposal of RW (no treatment)[6, 7]	367	TON	$107.10	$39,327
7.6	Out-of-Town Disposal of RW (treatment)[6, 7]	41	TON	$192.00	$7,834
	Subtotal				**$117,803**

CAPITAL COSTS
ALTERNATIVE 8 - EXCAVATION TO EITHER 2 OR 4 FEET WITH OUT-OF-TOWN DISPOSAL
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	1,700	SF	$1.29	$2,193
8.8	Furnish, Place, and Spread Topsoil (6")[9]	28	CY	$34.65	$960
8.9	Hydroseeding with Mulch and Fertilizer	1	MSF	$43.97	$60
8.10	Place, Spread, and Compact Asphalt Base Course (12")	13	ECY	$9.35	$118
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	340	SF	$2.27	$772
8.12	Site Cleanup	64	HR	$405	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	200	CY	$11.83	$2,361
8.14	Install Nonwoven Geotextile Fabric	189	SY	$2.21	$417
	Subtotal				**$32,809**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$255,441**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$15,326
10.2	Engineering and Design (12%)				$30,653
10.3	Construction management (8%)				$20,435
10.4	Location Adjustment (9%)				$22,990
10.5	Contingency (15%)				$38,316
TOTAL OTHER COSTS					**$127,720**
TOTAL CAPITAL COST FOR ALTERNATIVE 8					**$383,161**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Third Avenue Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 2 or 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Volume includes all RW intended for disposal .
[6] A conversion factor of 1.5 was used to convert CY to TON.
[7] Volume of RW for Out-of-Town disposal assumes that 10% would be hazardous requiring treatment prior to disposal.
[8] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement;
Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[10] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$239,607	$0	0	$239,607	7.0%	$239,607
1	$0	$58,813	$0	$58,813	7.0%	$54,965
2	$0	$58,813	$0	$58,813	7.0%	$51,369
3	$0	$31,870	$0	$31,870	7.0%	$26,015
4	$0	$31,870	$0	$31,870	7.0%	$24,313
5	$0	$31,870	$10,000	$41,870	7.0%	$29,852
6	$0	$31,870	$0	$31,870	7.0%	$21,236
7	$0	$31,870	$0	$31,870	7.0%	$19,847
8	$0	$31,870	$0	$31,870	7.0%	$18,548
9	$0	$31,870	$0	$31,870	7.0%	$17,335
10	$0	$31,870	$10,000	$41,870	7.0%	$21,284
11	$0	$31,870	$0	$31,870	7.0%	$15,141
12	$0	$31,870	$0	$31,870	7.0%	$14,150
13	$0	$31,870	$0	$31,870	7.0%	$13,225
14	$0	$31,870	$0	$31,870	7.0%	$12,360
15	$0	$31,870	$10,000	$41,870	7.0%	$15,175
16	$0	$31,870	$0	$31,870	7.0%	$10,795
17	$0	$31,870	$0	$31,870	7.0%	$10,089
18	$0	$31,870	$0	$31,870	7.0%	$9,429
19	$0	$31,870	$0	$31,870	7.0%	$8,812
20	$0	$31,870	$10,000	$41,870	7.0%	$10,820
21	$0	$31,870	$0	$31,870	7.0%	$7,697
22	$0	$31,870	$0	$31,870	7.0%	$7,193
23	$0	$31,870	$0	$31,870	7.0%	$6,723
24	$0	$31,870	$0	$31,870	7.0%	$6,283
25	$0	$31,870	$10,000	$41,870	7.0%	$7,714
26	$0	$31,870	$0	$31,870	7.0%	$5,488
27	$0	$31,870	$0	$31,870	7.0%	$5,129
28	$0	$31,870	$0	$31,870	7.0%	$4,793
29	$0	$31,870	$0	$31,870	7.0%	$4,480
30	$0	$31,870	$10,000	$41,870	7.0%	$5,500
TOTAL	**$239,607**	**$1,009,974**	**$60,000**	**$1,309,581**		**$705,370**
					PV O&M	**$465,763**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	312	LF	$27.57	$8,602
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$8,898**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	1	MONTH	$4,531	$4,531
	Subtotal				**$33,982**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0.3	ACRE	$3,968.29	$1,190
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	312	LF	$8.97	$2,797
	Subtotal				**$24,659**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	252	CY	$2.12	$535
6.2	Haul RW to Stockpile Area[4]	302	CY	$4.00	$1,209
6.3	Perimeter Air Sampling	9	EA	$243.76	$2,253
6.4	Equipment Decontamination	13	HR	$54.56	$687
6.5	Stockpile Management	302	CY	$1.44	$434
6.6	Stockpile Characterization[5]	1	EA	$1,535.00	$835
	Subtotal				**$5,953**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[6]	302	CY	$2.44	$738
7.2	Transport RW to in-town consolidation[7]	272	CY	$5.52	$1,502
7.3	Equipment Decontamination	13	HR	$54.56	$687
7.4	Out-of-Town Transportation of Waste[7, 8]	45	TON	$170.00	$7,707
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Disposal of RW (treatment)[7, 8]	45	TON	$192.00	$8,704
	Subtotal				**$19,338**

CAPITAL COSTS
ALTERNATIVE 9 - EXCAVATION TO 4 FEET WITH IN-TOWN CONSOLIDATION
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[9]	1,700	SF	$1.29	$2,193
8.8	Furnish, Place, and Spread Topsoil (6")[10]	28	CY	$34.65	$960
8.9	Hydroseeding with Mulch and Fertilizer	1	MSF	$43.97	$60
8.10	Place, Spread, and Compact Asphalt Base Course (12")	13	ECY	$9.35	$118
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	340	SF	$2.27	$772
8.12	Site Cleanup	64	HR	$405	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	227	CY	$11.83	$2,689
8.14	Install Nonwoven Geotextile Fabric	189	SY	$2.21	$417
	Subtotal				**$33,136**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$159,738**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$9,584
10.2	Engineering and Design (12%)				$19,169
10.3	Construction management (8%)				$12,779
10.4	Location Adjustment (9%)				$14,376
10.5	Contingency (15%)				$23,961
TOTAL OTHER COSTS					**$79,869**
TOTAL CAPITAL COST FOR ALTERNATIVE 9					**$239,607**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Third Avenue Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW includes a bulking factor of 1.2.
[5] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal (assume 1 sample per 500 CY).
[6] Volume includes all RW intended for disposal.
[7] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement;
Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

PRESENT VALUE ANALYSIS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$405,480	$0	0	$405,480	7.0%	$405,480
1	$0	$58,813	$0	$58,813	7.0%	$54,965
2	$0	$58,813	$0	$58,813	7.0%	$51,369
3	$0	$31,870	$0	$31,870	7.0%	$26,015
4	$0	$31,870	$0	$31,870	7.0%	$24,313
5	$0	$31,870	$10,000	$41,870	7.0%	$29,852
6	$0	$31,870	$0	$31,870	7.0%	$21,236
7	$0	$31,870	$0	$31,870	7.0%	$19,847
8	$0	$31,870	$0	$31,870	7.0%	$18,548
9	$0	$31,870	$0	$31,870	7.0%	$17,335
10	$0	$31,870	$10,000	$41,870	7.0%	$21,284
11	$0	$31,870	$0	$31,870	7.0%	$15,141
12	$0	$31,870	$0	$31,870	7.0%	$14,150
13	$0	$31,870	$0	$31,870	7.0%	$13,225
14	$0	$31,870	$0	$31,870	7.0%	$12,360
15	$0	$31,870	$10,000	$41,870	7.0%	$15,175
16	$0	$31,870	$0	$31,870	7.0%	$10,795
17	$0	$31,870	$0	$31,870	7.0%	$10,089
18	$0	$31,870	$0	$31,870	7.0%	$9,429
19	$0	$31,870	$0	$31,870	7.0%	$8,812
20	$0	$31,870	$10,000	$41,870	7.0%	$10,820
21	$0	$31,870	$0	$31,870	7.0%	$7,697
22	$0	$31,870	$0	$31,870	7.0%	$7,193
23	$0	$31,870	$0	$31,870	7.0%	$6,723
24	$0	$31,870	$0	$31,870	7.0%	$6,283
25	$0	$31,870	$10,000	$41,870	7.0%	$7,714
26	$0	$31,870	$0	$31,870	7.0%	$5,488
27	$0	$31,870	$0	$31,870	7.0%	$5,129
28	$0	$31,870	$0	$31,870	7.0%	$4,793
29	$0	$31,870	$0	$31,870	7.0%	$4,480
30	$0	$31,870	$10,000	$41,870	7.0%	$5,500
TOTAL	**$405,480**	**$1,009,974**	**$60,000**	**$1,475,454**		**$871,243**
					PV O&M	**$465,763**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees	1	LS	$22,655	$22,655
	Subtotal				**$22,655**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[2]					
3.1	Chain Link Fence	312	LF	$27.57	$8,602
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$8,898**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	1	MONTH	$4,531	$4,531
	Subtotal				**$33,982**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0.3	ACRE	$3,968.29	$1,190
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	312	LF	$8.97	$2,797
	Subtotal				**$24,659**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW[3]	252	CY	$2.12	$535
6.2	Haul RW to Stockpile Area[4]	302	CY	$4.00	$1,209
6.3	Perimeter Air Sampling	9	EA	$243.76	$2,253
6.4	Equipment Decontamination	11	HR	$54.56	$618
6.5	Stockpile Management	302	CY	$1.44	$434
6.6	Stockpile Characterization	0	EA	$1,535.00	$0
	Subtotal				**$5,049**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[5]	302	CY	$2.44	$738
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	11	HR	$54.56	$618
7.4	Out-of-Town Transportation of Waste[6]	453	TON	$170.00	$77,067
7.5	Out-of-Town Disposal of RW (no treatment)[6, 7]	408	TON	$107.10	$43,697
7.6	Out-of-Town Disposal of RW (treatment)[6, 7]	45	TON	$192.00	$8,704
	Subtotal				**$130,824**

CAPITAL COSTS
ALTERNATIVE 10 - EXCAVATION TO 4 FEET WITH OUT-OF-TOWN DISPOSAL
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material	0	CY	$2.40	$0
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer[8]	1,700	SF	$1.29	$2,193
8.8	Furnish, Place, and Spread Topsoil (6")[9]	28	CY	$34.65	$960
8.9	Hydroseeding with Mulch and Fertilizer	1	MSF	$43.97	$60
8.10	Place, Spread, and Compact Asphalt Base Course (12")	13	ECY	$9.35	$118
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	340	SF	$2.27	$772
8.12	Site Cleanup	64	HR	$405	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[9]	227	CY	$11.83	$2,689
8.14	Install Nonwoven Geotextile Fabric	189	SY	$2.21	$417
	Subtotal				**$33,136**
9.0	**Flood Storage Mitigation/Stormwater Management[10]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$270,320**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$16,219
10.2	Engineering and Design (12%)				$32,438
10.3	Construction management (8%)				$21,626
10.4	Location Adjustment (9%)				$24,329
10.5	Contingency (15%)				$40,548
TOTAL OTHER COSTS					**$135,160**
TOTAL CAPITAL COST FOR ALTERNATIVE 10					**$405,480**

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Third Avenue Property.
[2] Assume fencing and signage to be temporary and required during construction activities for site security only.
[3] Represents in situ estimate of RW to be excavated to a depth of 4 ft below ground surface.
[4] Volume for hauling RW to the stockpile area includes a bulking factor of 1.2.
[5] Volume includes all RW intended for disposal .
[6] A conversion factor of 1.5 was used to convert CY to TON.
[7] Volume of RW for Out-of-Town disposal assumes that 10% would be hazardous requiring treatment prior to disposal.
[8] Delineation ("warning") layer included for excavation area where waste is left-in-place.
[9] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement;
Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain.
[10] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each

MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.

G-19

OVERALL COST ASSUMPTIONS

2010 COST ASSUMPTIONS
ALTERNATIVES 2, 3, 4, 5, 6, 7, 8, 9 and 10
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CT

DESCRIPTION		RATIONALE
General Assumptions		
	The costs shown in these tables reflect those that would be expected for implementation of remedial actions at one property or property group at a time. Performing actions on more than one property or property group during the same mobilization could potentially result in cost savings.	
	Other Costs presented in Section 10.0 of the cost estimate are based on recommended percentages contained in A Guide to Developing and Documenting Cost Estimates During the Feasibility (OSWER 9355.0-75), July 2000. Location adjustment based on value published in Means 2005 ER. Contingency line items based on typical values presented in OSWER 9355.0-75	
1.0 Deed Restrictions		
1.1	Transactional Fees	It is assumed that a deed restriction is only required for those properties deemed non-clean closure. For each property requiring a deed restriction the cost is $20,000.
2.0 Monitoring Well Construction		
	Some level of site preparation was assumed to be required at each property or group of properties. At certain properties, no site access road improvements or clearing/grubbing is required. For in-town consolidation options, no stockpiling area is assumed. Instead, excavated Raymark waste would be transported diretly to the CAMU areas. For on-property stockpiling areas, no specific stockpiling/staging location is specified for the property.	
2.1	Mobilize Drill Rig Crew	Equipment would be mobilized and demobilized to and from the property once each. Drill Rig Crew: 1 equip operator, 1 truck driver/helper; 1 drill rig, 1 support truck. Assume a lump sum of $2,500 total for the mobilization/demobization.
2.2	Drilling	Assume that 3 groundwater wells will each be drilled to an average depth of 15' below ground surface (bgs). Each well will comprise of 10' screen, 5' casing, 12' filter pack, 1 bag of bentonite seal, 2 bags of annular seal, and 1 pvc plug, 1 flush-mount protective cover with locking cap and 1 surface pad. $32.50/LF [Vendor quote October 2007]
2.3	Install PVC Well Screens (2"diameter)	$15.49/LF [Means 2004 ER, 33 23 0201]
2.4	Install PVC Well Casing (2"diameter)	$11.64/LF [Means 2004 ER, 33 23 0101]
2.5	Install Filter Pack	$12.21/LF [Means 2004 ER, 33 23 1401]
2.6	Install Bentonite Seal	$45 EA [Means 2004 ER, 33 23 2101]
2.7	Install Annular Seal	$54.31/LF [Means 2004 ER, 33 23 1801]
2.8	PVC Well Plugs	$21.91 EA [Means 2004 ER, 33 23 0301]
2.9	Flush-Mount	$355.19 EA [Means 2004 ER, 33 23 2211]
2.10	Surface Pad, Concrete 2' x 2'	$121.76 EA [Means 2004 ER, 33 23 1504]
2.11	Well Development	Each well will require 2 hours of well development, at $85/hour. Total of $179.52 for each well (inflation adjusted).
2.12	IDW Transportation/Disposal (drums)	It is assumed that there will be 1 drum per well to collect the purge water and includes the cost of transportation and disposal of the drums. $400 per drum.
3.0 Fencing and Signage		
	Fencing and signage included to restrict access to RW left in-place per Alternative 2 requires long-term O&M. Fencing and signage included for Alt. 3 - 10 would be temporary, intended only to support active remedial action by securing the site and faciliating maintenance of a safe distance between the public and construction activities, and will not require long-term O&M.	
3.1	Chain Link Fence	Aluminized steel chain link fence. It assumed that it will require 250' of fencing at $27.57/LF. Crew B-80C: 2 laborers, 1 truck driver (light), 1 flatbed truck (gas) 1.5 ton, 1 manual fence post auger (gas).
3.2	Signage	A signage frequency of 1 per 100 LF of fence was used to help prevent tresspassing.

2010 COST ASSUMPTIONS
ALTERNATIVES 2, 3, 4, 5, 6, 7, 8, 9 and 10
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CT

DESCRIPTION		RATIONALE
4.0 Mobilization/Demobilization		
4.1	Equipment mobilization	Assume less than 25 mile haul distance for all equipment. Equipment would be mobilized and demobilized to and from the property once each. Assume $500 for mob, $500 for demob per piece of equipment. The following pieces of heavy equipment would be mobilized to the property at various points of the project: excavator(s), FE loader(s), dozer(s), dump truck(s), roller(s), grader(s), paver(s), chipping machine(s), water truck(s). Mobilization/demobilization costs vary based on size and scope of excavation required for property. Unit costs include labor cost for equipment mob/demob.
4.2	Field Support Facilities	Field support facilities will be mobilized and demobilized to and from the property once during the course of the remedial action. The following items are included in this cost line item: office trailer @ $500, storage trailers (2) @ $400, site utilities @ 500, dumpster @ $100, sanitary facilities @ $100, soil sampling equip @ $4000. Costs may vary based on size and scope of excavation required.
4.3	Monthly Costs associated with Field Support	Includes monthly rental costs for duration of project for the following: office trailer @ $400, storage trailers @ $200, utilities @ $200, dumpster @ $200, sampling materials @ $2000, air sampling equipment (PID, air pumps) @ 1000.
5.0 Site Preparation		
	Some level of site preparation was assumed to be required at each property or group of properties. At certain properties, no site access road improvements or clearing/grubbing is required.	
	For on-property stockpiling areas, no specific stockpiling/staging location is specified for the property.	
5.1	Site Access Road Construction	Aggregate base course, 12" deep, daily output 5,000 S.Y. Crew B-36C: 1 labor foreman, 3 equip operators, 1 truck driver; 1 dozer, 1 roller, 1 grader, 1 water tanker.
5.2	Clear and Grub	Cut & chip light trees to 6" diameter. Crew B-7: 1 labor foreman, 4 laborers, 1 equipment operator. 1 chipping machine, 1 front-end loader, 2 chainsaws.
5.3	Site survey	Assume $5,000 per construction area for site survey. Site survey would serve to identify the delineated Raymark waste footprints prior to excavation.
5.4	Construct Decontamination Pads	Assumes construction of a heavy equipment decontamination pad at each property, or one per property group. Equipment decontamination pads assumed assumed 20' x 40' in size with 6" gravel base, 40 mil high density polyethylene liner, and 4" crushed stone, graded to divert decontamination fluids into a water collection sump.
	Gravel base, delivered and dumped	$24.51/CY [Means 2004 ER, 18 01 0102]
	40 mil polyethylene liner	$1.39/SF [Means 2004 ER, 33 08 0563]
	Stone drainage layer	$22.94/CY [Means 2004 ER, 17 03 0419]
5.5	Construct Soil Stockpiling/Staging Areas	Assume one soil stockpiling/staging area to be constructed to implement the alternative. Stockpiling/staging areas would be constructed using six inches of sand/gravel to establish an adequate base (where appropriate). This material would be overlain by a 40-mil polyethylene liner, six inches of sand/gravel to protect the underliner from punc The stockpile will be covered with 6 mil polytarps daily to prevent excessive erosion due to stormwater runoff. Stockpiling/staging areas sized to hold approximately 1 week production of excavated soil (75 CY/HR * 40 HR/WK). Silt fence and hay bales would be installed at the perimeter of each stockpiling/staging area to prevent sedimentation that might enable contaminant transport from the stockpiles (see section 2.6 below).

2010 COST ASSUMPTIONS
ALTERNATIVES 2, 3, 4, 5, 6, 7, 8, 9 and 10
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CT

DESCRIPTION		RATIONALE
	Gravel base, delivered and dumped *40 mil polyethylene liner* *6 mil polyethylene cover tarps (60 x 60)*	$24.51/CY [Means 2004 ER, 18 01 0102] $1.39/SF [Means 2004 ER, 33 08 0563] $150 EA
5.6	Install Erosion and Sedimentation Controls	Erosion and sedimentation controls will consist of hay/straw bales and silt fence installed at the perimeter of each soil bales and silt fence installed at the perimeter of each soil stockpiling/staging area and at the perimeter of each excavation area.
	Hay bails, staked *Silt Fence*	$2.72/LF [Means 2004 HC, 02370 700 1250] Silt fence $1.01/LF [Means 2004 HC, 02370 700 1100]
6.0 Excavate and Haul Raymark Waste		
	Excavation and loading of Raymark waste from the Raymark properties is assumed to occur using a hydraulic excavator. Based on unit cost sources that were used to develop excavation costs, the excavation rate was assumed to be 75 CY/HR. Excavated Raymark waste will be loaded directly into 20 CY dump trailers and transported to one of the construction staging/soil stockpiling areas (described above under Site Preparation).	
6.1	Excavate and Load Waste	Excavate and Load, 1 CY Hydraulic Excavator, Medium Material, 40 CY/HR. Crew CODEO: 1 laborer (semi-skilled); 1 hydraulic excavator, crawler, 1.00 CY bucket; 1 equipment operator. Labor costs included in unit cost. Excavation rate may vary based on volume of material excavated and condition of material being excavated (i.e. wet or saturated excavation would take longer). For Alt. 3 - 6, additional non-RW soil would require excavation to facilitate cap construction (due to non-contiguous RW delineated within property group) and/or excavation to depths greater than 4-ft to facilitate compliance with safety standards regarding sloping/benching of sidewalls. Pending analytical analysis for PHCs, additionally excavated soil may be used onsite as backfill following excavation and was deducted from the estimated volume of backfill required.
6.2	Haul Waste to Stockpile/Staging Area	Haul Raymark waste to on-site stockpiling area . 12 CY dump truck(s), 0.5-mile round trip, 3.2 loads/hour, 250 CY/ truck/day assumed. Crew B-34B: 1 truck driver, 1 dump truck 16 ton. Assume bulking factor from removal of soil at 1.2.
6.3	Perimeter Air Samples	Monitoring of air at perimeter of site during excavation activities to confirm the effectiveness of engineering controls at preventing releases of contaminants to the environment. Sampling stations to be located at perimeter of excavation areas. Assume 6 samples per day (one at north, south, east, and west borders of work area plus quality control samples; or frequency of 1 sample/44 CY of in situ RW volume excavated) at $205/SAMPLE (PCBs @ $160/SAMPLE; asbestos @ $20/SAMPLE; lead @$25/SAMPLE). Sample analysis costs based on costs provided by Aero-Tech Environmental Laboratories via email, April 2005.
6.4	Equipment Decontamination	Assume decontamination of heavy vehicles as they leave excavation area to transport excavated soil. Operate 1,800 PSI pressure washer. Includes equipment, water, soap, electricity, and labor. Assume operation during entire duration of excavation activities at a rate of 2 trucks/hour.
6.5	Stockpile Management	Stockpile management assumed to include stripping & stockpiling of soil at each of the stockpiling areas. Assume 200 HP dozer adverse conditions, 1150 CY/day. Crew B-10B: 1 equipment operator, 0.5 laborer, 1 dozer. Stockpile management shall continue for duration of the project to faciliate characterization sampling to ensure In-Town disposal of Raymark waste complies with PHC criteria and faciliate backfilling/restoration activities.
6.6	Characterization Sampling	Characterization sampling included for In-Town Disposal and re-use of additionally excavated soil (to faciliate cap construction and/or meet safety compliance requirements) to evaluate PHC concentrations prior to final disposition and/or re-use as backfill (Out-of-Town disposal characterization included below - see line item 7.6). Assumes no data validation or QA/QC samples is required and that samples would be collected as 8-point composites at a frequency of 1 sample/500 CY of waste and includes: FOL ($110/hr) and sampler ($90/hr) labor a 0.5HR/sample; dedicated/disposable sampling equipment ($1.75/sample) and analytical suite ($1,433/sample) for VOCs, SVOCs, total Metals, total PCBs, dioxins and courier service. Total cost as $1,535/sample.

2010 COST ASSUMPTIONS
ALTERNATIVES 2, 3, 4, 5, 6, 7, 8, 9 and 10
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CT

DESCRIPTION		RATIONALE
7.0 Transportation and Out-of-Town Treatment/Disposal or In-Town Consolidation of Raymark Waste		
	For alternatives involving out-of-town treatment/disposal of Raymark waste, this section includes costs for loading Raymark waste (from stockpiles) into 20 CY dump trailers for transport to the out-of-town treatment/disposal facility (4.1), transporting Raymark waste to the out-of-town facility (4.2), equipment decontamination during T&D (4.3), and transportation (4.4), disposal (4.5), and treatment (4.6) fees associated with out-of-town treatment/disposal of Raymark waste.	
7.1	Load Raymark Waste into Trucks	Excavate and Load, 1 CY Hydraulic Excavator, Medium Material, 40 CY/Hour . Load waste from stockpiles into 12 CY dump trailers for transportation to treatment/disposal facility. Crew CODEO: 1 laborer (semi-skilled); 1 hydraulic excavator, crawler, 1.00 CY bucket; 1 equipment operator. Labor costs included in unit cost.
7.2	Transport Raymark Waste to CAMU	Only applicable to in-town consolidation scenarios. 12 CY dump truck(s), 2-mile round trip, 2.2 loads/hour, 180 CY/ truck/day assumed. Crew B-34B: 1 truck driver, 1 dump truck 16 ton. Assume bulking factor from removal of soil at 1.2.
7.3	Equipment Decontamination	Assume decontamination of heavy vehicles as they leave excavation area to transport excavated soil. Operate 1,800 PSI pressure washer. Includes equipment, water, soap, electricity, and labor. Assume operation during entire duration of excavation activities at a rate of 2 trucks/hour.
7.4	Out-of-Town Transportation of Waste	Assume transportation of excavated Raymark waste using 12 CY dump trailers (NY State fee included and weight limit in CT (20 ton max) considered). Unit cost for transportation based on quote from disposal subcontractor. 20% fuel charge included. Unit cost for disposal based on quote from disposal subcontractor (Charter Environmental, Inc. April, 2010). 1.5 tons per 1.0 cubic yards excavated assumed for transportation and disposal estimates.
7.5	Out-of-Town Disposal of Waste (no treatment) Subtitle C	Assume disposal of waste at hazardous waste facility in New York (Model City). Disposal cost includes full suite of analytical characterization (one per 500 tons of waste), NY State hazardous waste tax, and local hazardous waste tax. Quoted disposal cost assumes hazardous waste with total PCB > 50 ppm, but < 500 ppm. Unit cost for disposal based on quote from disposal subcontractor (Charter Environmental, Inc. April, 2010).
7.6	Out-of-Town Disposal of Waste (treatment) Subtitle C	For the purposes of estimating cost, 10% of soil assumed to require treatment prior to disposal. The remaining 90% of soil would be disposed without treatment. Off-site stabilization for TCLP hazards assumed treatment processes. This line item includes treatment and disposal costs. Transportation costs for this waste included in line item 4.4. Quoted disposal cost assumes hazardous waste with total PCB > 50 ppm, but < 500 ppm. Unit cost for disposal based on quote from disposal subcontractor (Charter Environmental, Inc. April, 2010).
8.0 Construction of Low-Permeability Cap		
	For alternatives that include excavation but do not include low-permeability cap construction, backfill and site restoration will consist of importing clean fill from an off-site source, dumping clean material at each of the excavation areas, spreading and compacting clean material, and restoring ground surfaces to their pre-excavation condition.	
8.1	Spread, and Compact Non-RW Excavated Material.	Unclassified fill placed in 6" lifts, includes spreading and compaction. Also includes the following: soil density test nuclear method ASTM D2922-71, compaction water price $0.005/Gallon. Excavate and load using 2-3/4 CY track loader, medium material 100 CY/hour. Haul, 16.5 CY truck, 1 mile 20 MPH, 4.2 cycles/hour. Compact with sheepsfoot roller, 6" lift, 654 CY/hour.
8.2	Deliver, Dump, Spread and Compact Sand Subbase	The sand subbase is assumed to have 6" thickness at a cost of $25.17/CY.
8.3	Install Geosynthetic Clay Liner (bottom layer)	$2.83/SF (Means 2009 FC, 33.46.26.10 0180)
8.4	Install 60 mil HDPE Liner	$2.65/SF (Means 2005 ER, 33 08 0572)

2010 COST ASSUMPTIONS
ALTERNATIVES 2, 3, 4, 5, 6, 7, 8, 9 and 10
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CT

DESCRIPTION		RATIONALE
8.5	Install Geosynthetic Drainage Liner	Drainage netting, geotextile fabric heat-bonded 2 sides at a cost of $0.61/SF (Means 2005 ER, 33 08 0513)
8.6	Furnish, Spread, and Compact Soil Layer (24")	The soil layer will be placed in 6" lifts, includes spreading and compaction. $11.03/CY.
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	Assume orange, non-woven geotextile fabric to be installed within top 6-inches of protective layer with RCRA cap construction at $1.29/SF (Means 2010)
8.8	Furnish, Place and Spread Topsoil	The soil layer will be placed in 6" lifts. The topsoil layer should have a total thickness of 6" at a cost of $29.14/CY (Means 2005 ER, 18 05 0301)
8.9	Hydroseeding with Mulch and Fertilizer	Hydro or air seeding with mulch and fertilizer, 80 MSF/day. Applicable to vegetated areas only. Crew B81: 1 laborer, 1 equipment operator, 1 truck driver, 1 hydromulcher, 1 tractor truck. 80,000 SF/DAY.
8.1	Place, Spread and Compact Asphalt Base Course	Assume 12-inch layer of aggregate subbase. Crew B-36C: 1 labor foreman (outside), 3 equipment operators (medium), 1 truck driver (heavy), 1 grader 30,000 lbs, 1 dozer 300 HP, 1 roller (vibratory) 25 ton, 1 truck tractor 6x4 450 HP, 1 water tanker 5,000 gal.
8.11	Repave with Asphalt	Asphaltic concrete pavement, lots and driveways, 6" stone base, 2" binder course, 1" thick topping. Applicable to currently paved areas only. Crew B-25C: 1 labor foreman, 3 laborers, 2 equipment operators (medium), 1 asphalt paver 130 HP, 1 roller steel wheels. 10,800 SF/DAY
8.12	Site Cleanup	General area cleanup, 0.625 acres/hour Crew COETF: 1 equipment operator, 1 loader backhoe wheeled 1.38 CY front end bucket w/ 30" dip, 1 highway truck 46,000 GVW 6x4 w/ 3-axle, 2 labor (semi-skilled), 1 truck driver (heavy), 1 rear dump body 8 CY w/ 30,000 GVW. 43.5 MSF/ACRE 0.625 ACRE/HR
8.13	Clean Fill, Delivered and Dumped, Spread, and Compacted	Unclassified fill placed in 6" lifts, includes spreading and compaction. Also includes the following: soil density test nuclear method ASTM D2922-71, compaction water price $0.005/Gallon. Same pricing used for protective layer construction. Excavate and load using 2-3/4 CY track loader, medium material 100 CY/hour. Haul, 16.5 CY truck, 1 mile 20 MPH, 4.2 cycles/hour. Compact with sheepsfoot roller, 6" lift, 654 CY/hour.
8.14	Install Geotextile Fabric Layer	$2.21/SF (Means 2010 SW, 31.32.19.16 1500)
9.0 Flood Storage Mitigation/Stormwater Management		
	There are certain properties where there are floodplains and/or wetlands that will be impacted by the remediation activities. Therefore, work will be required as outlined below and estimated in 2008. Some areas and volumes were updated in 2010 as shown presented in the Floodplains and Wetlands Mitigation Cost.xls back-up table.	
9.1	Flood Storage Mitigation Costs	1 acre acquisition cost assumed at $200,000. Based on factors presented in The Use of Best Management Practices (BMPs) in Urban Watersheds, EPA/600/R-04/184, 2004. Mitigation costs by property presented in Floodplains Wetlands Mitigation Costs.xls
6.2	Wetlands Mitigation Costs	1 acre acquisition cost assumed at $200,000. Based on factors presented in THE COST OF WETLAND CREATION AND RESTORATION, U.S. Department of Energy, Proj. No. 22-92MT92006.000, 1994 Mitigation costs by property presented in Floodplains Wetlands Mitigation Costs.xls

2010 COST ASSUMPTIONS
ALTERNATIVES 2, 3, 4, 5, 6, 7, 8, 9 and 10
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CT

DESCRIPTION		RATIONALE
Operations and Maintenance Cost Assumptions		
OM.1.0 Groundwater Monitoring (per event)		
Groundwater monitoring costs were estimated for a single monitoring event. For long-term O&M, it was assumed that monitoring would occur quarterly for the first 2 years after construction, and semiannually thereafter.		
OM.1.1	Sampling Equipment Rental	Includes groundwater pumps (2), water quality monitoring instruments (2), water level indicators (2), air-monitoring instrument (2008).
OM.1.2	Sampling Labor (FOL)	Labor hours assume 4 hours per monitoring well.
OM.1.3	Sampling Labor (sampler)	Labor hours assume 2 hours per monitoring well.
OM.1.4	Analytical Costs	Assume samples are collected from all wells plus 10% for QA/QC (assume no cost for MS/MSD). Samples analyzed for VOCs ($150), SVOCs ($250), pesticides/PCBs ($150), and metals ($100) (2008).
OM.1.5	Data Validation	Assume 1 HR per sample analysis for data validation (2008).
OM.1.6	Report Preparation	Assume 20 HR/per sample event at $110/HR to account for report preparation and inclusion of results into the annual O&M report (see line OM 3.2 below).
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)		
Cap inspections, maintenance, and repairs were estimated per year.		
OM.2.1	Cap Inspection	Assume monthly inspections for Alternatives 2, 3, 4, 7, 8, 9 and 10. Excavation to the water table (Alternatives 5 and 6) will only require annual inspections.
OM.2.2	Mowing (twice per year)	MSF twice per year.
OM.2.3	Revegetation (1% per year)	(SF * 0.01)/1000 = MSF
OM 2.4	Asphalt Repairs (5%)	SF * 0.05 = SF
OM 2.5	Fence Repair	Assumed annual repair frequency of 25% of total linear footage of fence during period of O&M (actual frequency to be determined during 5-Year Reviews) for Alternative 2 only. All other fencing (Alternatives 3 through 10) assumed to be temporary and required during remedial action implementation only.
OM 2.6	Sign Replacement	Assumed replacement frequency of 4 times during period of O&M (actual frequency to be determined during 5-Year Reviews) for Alternative 2 only. All other signage (Alternatives 3 through 10) assumed to be temporary and required during remedial action implementation only.
OM 2.7	Reporting (annual)	Assume lump sum of $2,250 to account for annual reporting on ground surfaces as required for inclusion in the annual O&M report (see line OM 3.2 below).
OM 2.8	Contractor mobilizations	Assume lump sum per mobilization of $300.00 (2008)
OM.3.0 Deed Restrictions (per year)		
OM 3.1	Inspection (annual)	Assume 10 Hr per annual inspection at labor rate of $110.00/hr
OM 3.2	Deed Restriction Reporting (annual)	A lump sum rate of $2,250 was estimated to account for annual deed restriction maintenance reporting for inclusion in the annual O&M report (intended to address all types of O&M conducted annually) with an additional $2,750 to account for other costs (copying/printing/delivery) required for report submission (total cost of $5,000 for line item).

Notes:

These cost assumptions are general assumptions and information to supplement source information provided in the individual property group Unit Price tables (Appendix G) and represent both historical information from previous Feasibility Study submittals and amended/new rates included per the alternatives as described in Sections 3 and 4 of the 2010 Draft Feasibility Study for OU6.

See specific Means references in individual property group Unit Price tables

Unit prices have been adjusted as needed to reflect 2010 construction cost increases as indicated within individual property group Unit Price tables

APPENDIX H

COST EVALUATIONS FOR COMPLETE REMOVAL OF RAYMARK WASTE

APPENDIX H-1

Purpose

Appendix H compares costs associated with the excavation of Raymark waste to the depth of the seasonal high water table to those of complete excavation of all Raymark waste on a property group. While the increase in capital costs for the additional excavation of Raymark waste can be minimal, the savings in long term monitoring can be significant. The objective of Appendix H was to determine if any property groups would realize an overall savings in remedial costs when all Raymark waste was excavated and long term monitoring was no longer required.

Evaluation

Excavation to the seasonal high water table (Alternatives 5 and 6) results in complete removal of all Raymark waste at 8 of the 18 property groups identified in Operable Unit 6 (OU6). This is because all Raymark waste on these 8 properties is located at or above the seasonal high water table. When all Raymark waste is removed, long term monitoring is not required which is a significant costs savings. These savings have been documented in the costs associated with Alternatives 5 and 6 and are presented in Section 4 (Volume one) of this OU6 FS (See 200 Ferry Boulevard, Vacant DOT abutting I-95, Connecticut Right of Way, 380 East Main Street, Department of Public Works Lot AOC1, Department of Public Works AOC2 & 251 East Main Street, Beacon Point AOC1, and Wooster Park).

At one other property group, Raymark waste was only found below the seasonal high water table (8-10 feet depth with seasonal high water table depth of approximately 5 feet). Because of its location below the seasonal high water table, long term monitoring requirements are limited. Associated costs have been documented in Alternative 2 and are presented in Section 4 (Volume one) of this OU6 FS (See Beacon Point AOC2.).

For the remaining nine property groups, all of which have Raymark waste located below the elevation of the seasonal high water table, an additional evaluation has been performed in Appendix H. This evaluation determined if the additional costs associated with complete excavation of Raymark waste would be offset by the savings realized from the elimination of long term monitoring. Table H-1 provides details on Raymark waste volumes and depths.

Table H-2 provides costs comparisons of complete excavation (without long term monitoring) to those of excavation to only the depth of the seasonal high water table (with long term monitoring). Appendix H-2 provides the backup costs for complete excavation evaluations in Table H-2. Costs associated with excavation to the seasonal high water table with long term monitoring are included in Alternatives 5 and 6 and are presented in Section 4 (Volume one) of this OU6 FS (See Lockwood Avenue, Ferry Boulevard Properties, Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue, 326 Ferry Blvd, 576/600 East Broadway, 250, 304, and 340 East Main Street, Beacon Point AOC3, Airport Property, and Third Avenue).

Findings

As shown on Table H-2, it was found that a savings could be realized at two of the remaining nine property groups (See 326 Ferry Boulevard ($85,000) and Third Avenue ($134,000)). This savings would only be realized for in-town consolidation. This approach will be referred to as Alternative 5A (Complete excavation with in-town consolidation) for each of these property groups.

The reason that a savings was found at only two property groups is directly related to the volume of Raymark waste located below the elevation of the seasonal high water table. Raymark waste volumes of 600 CY and 265 CY are found within the seasonal high water table at 326 Ferry Boulevard and Third Avenue, respectively. Raymark waste volumes within the seasonal high water table for the remaining property groups are significantly higher (See Table H-1) which quickly increase capital costs.

An additional factor to be noted is the cost for out-of-town disposal. A cost savings for complete excavation of Raymark waste was not found for any property group when the waste was to be shipped out-of-town for disposal. This is because the higher costs associated with out-of-town disposal were not offset by the savings realized by eliminating long term monitoring requirements.

TABLE H-1
ESTIMATED VOLUME OF RAYMARK WASTE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

OU-6 Property	Areal Extent of Raymark Waste (SF)	Depth (FT)		Volume of Raymark Waste (CY)		
		Groundwater	Raymark Waste	Above Water Table Excavated[1]	Below Water Table Excavated[1]	Total Excavated[1]
Lockwood Ave	80000	2.5	8	8889	19555	28444
200 Ferry Boulevard	2000	5.5	5.5	489	0	489
Ferry Boulevard Properties (230, 250, 280, 300 Ferry Boulevard)	170000	6	16	45333	75556	120889
Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue	40000	6	10	10400	6933	17333
326 Ferry Boulevard	2700	5	10	600	600	1200
576 and 600 East Broadway	64000	6	18	17067	34134	51201
Vacant DOT Lot Abutting I-95 Property	9000	8	8	3247	0	3247
Connecticut Right-of-Way Property	4300	10	10	1911	0	1911
250, 304 and 340 East Main Street	18000	5	10	4000	4001	8001
380 East Main Street	130	5	5	29	0	29
DPW Lot AOC 1	18000	8	8	7467	0	7467
DPW Lot AOC 2 & 251 E. Main St	15000	7.5	7.5	3333	0	3333
Beacon Point AOC 1	10000	6	6	1520	0	1520
Beacon Point AOC 2	17000	5	10[2]	0	1512	1512
Beacon Point AOC 3	30000	5	10	6000	6000	12000
Airport Property North of Marine Basin Property	46500	4.5	6	9400	3133	12533
Wooster Park Property	7100	6	6	1893	0	1894
Third Avenue	1700	6.5	10	491	265	756

Notes:

[1] Estimated volumes include a bulking factor of 1.2 applied to in situ volume calculation.

[2] Raymark waste detected at the 8 to 10 feet sample interval, below the water table.

All Raymark waste quantities are subject to change if additional information becomes available.

SF = Square feet

CY = Cubic yards

FT = Feet

TABLE H-2-1
COMPARISON OF COSTS FOR EXCAVATION OF RAYMARK WASTE TO GROUNDWATER VERSUS COMPLETE EXCAVATION OF ALL RAYMARK WASTE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

OU-6 Property/Volume of RW (CY)[1]	Excavation of Raymark Waste to Groundwater (Alternative 5) Compared to Complete Excavation (Alternative 5A) with In-Town Consolidation				Excavation of Raymark Waste to Groundwater (Alternative 6) Compared to Complete Excavation (Alternative 6A) with Out-of-Town Disposal			
		Capital Costs	PV O&M	PV of Alternative		Capital Costs	PV O&M	PV of Alternative
Lockwood Ave								
NA	Alt 5	NA	NA	NA	Alt 6	NA	NA	NA
28,444	Alt 5A	$4,257,283	$64,952	$4,322,235	Alt 6A	$19,979,665	$64,952	$20,044,617
Savings Realized if all RW Were Excavated				**-$4,322,235**	**Savings Realized if all RW Were Excavated**			**-$20,044,617**
Ferry Boulevard Properties (230, 250, 280, 300 Ferry Boulevard)								
45,333	Alt 5	$7,697,916	$622,380	$8,320,296	Alt 6	$32,588,135	$622,380	$33,210,515
120,889	Alt 5A	$18,008,741	$95,915	$18,104,656	Alt 6A	$84,379,587	$95,915	$84,475,502
Savings Realized if all RW Were Excavated				**-$9,784,360**	**Savings Realized if all RW Were Excavated**			**-$51,264,987**
Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue								
10,400	Alt 5	$1,888,290	$291,270	$2,179,560	Alt 6	$7,598,115	$291,270	$7,889,385
17,333	Alt 5A	$2,751,737	$75,273	$2,827,010	Alt 6A	$12,268,112	$75,273	$12,343,384
Savings Realized if all RW Were Excavated				**-$647,450**	**Savings Realized if all RW Were Excavated**			**-$4,453,999**
326 Ferry Boulevard								
600	Alt 5	$307,216	$213,411	$520,627	Alt 6	$637,116	$213,411	$850,527
1,200	Alt 5A	$370,671	$64,952	$435,622	Alt 6A	$1,030,471	$64,952	$1,095,422
Savings Realized if all RW Were Excavated				**$85,005**	**Savings Realized if all RW Were Excavated**			**-$244,895**
576 and 600 East Broadway								
17,067	Alt 5	$3,059,326	$306,473	$3,365,799	Alt 6	$12,430,357	$306,473	$12,736,830
51,201	Alt 5A	$8,257,175	$81,110	$8,338,285	Alt 6A	$36,358,755	$81,110	$36,439,865
Additional Cost to Excavate all RW				**-$4,972,485**	**Savings Realized if all RW Were Excavated**			**-$23,703,035**

TABLE H-2-1
COMPARISON OF COSTS FOR EXCAVATION OF RAYMARK WASTE TO GROUNDWATER VERSUS COMPLETE EXCAVATION OF ALL RAYMARK WASTE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

OU-6 Property/Volume of RW (CY)[1]	Excavation of Raymark Waste to Groundwater (Alternative 5) Compared to Complete Excavation (Alternative 5A) with In-Town Consolidation					Excavation of Raymark Waste to Groundwater (Alternative 6) Compared to Complete Excavation (Alternative 6A) with Out-of-Town Disposal			
		Capital Costs	PV O&M	PV of Alternative			Capital Costs	PV O&M	PV of Alternative
250, 304 and 340 East Main Street									
4,000	Alt 5	$944,165	$380,508	$1,324,674		Alt 6	$3,140,429	$380,508	$3,520,937
8,001	Alt 5A	$1,403,380	$85,594	$1,488,974		Alt 6A	$5,793,605	$85,594	$5,879,198
Savings Realized if all RW Were Excavated				**-$164,300**	**Savings Realized if all RW Were Excavated**				**-$2,358,261**
Beacon Point AOC 3									
6,000	Alt 5	$1,157,506	$218,350	$1,375,857		Alt 6	$4,451,901	$218,350	$4,670,252
12,000	Alt 5A	$1,961,941	$75,273	$2,037,214		Alt 6A	$8,548,429	$75,273	$8,623,702
Savings Realized if all RW Were Excavated				**-$661,357**	**Savings Realized if all RW Were Excavated**				**-$3,953,450**
Airport Property North of Marine Basin Property									
9,400	Alt 5	$1,727,312	$208,187	$1,935,499		Alt 6	$6,911,095	$208,187	$7,119,283
12,533	Alt 5A	$2,085,129	$64,952	$2,150,080		Alt 6A	$8,966,908	$64,952	$9,031,859
Savings Realized if all RW Were Excavated				**-$214,581**	**Savings Realized if all RW Were Excavated**				**-$1,912,576**
Third Avenue									
491	Alt 5	$292,575	$212,172	$504,748		Alt 6	$562,187	$212,172	$774,359
756	Alt 5A	$305,581	$64,952	$370,533		Alt 6A	$721,608	$64,952	$786,559
Savings Realized if all RW Were Excavated				**$134,215**	**Savings Realized if all RW Were Excavated**				**-$12,200**

Notes:

[1] Estimated volume of RW to be addressed by remedial action includes a bulking factor of 1.2 applied to in situ excavation volumes.
PV = present value (30 year period evaluated at a discount rate of 7%).
O&M = operations and maintenance
NA = not applicable; alternative was not evaluated in FS.
RW = Raymark waste
CY = cubic yard
Alt = Alternative
OU = operable unit
= Values in shaded areas indicate cost efficiencies if all RW was excavated. Savings only found with 326 Ferry Blvd. and Third Ave.

TABLE H-2-2a
PRESENT VALUE ANALYSIS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$4,257,283	$0	$0	$4,257,283	7.0%	$4,257,283
1	$0	$35,924	$0	$35,924	7.0%	$33,574
2	$0	$35,924	$0	$35,924	7.0%	$31,378
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$4,257,283**	**$71,848**	**$0**	**$4,329,132**		**$4,322,235**
					PV O&M	**$64,952**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal; Reviews not required following complete excavation of Raymark waste at a property group.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE H-2-2b
CAPITAL COSTS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 15 LF avg depth per well)	30	LF	$35.79	$1,074
2.3	Install PVC Well Screens (2" diameter)	20	LF	$19.69	$394
2.4	Install PVC Well Casing (2" diameter)	10	LF	$14.79	$148
2.5	Install Filter Pack	24	LF	$15.52	$372
2.6	Install Bentonite Seal	2	EA	$57.23	$114
2.7	Install Annular Seal	4	LF	$69.04	$276
2.8	PVC Well Plugs	2	EA	$27.86	$56
2.9	Flush-Mount Protective Cover with Locking Cap	2	EA	$451.55	$903
2.10	Surface Pad, Concrete 2' x 2'	2	EA	$154.79	$310
2.11	Well Development (2 HR/WELL)	4	EA	$228.23	$913
2.12	IDW Transportation/Disposal (drums)	2	EA	$508.52	$1,017
	Subtotal				**$8,330**
3.0	**Fencing and Signage[3]**				
3.1	Chain Link Fence	900	LF	$27.57	$24,813
3.2	Signage	9	EA	$73.95	$666
	Subtotal				**$25,479**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	14	MONTH	$4,531	$63,433
	Subtotal				**$92,884**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	5	ACRE	$3,968.29	$19,841
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	900	LF	$8.97	$8,070
	Subtotal				**$48,582**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
6.1	Excavate and Load RW/Soil[4]	25,600	CY	$2.12	$54,363
6.2	Haul RW/Soil to Stockpile Area[5]	30,720	CY	$4.00	$122,894
6.3	Perimeter Air Sampling	576	EA	$243.76	$140,415
6.4	Equipment Decontamination	1,280	HR	$54.56	$69,843
6.5	Stockpile Management	30,720	CY	$1.44	$44,150
6.6	Stockpile Characterization[6]	62	EA	$1,535.00	$95,170
	Subtotal				**$526,835**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks[7]	28,444	CY	$2.44	$69,464
7.2	Transport RW to in-town consolidation[8]	25,600	CY	$5.52	$141,400
7.3	Equipment Decontamination	0	HR	$54.56	$0
7.4	Out-of-Town Transportation of Waste[8, 9]	4,267	TON	$170.00	$725,333
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Diposal of RW (treatment)[8, 9]	4,267	TON	$192.00	$819,200
	Subtotal				**$1,755,398**

TABLE H-2-2b
CAPITAL COSTS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	2048	CY	$2.40	$4,920
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	1,890	CY	$34.65	$65,501
8.9	Hydroseeding with Mulch and Fertilizer	93	MSF	$43.97	$4,081
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	24,222	CY	$11.83	$286,537
8.14	Install Nonwoven Geotextile Fabric	8,889	SY	$2.21	$19,644
	Subtotal				**$380,683**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$188,862	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$2,838,189**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$170,291
10.2	Engineering and Design (12%)				$340,583
10.3	Construction management (8%)				$227,055
10.4	Location Adjustment (9%)				$255,437
10.5	Contingency (15%)				$425,728
TOTAL OTHER COSTS					**$1,419,094**
TOTAL CAPITAL COST FOR ALTERNATIVE 5A					**$4,257,283**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Lockwood Avenue Property.

[2] Complete excavation of Raymark waste will not require transactional fees due to deed management.

[3] Assume fencing and signage to be temporary and required during construction activities for site security only.

[4] Represents in situ estimate of RW and additional soil (to be excavated for safety benching/sloping) to be excavated to a depth of 8 ft below ground surface.

[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[8] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[9] A conversion factor of 1.5 was used to convert CY to TON.

[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; impacted wetlands will be restored to pre-existing conditions to the extent practical.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for sediment dewatering and potential water treatment is not included in this estimate.

TABLE H-2-2c
OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN CONSOLIDATION
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation (annual)	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$7,331**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)[2]						
OM.2.1	Inspection	0	HR	$110.00	$0	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation	0	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement	0	EA	$73.95	$0	see cost assumptions
OM.2.5	Reporting (annual)	0	LS	$2,250.00	$0	see cost assumptions
OM.2.6	Contractor mobilizations	0	EA	$321.75	$0	see cost assumptions
	Subtotal				**$0**	
OM.3.0 Deed Restrictions[2]						
OM.3.1	Inspection (annual)	0	LS	$1,100.00	$0	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	0	EA	$5,000.00	$0	see cost assumptions
	Subtotal				**$0**	
ANNUAL O&M COST (YEARS 1-2)[3]					**$35,924**	
ANNUAL O&M COST (YEARS 3-30)[4]					**$0**	

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Lockwood Avenue Property.
[2] Assumed that O&M for ground surfaces and deed maintenance would not be required following complete excavation of all Raymark waste.
[3] O&M for Years 1 and 2 include quarterly groundwater monitoring with annual reporting.
[4] O&M for Years 3 - 30 will not be required pending analytical data and concurrence from the State following the first 2 years of groundwater data collection.
Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

TABLE H-2-2d
PRESENT VALUE ANALYSIS
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$19,979,665	$0	$0	$19,979,665	7.0%	$19,979,665
1	$0	$35,924	$0	$35,924	7.0%	$33,574
2	$0	$35,924	$0	$35,924	7.0%	$31,378
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$19,979,665**	**$71,848**	**$0**	**$20,051,513**		**$20,044,617**
					PV O&M	**$64,952**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal; Reviews not required following complete excavation of Raymark waste at a property group.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE H-2-2e
CAPITAL COSTS
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 15 LF avg depth per well)	30	LF	$35.79	$1,074
2.3	Install PVC Well Screens (2" diameter)	20	LF	$19.69	$394
2.4	Install PVC Well Casing (2" diameter)	10	LF	$14.79	$148
2.5	Install Filter Pack	24	LF	$15.52	$372
2.6	Install Bentonite Seal	2	EA	$57.23	$114
2.7	Install Annular Seal	4	LF	$69.04	$276
2.8	PVC Well Plugs	2	EA	$27.86	$56
2.9	Flush-Mount Protective Cover with Locking Cap	2	EA	$451.55	$903
2.10	Surface Pad, Concrete 2' x 2'	2	EA	$154.79	$310
2.11	Well Development (2 HR/WELL)	4	EA	$228.23	$913
2.12	IDW Transportation/Disposal (drums)	2	EA	$508.52	$1,017
	Subtotal				**$8,330**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	900	LF	$27.57	$24,813
3.2	Signage	9	EA	$73.95	$666
	Subtotal				**$25,479**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	14	MONTH	$4,531	$63,433
	Subtotal				**$92,884**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	5	ACRE	$3,968.29	$19,841
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	900	LF	$8.97	$8,070
	Subtotal				**$48,582**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[4]	25,600	CY	$2.12	$54,363
6.2	Haul RW/Soil to Stockpile Area[5]	30,720	CY	$4.00	$122,894
6.3	Perimeter Air Sampling	576	EA	$243.76	$140,415
6.4	Equipment Decontamination	1,280	HR	$54.56	$69,843
6.5	Stockpile Management	30,720	CY	$1.44	$44,150
6.6	Stockpile Characterization[6]	5	EA	$1,535.00	$7,675
	Subtotal				**$439,340**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	28,444	CY	$2.44	$69,464
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	1,280	HR	$54.56	$69,843
7.4	Out-of-Town Transportation of Waste[8]	42,667	TON	$170.00	$7,253,333
7.5	Out-of-Town Disposal of RW (no treatment)[8, 9]	38,400	TON	$107.10	$4,112,640
7.6	Out-of-Town Disposal of RW (treatment)[8, 9]	4,267	TON	$192.00	$819,200
	Subtotal				**$12,324,480**

TABLE H-2-2e
CAPITAL COSTS
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
LOCKWOOD AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	2048	CY	$2.40	$4,920
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	1890	CY	$34.65	$65,501
8.9	Hydroseeding with Mulch and Fertilizer	93	MSF	$43.97	$4,081
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	0	HR	$405	$0
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	24222	CY	$11.83	$286,537
8.14	Install Nonwoven Geotextile Fabric	8889	SY	$2.21	$19,644
	Subtotal				**$380,683**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$188,862	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$13,319,777**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$799,187
10.2	Engineering and Design (12%)				$1,598,373
10.3	Construction management (8%)				$1,065,582
10.4	Location Adjustment (9%)				$1,198,780
10.5	Contingency (15%)				$1,997,967
TOTAL OTHER COSTS					**$6,659,888**
TOTAL CAPITAL COST FOR ALTERNATIVE 6A					**$19,979,665**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Lockwood Avenue Property.

[2] Complete excavation of Raymark waste will not require transactional fees due to deed management.

[3] Assume fencing and signage to be temporary and required during construction activities for site security only.

[4] Represents in situ estimate of RW and additional soil (to be excavated for safety benching/sloping) to be excavated to a depth of 8 ft below ground surface.

[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[8] A conversion factor of 1.5 was used to convert CY to TON.

[9] Volume of RW for Out-of-Town assumes that 10% would be hazardous requiring treatment prior to disposal.

[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; impacted wetlands will be restored to pre-existing conditions to the extent practical.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for sediment dewatering and potential water treatment is not included in this estimate.

TABLE H-2-3a
PRESENT VALUE ANALYSIS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
FERRY BOULEVARD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$18,008,741	$0	$0	$18,008,741	7.0%	$18,008,741
1	$0	$53,050	$0	$53,050	7.0%	$49,579
2	$0	$53,050	$0	$53,050	7.0%	$46,336
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$18,008,741**	**$106,099**	**$0**	**$18,114,841**		**$18,104,656**
					PV O&M	**$95,915**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal; Reviews not required following complete excavation of Raymark waste at a property group.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE H-2-3b
CAPITAL COSTS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
FERRY BOULEVARD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	60	LF	$35.79	$2,147
2.3	Install PVC Well Screens (2" diameter)	40	LF	$19.69	$788
2.4	Install PVC Well Casing (2" diameter)	20	LF	$14.79	$296
2.5	Install Filter Pack	48	LF	$15.52	$745
2.6	Install Bentonite Seal	4	EA	$57.23	$229
2.7	Install Annular Seal	8	LF	$69.04	$552
2.8	PVC Well Plugs	4	EA	$27.86	$111
2.9	Flush-Mount Protective Cover with Locking Cap	4	EA	$451.55	$1,806
2.10	Surface Pad, Concrete 2' x 2'	4	EA	$154.79	$619
2.11	Well Development (2 HR/WELL)	8	EA	$228.23	$1,826
2.12	IDW Transportation/Disposal (drums)	4	EA	$508.52	$2,034
	Subtotal				**$13,906**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	2,692	LF	$27.57	$74,218
3.2	Signage	27	EA	$73.95	$1,997
	Subtotal				**$76,215**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	33	MONTH	$4,531	$149,520
	Subtotal				**$178,971**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	2	ACRE	$3,968.29	$7,937
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	2,692	LF	$8.97	$24,137
	Subtotal				**$52,744**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[4]	108,847	CY	$2.12	$231,145
6.2	Haul RW/Soil to Stockpile Area[5]	130,617	CY	$4.00	$522,529
6.3	Perimeter Air Sampling	2,449	EA	$243.76	$597,023
6.4	Equipment Decontamination	5,442	HR	$54.56	$296,961
6.5	Stockpile Management	130,617	CY	$1.44	$187,718
6.6	Stockpile Characterization[6]	262	EA	$1,535.00	$402,170
	Subtotal				**$2,237,545**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	120,889	CY	$2.44	$295,224
7.2	Transport RW to in-town consolidation[8]	108,800	CY	$5.52	$600,949
7.3	Equipment Decontamination	5,442	HR	$54.56	$296,961
7.4	Out-of-Town Transportation of Waste[8, 9]	18,133	TON	$170.00	$3,082,667
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Diposal of RW (treatment)[8, 9]	18,133	TON	$192.00	$3,481,600
	Subtotal				**$7,757,400**

TABLE H-2-3b
CAPITAL COSTS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
FERRY BOULEVARD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	8755	CY	$2.40	$21,034
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	922	CY	$34.65	$31,932
8.9	Hydroseeding with Mulch and Fertilizer	45	MSF	$43.97	$1,989
8.10	Place, Spread, and Compact Asphalt Base Course (12")	5,296	ECY	$9.35	$49,520
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	143,000	SF	$2.27	$324,610
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	100,787	CY	$11.83	$1,192,288
8.14	Install Nonwoven Geotextile Fabric	18,889	SY	$2.21	$41,744
	Subtotal				**$1,689,046**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$12,005,828**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$720,350
10.2	Engineering and Design (12%)				$1,440,699
10.3	Construction management (8%)				$960,466
10.4	Location Adjustment (9%)				$1,080,524
10.5	Contingency (15%)				$1,800,874
TOTAL OTHER COSTS					**$6,002,914**
TOTAL CAPITAL COST FOR ALTERNATIVE 5A					**$18,008,741**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Ferry Boulevard Properties.

[2] Complete excavation of Raymark waste will not require transactional fees due to deed management.

[3] Assume fencing and signage to be temporary and required during construction activities for site security only.

[4] Represents in situ estimate of RW and additional soil (to be excavated for safety benching/sloping) to be excavated to a depth of 16 ft below ground surface.

[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[8] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[9] A conversion factor of 1.5 was used to convert CY to TON.

[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.
Cost for sediment dewatering and potential water treatment is not included in this estimate.

TABLE H-2-3c
OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
FERRY BLVD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	28	HR	$110	$3,080	see cost assumptions
OM.1.3	Sampling Labor - Sampler	14	HR	$90	$1,260	see cost assumptions
OM.1.4	Analytical Costs	7	EA	$697	$4,880	see cost assumptions
OM.1.5	Data Validation	7	HR	$110	$770	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$13,262**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)[2]						
OM.2.1	Inspection	0	HR	$110.00	$0	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation	0.00	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	0	LS	$2,250.00	$0	see cost assumptions
OM.2.8	Contractor mobilizations	0	EA	$321.75	$0	see cost assumptions
	Subtotal				**$0**	
OM.3.0 Deed Restrictions[2]						
OM.3.1	Inspection (annual)	0	LS	$1,100.00	$0	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	0	EA	$5,000.00	$0	see cost assumptions
	Subtotal				**$0**	
ANNUAL O&M COST (YEARS 1-2)[3]					**$53,050**	
ANNUAL O&M COST (YEARS 3-30)[4]					**$0**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Ferry Boulevard Properties.

[2] Assumed that O&M for ground surfaces and deed maintenance would not be required following complete excavation of all Raymark waste.

[3] O&M for Years 1 and 2 include quarterly groundwater monitoring with annual reporting.

[4] O&M for Years 3 - 30 will not be required pending analytical data and concurrence from the State following the first 2 years of groundwater data collection.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

TABLE H-2-3d
PRESENT VALUE ANALYSIS
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
FERRY BOULEVARD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$84,379,587	$0	$0	$84,379,587	7.0%	$84,379,587
1	$0	$53,050	$0	$53,050	7.0%	$49,579
2	$0	$53,050	$0	$53,050	7.0%	$46,336
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$84,379,587**	**$106,099**	**$0**	**$84,485,687**		**$84,475,502**
					PV O&M	**$95,915**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal; Reviews not required following complete excavation of Raymark waste at a property group.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE H-2-3e
CAPITAL COSTS
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-OWN DISPOSAL
FERRY BOULEVARD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	60	LF	$35.79	$2,147
2.3	Install PVC Well Screens (2" diameter)	40	LF	$19.69	$788
2.4	Install PVC Well Casing (2" diameter)	20	LF	$14.79	$296
2.5	Install Filter Pack	48	LF	$15.52	$745
2.6	Install Bentonite Seal	4	EA	$57.23	$229
2.7	Install Annular Seal	8	LF	$69.04	$552
2.8	PVC Well Plugs	4	EA	$27.86	$111
2.9	Flush-Mount Protective Cover with Locking Cap	4	EA	$451.55	$1,806
2.10	Surface Pad, Concrete 2' x 2'	4	EA	$154.79	$619
2.11	Well Development (2 HR/WELL)	8	EA	$228.23	$1,826
2.12	IDW Transportation/Disposal (drums)	4	EA	$508.52	$2,034
	Subtotal				**$13,906**
3.0	**Fencing and Signage[3]**				
3.1	Chain Link Fence	2,692	LF	$27.57	$74,218
3.2	Signage	27	EA	$73.95	$1,997
	Subtotal				**$76,215**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	33	MONTH	$4,531	$149,520
	Subtotal				**$178,971**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	2	ACRE	$3,968.29	$7,937
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	2692	LF	$8.97	$24,137
	Subtotal				**$52,744**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
6.1	Excavate and Load RW/Soil[4]	108,847	CY	$2.12	$231,145
6.2	Haul RW/Soil to Stockpile Area[5]	130,617	CY	$4.00	$522,529
6.3	Perimeter Air Sampling	2,449	EA	$243.76	$597,023
6.4	Equipment Decontamination	5,442	HR	$54.56	$296,961
6.5	Stockpile Management	130,617	CY	$1.44	$187,718
6.6	Stockpile Characterization[6]	18	EA	$1,535.00	$27,630
	Subtotal				**$1,863,005**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks[7]	120,889	CY	$2.44	$295,224
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	5,442	HR	$54.56	$296,961
7.4	Out-of-Town Transportation of Waste[8]	181,333	TON	$170.00	$30,826,667
7.5	Out-of-Town Disposal of RW (no treatment)[8, 9]	163,200	TON	$107.10	$17,478,720
7.6	Out-of-Town Disposal of RW (treatment)[8, 9]	18,133	TON	$192.00	$3,481,600
	Subtotal				**$52,379,171**

TABLE H-2-3e
CAPITAL COSTS
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-OWN DISPOSAL
FERRY BOULEVARD PROPERTIES (230, 250, 280, 300)
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	8755	CY	$2.40	$21,034
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	922	CY	$34.65	$31,932
8.9	Hydroseeding with Mulch and Fertilizer	45	MSF	$43.97	$1,989
8.10	Place, Spread, and Compact Asphalt Base Course (12")	5296	ECY	$9.35	$49,520
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	143000	SF	$2.27	$324,610
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	100787	CY	$11.83	$1,192,288
8.14	Install Nonwoven Geotextile Fabric	18889	SY	$2.21	$41,744
	Subtotal				**$1,689,046**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$56,253,058**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$3,375,183
10.2	Engineering and Design (12%)				$6,750,367
10.3	Construction management (8%)				$4,500,245
10.4	Location Adjustment (9%)				$5,062,775
10.5	Contingency (15%)				$8,437,959
TOTAL OTHER COSTS					**$28,126,529**
TOTAL CAPITAL COST FOR ALTERNATIVE 6A					**$84,379,587**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Ferry Boulevard Properties.

[2] Deed restrictions not required for complete excavation of all Raymark waste.

[3] Assume fencing and signage to be temporary and required during construction activities for site security only.

[4] Represents in situ estimate of RW and additional soil (to be excavated for safety benching/sloping) to be excavated to a depth of 16 ft below ground surface.

[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[8] A conversion factor of 1.5 was used to convert CY to TON.

[9] Volume of RW for Out-of-Town assumes that 10% would be hazardous requiring treatment prior to disposal.

[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.
Cost for sediment dewatering and potential water treatment is not included in this estimate.

TABLE H-2-4a
PRESENT VALUE ANALYSIS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
LOT BEHIND 326 FERRY BOULEVARD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$2,751,737	$0	$0	$2,751,737	7.0%	$2,751,737
1	$0	$41,633	$0	$41,633	7.0%	$38,909
2	$0	$41,633	$0	$41,633	7.0%	$36,364
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$2,751,737**	**$83,265**	**$0**	**$2,835,003**		**$2,827,010**
					PV O&M	**$75,273**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal; Reviews not required following complete excavation of Raymark waste at a property group.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE H-2-4b
CAPITAL COSTS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
LOT BEHIND 326 FERRY BOULEVARD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	30	LF	$35.79	$1,074
2.3	Install PVC Well Screens (2" diameter)	20	LF	$19.69	$394
2.4	Install PVC Well Casing (2" diameter)	10	LF	$14.79	$148
2.5	Install Filter Pack	24	LF	$15.52	$372
2.6	Install Bentonite Seal	2	EA	$57.23	$114
2.7	Install Annular Seal	4	LF	$69.04	$276
2.8	PVC Well Plugs	2	EA	$27.86	$56
2.9	Flush-Mount Protective Cover with Locking Cap	2	EA	$451.55	$903
2.10	Surface Pad, Concrete 2' x 2'	2	EA	$154.79	$310
2.11	Well Development (2 HR/WELL)	4	EA	$228.23	$913
2.12	IDW Transportation/Disposal (drums)	2	EA	$508.52	$1,017
	Subtotal				**$8,330**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	1,176	LF	$27.57	$32,422
3.2	Signage	12	EA	$73.95	$887
	Subtotal				**$33,310**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	7	MONTH	$4,531	$31,716
	Subtotal				**$61,167**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	2	ACRE	$3,968.29	$7,937
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	1,176	LF	$8.97	$10,544
	Subtotal				**$39,152**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[4]	16,178	CY	$2.12	$34,355
6.2	Haul RW/Soil to Stockpile Area[5]	19,413	CY	$4.00	$77,662
6.3	Perimeter Air Sampling	364	EA	$243.76	$88,734
6.4	Equipment Decontamination	809	HR	$54.56	$44,137
6.5	Stockpile Management	19,413	CY	$1.44	$27,900
6.6	Stockpile Characterization[6]	39	EA	$1,535.00	$59,865
	Subtotal				**$332,653**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	17,333	CY	$2.44	$42,330
7.2	Transport RW to in-town consolidation[8]	15,600	CY	$5.52	$86,166
7.3	Equipment Decontamination	809	HR	$54.56	$44,137
7.4	Out-of-Town Transportation of Waste[8, 9]	2,600	TON	$170.00	$442,000
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Diposal of RW (treatment)[8, 9]	2,600	TON	$192.00	$499,200
	Subtotal				**$1,113,832**

TABLE H-2-4b
CAPITAL COSTS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
LOT BEHIND 326 FERRY BOULEVARD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	1872	CY	$2.40	$4,497
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	953	CY	$34.65	$33,033
8.9	Hydroseeding with Mulch and Fertilizer	47	MSF	$43.97	$2,058
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	14,970	CY	$11.83	$177,095
8.14	Install Nonwoven Geotextile Fabric	1,556	SY	$2.21	$3,438
	Subtotal				**$246,048**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$1,834,492**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$110,069
10.2	Engineering and Design (12%)				$220,139
10.3	Construction management (8%)				$146,759
10.4	Location Adjustment (9%)				$165,104
10.5	Contingency (15%)				$275,174
TOTAL OTHER COSTS					**$917,246**
TOTAL CAPITAL COST FOR ALTERNATIVE 5A					**$2,751,737**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue

[2] Complete excavation of Raymark waste will not require transactional fees due to deed management.

[3] Assume fencing and signage to be temporary and required during construction activities for site security only.

[4] Represents in situ estimate of RW and additional soil (to be excavated for safety benching/sloping) to be excavated to a depth of 10 ft below ground surface.

[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[8] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[9] A conversion factor of 1.5 was used to convert CY to TON.

[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for sediment dewatering and potential water treatment is not included in this estimate.

TABLE H-2-4c
OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
LOT BEHIND 326 FERRY BOULEVARD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	20	HR	$110	$2,200	see cost assumptions
OM.1.3	Sampling Labor - Sampler	10	HR	$90	$900	see cost assumptions
OM.1.4	Analytical Costs	5	EA	$697	$3,486	see cost assumptions
OM.1.5	Data Validation	5	HR	$110	$550	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$10,408**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)[2]						
OM.2.1	Inspection	0	HR	$110.00	$0	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation	0.00	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	0	LS	$2,250.00	$0	see cost assumptions
OM.2.8	Contractor mobilizations	0	EA	$321.75	$0	see cost assumptions
	Subtotal				**$0**	
OM.3.0 Deed Restrictions[2]						
OM.3.1	Inspection (annual)	0	LS	$1,100.00	$0	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	0	EA	$5,000.00	$0	see cost assumptions
	Subtotal				**$0**	
ANNUAL O&M COST (YEARS 1-2)[3]					**$41,633**	
ANNUAL O&M COST (YEARS 3-30)[4]					**$0**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue Property.

[2] Assumed that O&M for ground surfaces and deed maintenance would not be required following complete excavation of all Raymark waste.

[3] O&M for Years 1 and 2 include quarterly groundwater monitoring with annual reporting.

[4] O&M for Years 3 - 30 will not be required pending analytical data and concurrence from the State following the first 2 years of groundwater data collection.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

TABLE H-2-4d
PRESENT VALUE ANALYSIS
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
LOT BEHIND 326 FERRY BOULEVARD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$12,268,112	$0	$0	$12,268,112	7.0%	$12,268,112
1	$0	$41,633	$0	$41,633	7.0%	$38,909
2	$0	$41,633	$0	$41,633	7.0%	$36,364
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$12,268,112**	**$83,265**	**$0**	**$12,351,377**		**$12,343,384**
					PV O&M	**$75,273**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal; Reviews not required following complete excavation of Raymark waste at a property group.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE H-2-4e
CAPITAL COSTS
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
LOT BEHIND 326 FERRY BOULEVARD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0	**Deed Restrictions**				
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0	**Monitoring Well Construction**				
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	30	LF	$35.79	$1,074
2.3	Install PVC Well Screens (2" diameter)	20	LF	$19.69	$394
2.4	Install PVC Well Casing (2" diameter)	10	LF	$14.79	$148
2.5	Install Filter Pack	24	LF	$15.52	$372
2.6	Install Bentonite Seal	2	EA	$57.23	$114
2.7	Install Annular Seal	4	LF	$69.04	$276
2.8	PVC Well Plugs	2	EA	$27.86	$56
2.9	Flush-Mount Protective Cover with Locking Cap	2	EA	$451.55	$903
2.10	Surface Pad, Concrete 2' x 2'	2	EA	$154.79	$310
2.11	Well Development (2 HR/WELL)	4	EA	$228.23	$913
2.12	IDW Transportation/Disposal (drums)	2	EA	$508.52	$1,017
	Subtotal				**$8,330**
3.0	**Fencing and Signage[3]**				
3.1	Chain Link Fence	1,176	LF	$27.57	$32,422
3.2	Signage	12	EA	$73.95	$887
	Subtotal				**$33,310**
4.0	**Mobilization/Demobilization**				
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	7	MONTH	$4,531	$31,716
	Subtotal				**$61,167**
5.0	**Site Preparation**				
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	2	ACRE	$3,968.29	$7,937
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	1176	LF	$8.97	$10,544
	Subtotal				**$39,152**
6.0	**Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill**				
6.1	Excavate and Load RW/Soil[4]	16,178	CY	$2.12	$34,355
6.2	Haul RW/Soil to Stockpile Area[5]	19,413	CY	$4.00	$77,662
6.3	Perimeter Air Sampling	364	EA	$243.76	$88,734
6.4	Equipment Decontamination	809	HR	$54.56	$44,137
6.5	Stockpile Management	19,413	CY	$1.44	$27,900
6.6	Stockpile Characterization[6]	4	EA	$1,535.00	$6,140
	Subtotal				**$278,928**
7.0	**Transportation and Treatment/Disposal of Raymark Waste**				
7.1	Load RW into Trucks[7]	17,333	CY	$2.44	$42,330
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	809	HR	$54.56	$44,137
7.4	Out-of-Town Transportation of Waste[8]	26,000	TON	$170.00	$4,420,000
7.5	Out-of-Town Disposal of RW (no treatment)[8, 9]	23,400	TON	$107.10	$2,506,140
7.6	Out-of-Town Disposal of RW (treatment)[8, 9]	2,600	TON	$192.00	$499,200
	Subtotal				**$7,511,807**

TABLE H-2-4e
CAPITAL COSTS
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
LOT BEHIND 326 FERRY BOULEVARD AND VACANT LOT AT HOUSATONIC AVENUE
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	1872	CY	$2.40	$4,497
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	953	CY	$34.65	$33,033
8.9	Hydroseeding with Mulch and Fertilizer	47	MSF	$43.97	$2,058
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	CY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	14970	CY	$11.83	$177,095
8.14	Install Nonwoven Geotextile Fabric	1556	SY	$2.21	$3,438
	Subtotal				**$246,048**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$8,178,741**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$490,724
10.2	Engineering and Design (12%)				$981,449
10.3	Construction management (8%)				$654,299
10.4	Location Adjustment (9%)				$736,087
10.5	Contingency (15%)				$1,226,811
TOTAL OTHER COSTS					**$4,089,371**
TOTAL CAPITAL COST FOR ALTERNATIVE 6A					**$12,268,112**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for Lot Behind 326 Ferry Boulevard and Vacant Lot at Housatonic Avenue Property.

[2] Deed restrictions not required for complete excavation of all Raymark waste.

[3] Assume fencing and signage to be temporary and required during construction activities for site security only.

[4] Represents in situ estimate of RW and additional soil (to be excavated for safety benching/sloping) to be excavated to a depth of 10 ft below ground surface.

[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[8] A conversion factor of 1.5 was used to convert CY to TON.

[9] Volume of RW for Out-of-Town assumes that 10% would be hazardous requiring treatment prior to disposal.

[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for sediment dewatering and potential water treatment is not included in this estimate.

TABLE H-2-5a
PRESENT VALUE ANALYSIS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
326 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$370,671	$0	$0	$370,671	7.0%	$370,671
1	$0	$35,924	$0	$35,924	7.0%	$33,574
2	$0	$35,924	$0	$35,924	7.0%	$31,378
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$370,671**	**$71,848**	**$0**	**$442,519**		**$435,622**
					PV O&M	**$64,952**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal; Reviews not required following complete excavation of Raymark waste at a property group.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE H-2-5b
CAPITAL COSTS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WIT IN-TOWN CONSOLIDATION
326 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	360	LF	$27.57	$9,925
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$10,221**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	3	MONTH	$4,531	$13,593
	Subtotal				**$43,044**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	360	LF	$8.97	$3,228
	Subtotal				**$23,899**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[4]	1,644	CY	$2.12	$3,492
6.2	Haul RW/Soil to Stockpile Area[5]	1,973	CY	$4.00	$7,894
6.3	Perimeter Air Sampling	37	EA	$243.76	$9,020
6.4	Equipment Decontamination	82	HR	$54.56	$4,486
6.5	Stockpile Management	1,973	CY	$1.44	$2,836
6.6	Stockpile Characterization[6]	4	EA	$1,535.00	$6,140
	Subtotal				**$33,868**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	1,200	CY	$2.44	$2,931
7.2	Transport RW to in-town consolidation[8]	1,080	CY	$5.52	$5,965
7.3	Equipment Decontamination	82	HR	$54.56	$4,486
7.4	Out-of-Town Transportation of Waste[8, 9]	180	TON	$170.00	$30,600
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Diposal of RW (treatment)[8, 9]	180	TON	$192.00	$34,560
	Subtotal				**$78,542**

TABLE H-2-5b
CAPITAL COSTS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WIT IN-TOWN CONSOLIDATION
326 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	696	CY	$2.40	$1,672
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	100	ECY	$9.35	$935
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2,700	SF	$2.27	$6,129
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	938	CY	$11.83	$11,095
8.14	Install Nonwoven Geotextile Fabric	300	SY	$2.21	$663
	Subtotal				**$46,422**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$247,114**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$14,827
10.2	Engineering and Design (12%)				$29,654
10.3	Construction management (8%)				$19,769
10.4	Location Adjustment (9%)				$22,240
10.5	Contingency (15%)				$37,067
TOTAL OTHER COSTS					**$123,557**
TOTAL CAPITAL COST FOR ALTERNATIVE 5A					**$370,671**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 326 Ferry Boulevard Property.

[2] Complete excavation of Raymark waste will not require transactional fees due to deed management.

[3] Assume fencing and signage to be temporary and required during construction activities for site security only.

[4] Represents in situ estimate of RW and additional soil (to be excavated for safety benching/sloping) to be excavated to a depth of 10 ft below ground surface.

[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate

[8] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[9] A conversion factor of 1.5 was used to convert CY to TON.

[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.
Cost for sediment dewatering and potential water treatment is not included in this estimate.

TABLE H-2-5c
OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
326 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)[2]						
OM.2.1	Inspection (annual)	0	HR	$110.00	$0	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation	0	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	0	LS	$2,250.00	$0	see cost assumptions
OM.2.8	Contractor mobilizations	0	EA	$321.75	$0	see cost assumptions
	Subtotal				**$0**	
OM.3.0 Deed Restrictions[2]						
OM.3.1	Inspection (annual)	0	LS	$1,100.00	$0	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	0	EA	$5,000.00	$0	see cost assumptions
	Subtotal				**$0**	
ANNUAL O&M COST (YEARS 1-2)[3]					**$35,924**	
ANNUAL O&M COST (YEARS 3-30)[4]					**$0**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 326 Ferry Boulevard Property.

[2] Assumed that O&M for ground surfaces and deed maintenance would not be required following complete excavation of all Raymark waste.

[3] O&M for Years 1 and 2 include quarterly groundwater monitoring with annual reporting.

[4] O&M for Years 3 - 30 will not be required pending analytical data and concurrence from the State following the first 2 years of groundwater data collection.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

TABLE H-2-5d
PRESENT VALUE ANALYSIS
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
326 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$1,030,471	$0	$0	$1,030,471	7.0%	$1,030,471
1	$0	$35,924	$0	$35,924	7.0%	$33,574
2	$0	$35,924	$0	$35,924	7.0%	$31,378
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$1,030,471**	**$71,848**	**$0**	**$1,102,319**		**$1,095,422**
					PV O&M	**$64,952**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal; Reviews not required following complete excavation of Raymark waste at a property group.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE H-2-5e
CAPITAL COSTS
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
326 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	360	LF	$27.57	$9,925
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$10,221**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	3	MONTH	$4,531	$13,593
	Subtotal				**$43,044**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	360	LF	$8.97	$3,228
	Subtotal				**$23,899**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[4]	1,644	CY	$2.12	$3,492
6.2	Haul RW/Soil to Stockpile Area[5]	1,973	CY	$4.00	$7,894
6.3	Perimeter Air Sampling	37	EA	$243.76	$9,020
6.4	Equipment Decontamination	82	HR	$54.56	$4,486
6.5	Stockpile Management	1,973	CY	$1.44	$2,836
6.6	Stockpile Characterization[6]	2	EA	$1,535.00	$3,070
	Subtotal				**$30,798**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	1,200	CY	$2.44	$2,931
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	82	HR	$54.56	$4,486
7.4	Out-of-Town Transportation of Waste[8]	1,800	TON	$170.00	$306,000
7.5	Out-of-Town Disposal of RW (no treatment)[8, 9]	1,620	TON	$107.10	$173,502
7.6	Out-of-Town Disposal of RW (treatment)[8, 9]	180	TON	$192.00	$34,560
	Subtotal				**$521,479**

TABLE H-2-5e
CAPITAL COSTS
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
326 FERRY BOULEVARD
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	696	CY	$2.40	$1,672
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	0	CY	$34.65	$0
8.9	Hydroseeding with Mulch and Fertilizer	0	MSF	$43.97	$0
8.10	Place, Spread, and Compact Asphalt Base Course (12")	100	ECY	$9.35	$935
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2700	SF	$2.27	$6,129
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	938	CY	$11.83	$11,095
8.14	Install Nonwoven Geotextile Fabric	300	SY	$2.21	$663
	Subtotal				**$46,422**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$686,980**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$41,219
10.2	Engineering and Design (12%)				$82,438
10.3	Construction management (8%)				$54,958
10.4	Location Adjustment (9%)				$61,828
10.5	Contingency (15%)				$103,047
TOTAL OTHER COSTS					**$343,490**
TOTAL CAPITAL COST FOR ALTERNATIVE 6A					**$1,030,471**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 326 Ferry Boulevard Property.

[2] Deed restrictions not required for complete excavation of all Raymark waste.

[3] Assume fencing and signage to be temporary and required during construction activities for site security only.

[4] Represents in situ estimate of RW and additional soil (to be excavated for safety benching/sloping) to be excavated to a depth of 10 ft below ground surface.

[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[8] A conversion factor of 1.5 was used to convert CY to TON.

[9] Volume of RW for Out-of-Town assumes that 10% would be hazardous requiring treatment prior to disposal.

[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.
Cost for sediment dewatering and potential water treatment is not included in this estimate.

TABLE H-2-6a
PRESENT VALUE ANALYSIS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$8,257,175	$0	$0	$8,257,175	7.0%	$8,257,175
1	$0	$44,861	$0	$44,861	7.0%	$41,926
2	$0	$44,861	$0	$44,861	7.0%	$39,184
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$8,257,175**	**$89,722**	**$0**	**$8,346,897**		**$8,338,285**
					PV O&M	**$81,110**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal; Reviews not required following complete excavation of Raymark waste at a property group.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE H-2-6b
CAPITAL COSTS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	15	LF	$35.79	$537
2.3	Install PVC Well Screens (2" diameter)	10	LF	$19.69	$197
2.4	Install PVC Well Casing (2" diameter)	5	LF	$14.79	$74
2.5	Install Filter Pack	12	LF	$15.52	$186
2.6	Install Bentonite Seal	1	EA	$57.23	$57
2.7	Install Annular Seal	2	LF	$69.04	$138
2.8	PVC Well Plugs	1	EA	$27.86	$28
2.9	Flush-Mount Protective Cover with Locking Cap	1	EA	$451.55	$452
2.10	Surface Pad, Concrete 2' x 2'	1	EA	$154.79	$155
2.11	Well Development (2 HR/WELL)	2	EA	$228.23	$456
2.12	IDW Transportation/Disposal (drums)	1	EA	$508.52	$509
	Subtotal				**$5,541**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	1,900	LF	$27.57	$52,383
3.2	Signage	19	EA	$73.95	$1,405
	Subtotal				**$53,788**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	10	MONTH	$4,531	$45,309
	Subtotal				**$74,760**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	1	ACRE	$3,968.29	$3,968
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	1,900	LF	$8.97	$17,036
	Subtotal				**$41,675**
6.0 Excavation of Raymark Waste/Soil					
6.1	Excavate and Load RW/Soil[4]	62,578	CY	$2.12	$132,888
6.2	Haul RW/Soil to Stockpile Area[5]	75,093	CY	$4.00	$300,408
6.3	Perimeter Air Sampling	1,408	EA	$243.76	$343,215
6.4	Equipment Decontamination	3,129	HR	$54.56	$170,726
6.5	Stockpile Management	75,093	CY	$1.44	$107,922
6.6	Stockpile Characterization[6]	151	EA	$1,535.00	$231,785
	Subtotal				**$1,286,944**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	51,200	CY	$2.44	$125,036
7.2	Transport RW to in-town consolidation[8]	46,080	CY	$5.52	$254,520
7.3	Equipment Decontamination	3,129	HR	$54.56	$170,726
7.4	Out-of-Town Transportation of Waste[8, 9]	7,680	TON	$170.00	$1,305,600
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Diposal of RW (treatment)[8, 9]	7,680	TON	$192.00	$1,474,560
	Subtotal				**$3,330,442**

TABLE H-2-6b
CAPITAL COSTS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	21,504	CY	$2.40	$51,662
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	1,990	CY	$34.65	$68,959
8.9	Hydroseeding with Mulch and Fertilizer	98	MSF	$43.97	$4,296
8.10	Place, Spread, and Compact Asphalt Base Course (12")	174	ECY	$9.35	$1,628
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	4,700	SF	$2.27	$10,669
8.12	Site Cleanup	64	HR	$405	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	45,037	CY	$11.83	$532,776
8.14	Install Nonwoven Geotextile Fabric	7,111	SY	$2.21	$15,716
	Subtotal				**$711,633**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$5,504,783**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$330,287
10.2	Engineering and Design (12%)				$660,574
10.3	Construction management (8%)				$440,383
10.4	Location Adjustment (9%)				$495,430
10.5	Contingency (15%)				$825,717
TOTAL OTHER COSTS					**$2,752,392**
TOTAL CAPITAL COST FOR ALTERNATIVE 5A					**$8,257,175**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for 576 and 600 East Broadway Properties.

[2] Complete excavation of Raymark waste will not require transactional fees due to deed management.

[3] Assume fencing and signage to be temporary and required during construction activities for site security only.

[4] Represents in situ estimate of RW and additional soil (to be excavated for safety benching/sloping) to be excavated to a depth of 18 ft below ground surface.

[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[8] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[9] A conversion factor of 1.5 was used to convert CY to TON.

[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for sediment dewatering and potential water treatment is not included in this estimate.

TABLE H-2-6c
OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - Field Operations Leader	20	HR	$110	$2,200	see cost assumptions
OM.1.3	Sampling Labor - Sampler	10	HR	$90	$900	see cost assumptions
OM.1.4	Analytical Costs	6	EA	$697	$4,183	see cost assumptions
OM.1.5	Data Validation	6	HR	$110	$660	see cost assumptions
OM.1.6	Report Preparation (annual)	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$11,215**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)[2]						
OM.2.1	Inspection	0	HR	$110.00	$0	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation	0.00	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair	0	LS	$73.95	$0	see cost assumptions
OM 2.6	Sign Replacement	0	EA	$2,250.00	$0	see cost assumptions
OM.2.7	Reporting (annual)	0	LS	$2,250.00	$0	see cost assumptions
OM.2.8	Contractor mobilizations	0	EA	$321.75	$0	see cost assumptions
	Subtotal				**$0**	
OM.3.0 Deed Restrictions[2]						
OM.3.1	Inspection (annual)	0	LS	$1,100.00	$0	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	0	EA	$5,000.00	$0	see cost assumptions
	Subtotal				**$0**	
ANNUAL O&M COST (YEARS 1-2)[3]					**$44,861**	
ANNUAL O&M COST (YEARS 3-30)[4]					**$0**	

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for 576 and 600 East Broadway Properties.
[2] Assumed that O&M for ground surfaces and deed maintenance would not be required following complete excavation of all Raymark waste.
[3] O&M for Years 1 and 2 include quarterly groundwater monitoring with annual reporting.
[4] O&M for Years 3 - 30 will not be required pending analytical data and concurrence from the State following the first 2 years of groundwater data collection.
Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear feet
FOL = field operations leader
O&M = operations and maintenance

TABLE H-2-6d
PRESENT VALUE ANALYSIS
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$36,358,755	$0	$0	$36,358,755	7.0%	$36,358,755
1	$0	$44,861	$0	$44,861	7.0%	$41,926
2	$0	$44,861	$0	$44,861	7.0%	$39,184
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$36,358,755**	**$89,722**	**$0**	**$36,448,478**		**$36,439,865**
					PV O&M	**$81,110**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal; Reviews not required following complete excavation of Raymark waste at a property group.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE H-2-6e
CAPITAL COSTS
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	15	LF	$35.79	$537
2.3	Install PVC Well Screens (2" diameter)	10	LF	$19.69	$197
2.4	Install PVC Well Casing (2" diameter)	5	LF	$14.79	$74
2.5	Install Filter Pack	12	LF	$15.52	$186
2.6	Install Bentonite Seal	1	EA	$57.23	$57
2.7	Install Annular Seal	2	LF	$69.04	$138
2.8	PVC Well Plugs	1	EA	$27.86	$28
2.9	Flush-Mount Protective Cover with Locking Cap	1	EA	$451.55	$452
2.10	Surface Pad, Concrete 2' x 2'	1	EA	$154.79	$155
2.11	Well Development (2 HR/WELL)	2	EA	$228.23	$456
2.12	IDW Transportation/Disposal (drums)	1	EA	$508.52	$509
	Subtotal				**$5,541**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	1,900	LF	$27.57	$52,383
3.2	Signage	19	EA	$73.95	$1,405
	Subtotal				**$53,788**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	10	MONTH	$4,531	$45,309
	Subtotal				**$74,760**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	1	ACRE	$3,968.29	$3,968
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	1,900	LF	$8.97	$17,036
	Subtotal				**$41,675**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[4]	62,578	CY	$2.12	$132,888
6.2	Haul RW/Soil to Stockpile Area[5]	75,093	CY	$4.00	$300,408
6.3	Perimeter Air Sampling	1,408	EA	$243.76	$343,215
6.4	Equipment Decontamination	3,129	HR	$54.56	$170,726
6.5	Stockpile Management	75,093	CY	$1.44	$107,922
6.6	Stockpile Characterization[6]	44	EA	$1,535.00	$67,540
	Subtotal				**$1,122,699**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	51,200	CY	$2.44	$125,036
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	3,129	HR	$54.56	$170,726
7.4	Out-of-Town Transportation of Waste[8]	76,800	TON	$170.00	$13,056,000
7.5	Out-of-Town Disposal of RW (no treatment)[8, 9]	69,120	TON	$107.10	$7,402,752
7.6	Out-of-Town Disposal of RW (treatment)[8, 9]	7,680	TON	$192.00	$1,474,560
	Subtotal				**$22,229,074**

TABLE H-2-6e
CAPITAL COSTS
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
576 AND 600 EAST BROADWAY PROPERTIES
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	21504	CY	$2.40	$51,662
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	1990	CY	$34.65	$68,959
8.9	Hydroseeding with Mulch and Fertilizer	98	MSF	$43.97	$4,296
8.10	Place, Spread, and Compact Asphalt Base Course (12")	174	ECY	$9.35	$1,628
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	4700	SF	$2.27	$10,669
8.12	Site Cleanup	64	HR	$405	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	45037	CY	$11.83	$532,776
8.14	Install Nonwoven Geotextile Fabric	7111	SY	$2.21	$15,716
	Subtotal				**$711,633**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$24,239,170**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$1,454,350
10.2	Engineering and Design (12%)				$2,908,700
10.3	Construction management (8%)				$1,939,134
10.4	Location Adjustment (9%)				$2,181,525
10.5	Contingency (15%)				$3,635,876
TOTAL OTHER COSTS					**$12,119,585**
TOTAL CAPITAL COST FOR ALTERNATIVE 6A					**$36,358,755**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for 576 and 600 East Broadway Properties.
[2] Deed restrictions not required for complete excavation of all Raymark waste.
[3] Assume fencing and signage to be temporary and required during construction activities for site security only.
[4] Represents in situ estimate of RW and additional soil (to be excavated for safety benching/sloping) to be excavated to a depth of 18 ft below ground surface.
[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.
[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).
[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Volume of RW for Out-of-Town assumes that 10% would be hazardous requiring treatment prior to disposal.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.
[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
ECY = embankment cubic yard (compacted)
CY = cubic yard
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for sediment dewatering and potential water treatment is not included in this estimate.

TABLE H-2-7a
PRESENT VALUE ANALYSIS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$1,403,380	$0	$0	$1,403,380	7.0%	$1,403,380
1	$0	$47,341	$0	$47,341	7.0%	$44,244
2	$0	$47,341	$0	$47,341	7.0%	$41,350
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$1,403,380**	**$94,682**	**$0**	**$1,498,063**		**$1,488,974**
					PV O&M	**$85,594**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal; Reviews not required following complete excavation of Raymark waste at a property group.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE H-2-7b
CAPITAL COSTS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	75	LF	$35.79	$2,684
2.3	Install PVC Well Screens (2" diameter)	50	LF	$19.69	$985
2.4	Install PVC Well Casing (2" diameter)	25	LF	$14.79	$370
2.5	Install Filter Pack	60	LF	$15.52	$931
2.6	Install Bentonite Seal	5	EA	$57.23	$286
2.7	Install Annular Seal	10	LF	$69.04	$690
2.8	PVC Well Plugs	5	EA	$27.86	$139
2.9	Flush-Mount Protective Cover with Locking Cap	5	EA	$451.55	$2,258
2.10	Surface Pad, Concrete 2' x 2'	5	EA	$154.79	$774
2.11	Well Development (2 HR/WELL)	10	EA	$228.23	$2,282
2.12	IDW Transportation/Disposal (drums)	5	EA	$508.52	$2,543
	Subtotal				**$16,695**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	799	LF	$27.57	$22,028
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,620**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	4	MONTH	$4,531	$18,124
	Subtotal				**$47,574**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	1	ACRE	$3,968.29	$3,968
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	799	LF	$8.97	$7,164
	Subtotal				**$31,803**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[4]	8,000	CY	$2.12	$16,989
6.2	Haul RW/Soil to Stockpile Area[5]	9,600	CY	$4.00	$38,404
6.3	Perimeter Air Sampling	180	EA	$243.76	$43,880
6.4	Equipment Decontamination	400	HR	$54.56	$21,826
6.5	Stockpile Management	9,600	CY	$1.44	$13,797
6.6	Stockpile Characterization[6]	20	EA	$1,535.00	$30,700
	Subtotal				**$165,595**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	8,000	CY	$2.44	$19,537
7.2	Transport RW to in-town consolidation[8]	7,200	CY	$5.52	$39,769
7.3	Equipment Decontamination	400	HR	$54.56	$21,826
7.4	Out-of-Town Transportation of Waste[8, 9]	1,200	TON	$170.00	$204,000
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Diposal of RW (treatment)[8, 9]	1,200	TON	$192.00	$230,400
	Subtotal				**$515,531**

TABLE H-2-7b
CAPITAL COSTS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	1440	CY	$2.40	$3,459
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	448	CY	$34.65	$15,528
8.9	Hydroseeding with Mulch and Fertilizer	22	MSF	$43.97	$967
8.10	Place, Spread, and Compact Asphalt Base Course (12")	74	ECY	$9.35	$693
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2,000	SF	$2.27	$4,540
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	6,782	CY	$11.83	$80,232
8.14	Install Nonwoven Geotextile Fabric	2,000	SY	$2.21	$4,420
	Subtotal				**$135,768**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$935,587**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$56,135
10.2	Engineering and Design (12%)				$112,270
10.3	Construction management (8%)				$74,847
10.4	Location Adjustment (9%)				$84,203
10.5	Contingency (15%)				$140,338
TOTAL OTHER COSTS					**$467,793**
TOTAL CAPITAL COST FOR ALTERNATIVE 5A					**$1,403,380**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 250, 304 and 340 East Main Street Property Group.

[2] Complete excavation of Raymark waste will not require transactional fees due to deed management.

[3] Assume fencing and signage to be temporary and required during construction activities for site security only.

[4] Represents in situ estimate of RW and additional soil (to be excavated for safety benching/sloping) to be excavated to a depth of 10 ft below ground surface.

[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate

[8] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[9] A conversion factor of 1.5 was used to convert CY to TON.

[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.
Cost for sediment dewatering and potential water treatment is not included in this estimate.

TABLE H-2-7c
OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	24	HR	$110	$2,640	see cost assumptions
OM.1.3	Sampling Labor - Sampler	12	HR	$90	$1,080	see cost assumptions
OM.1.4	Analytical Costs	6	EA	$697	$4,183	see cost assumptions
OM.1.5	Data Validation	6	HR	$110	$660	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$11,835**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)[2]						
OM.2.1	Inspection	0	HR	$110.00	$0	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation	0.00	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	0	LS	$2,250.00	$0	see cost assumptions
OM.2.8	Contractor mobilizations	0	EA	$321.75	$0	see cost assumptions
	Subtotal				**$0**	
OM.3.0 Deed Restrictions[2]						
OM.3.1	Inspection (annual)	0	LS	$1,100.00	$0	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	0	EA	$5,000.00	$0	see cost assumptions
	Subtotal				**$0**	
ANNUAL O&M COST (YEARS 1-2)[3]					**$47,341**	
ANNUAL O&M COST (YEARS 3-30)[4]					**$0**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 250, 304 and 340 East Main Street Property Group.

[2] Assumed that O&M for ground surfaces and deed maintenance would not be required following complete excavation of all Raymark waste.

[3] O&M for Years 1 and 2 include quarterly groundwater monitoring with annual reporting.

[4] O&M for Years 3 - 30 will not be required pending analytical data and concurrence from the State following the first 2 years of groundwater data collection.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

TABLE H-2-7d
PRESENT VALUE ANALYSIS
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$5,793,605	$0	$0	$5,793,605	7.0%	$5,793,605
1	$0	$47,341	$0	$47,341	7.0%	$44,244
2	$0	$47,341	$0	$47,341	7.0%	$41,350
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$5,793,605**	**$94,682**	**$0**	**$5,888,287**		**$5,879,198**
					PV O&M	**$85,594**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal; Reviews not required following complete excavation of Raymark waste at a property group.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE H-2-7e
CAPITAL COSTS
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	75	LF	$35.79	$2,684
2.3	Install PVC Well Screens (2" diameter)	50	LF	$19.69	$985
2.4	Install PVC Well Casing (2" diameter)	25	LF	$14.79	$370
2.5	Install Filter Pack	60	LF	$15.52	$931
2.6	Install Bentonite Seal	5	EA	$57.23	$286
2.7	Install Annular Seal	10	LF	$69.04	$690
2.8	PVC Well Plugs	5	EA	$27.86	$139
2.9	Flush-Mount Protective Cover with Locking Cap	5	EA	$451.55	$2,258
2.10	Surface Pad, Concrete 2' x 2'	5	EA	$154.79	$774
2.11	Well Development (2 HR/WELL)	10	EA	$228.23	$2,282
2.12	IDW Transportation/Disposal (drums)	5	EA	$508.52	$2,543
	Subtotal				**$16,695**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	799	LF	$27.57	$22,028
3.2	Signage	8	EA	$73.95	$592
	Subtotal				**$22,620**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	4	MONTH	$4,531	$18,124
	Subtotal				**$47,574**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	1	ACRE	$3,968.29	$3,968
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	799	LF	$8.97	$7,164
	Subtotal				**$31,803**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[4]	8,000	CY	$2.12	$16,989
6.2	Haul RW/Soil to Stockpile Area[5]	9,600	CY	$4.00	$38,404
6.3	Perimeter Air Sampling	180	EA	$243.76	$43,880
6.4	Equipment Decontamination	400	HR	$54.56	$21,826
6.5	Stockpile Management	9,600	CY	$1.44	$13,797
6.6	Stockpile Characterization[6]	3	EA	$1,535.00	$4,605
	Subtotal				**$139,500**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	8,000	CY	$2.44	$19,537
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	400	HR	$54.56	$21,826
7.4	Out-of-Town Transportation of Waste[8]	12,000	TON	$170.00	$2,040,000
7.5	Out-of-Town Disposal of RW (no treatment)[8, 9]	10,800	TON	$107.10	$1,156,680
7.6	Out-of-Town Disposal of RW (treatment)[8, 9]	1,200	TON	$192.00	$230,400
	Subtotal				**$3,468,443**

TABLE H-2-7e
CAPITAL COSTS
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
250, 304, 340 EAST MAIN STREET
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	1440	CY	$2.40	$3,459
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	448	CY	$34.65	$15,528
8.9	Hydroseeding with Mulch and Fertilizer	22	MSF	$43.97	$967
8.10	Place, Spread, and Compact Asphalt Base Course (12")	74	ECY	$9.35	$693
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	2000	SF	$2.27	$4,540
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	6782	CY	$11.83	$80,232
8.14	Install Nonwoven Geotextile Fabric	2000	SY	$2.21	$4,420
	Subtotal				**$135,768**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$3,862,403**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$231,744
10.2	Engineering and Design (12%)				$463,488
10.3	Construction management (8%)				$308,992
10.4	Location Adjustment (9%)				$347,616
10.5	Contingency (15%)				$579,360
TOTAL OTHER COSTS					**$1,931,202**
TOTAL CAPITAL COST FOR ALTERNATIVE 6A					**$5,793,605**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the 250, 304 and 340 East Main Street Property Group.

[2] Deed restrictions not required for complete excavation of all Raymark waste.

[3] Assume fencing and signage to be temporary and required during construction activities for site security only.

[4] Represents in situ estimate of RW and additional soil (to be excavated for safety benching/sloping) to be excavated to a depth of 10 ft below ground surface.

[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[8] A conversion factor of 1.5 was used to convert CY to TON.

[9] Volume of RW for Out-of-Town assumes that 10% would be hazardous requiring treatment prior to disposal.

[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for demolition and disposal of existing structures (if required) has not been included.
Cost for sediment dewatering and potential water treatment is not included in this estimate.

TABLE H-2-8a
PRESENT VALUE ANALYSIS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$1,961,941	$0	$0	$1,961,941	7.0%	$1,961,941
1	$0	$41,633	$0	$41,633	7.0%	$38,909
2	$0	$41,633	$0	$41,633	7.0%	$36,364
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$1,961,941**	**$83,265**	**$0**	**$2,045,207**		**$2,037,214**
					PV O&M	**$75,273**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal; Reviews not required following complete excavation of Raymark waste at a property group.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE H-2-8b
CAPITAL COSTS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	60	LF	$35.79	$2,147
2.3	Install PVC Well Screens (2" diameter)	40	LF	$19.69	$788
2.4	Install PVC Well Casing (2" diameter)	20	LF	$14.79	$296
2.5	Install Filter Pack	48	LF	$15.52	$745
2.6	Install Bentonite Seal	4	EA	$57.23	$229
2.7	Install Annular Seal	8	LF	$69.04	$552
2.8	PVC Well Plugs	4	EA	$27.86	$111
2.9	Flush-Mount Protective Cover with Locking Cap	4	EA	$451.55	$1,806
2.10	Surface Pad, Concrete 2' x 2'	4	EA	$154.79	$619
2.11	Well Development (2 HR/WELL)	8	EA	$228.23	$1,826
2.12	IDW Transportation/Disposal (drums)	4	EA	$508.52	$2,034
	Subtotal				**$13,906**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	600	LF	$27.57	$16,542
3.2	Signage	6	EA	$73.93	$444
	Subtotal				**$16,986**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	5	MONTH	$4,531	$22,655
	Subtotal				**$52,105**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	600	LF	$8.97	$5,380
	Subtotal				**$26,051**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[4]	11,680	CY	$2.12	$24,803
6.2	Haul RW/Soil to Stockpile Area[5]	14,016	CY	$4.00	$56,071
6.3	Perimeter Air Sampling	263	EA	$243.76	$64,064
6.4	Equipment Decontamination	584	HR	$54.56	$31,866
6.5	Stockpile Management	14,016	CY	$1.44	$20,143
6.6	Stockpile Characterization[6]	29	EA	$1,535.00	$44,515
	Subtotal				**$241,462**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	12,000	CY	$2.44	$29,305
7.2	Transport RW to in-town consolidation[8]	10,800	CY	$5.52	$59,653
7.3	Equipment Decontamination	584	HR	$54.56	$31,866
7.4	Out-of-Town Transportation of Waste[8, 9]	1,800	TON	$170.00	$306,000
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Diposal of RW (treatment)[8, 9]	1,800	TON	$192.00	$345,600
	Subtotal				**$772,424**

TABLE H-2-8b
CAPITAL COSTS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	1814	CY	$2.40	$4,359
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	704	CY	$34.65	$24,393
8.9	Hydroseeding with Mulch and Fertilizer	35	MSF	$43.97	$1,520
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	10,330	CY	$11.83	$122,197
8.14	Install Nonwoven Geotextile Fabric	3,000	SY	$2.21	$6,630
	Subtotal				**$185,027**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$171,602	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$1,307,961**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$78,478
10.2	Engineering and Design (12%)				$156,955
10.3	Construction management (8%)				$104,637
10.4	Location Adjustment (9%)				$117,716
10.5	Contingency (15%)				$196,194
TOTAL OTHER COSTS					**$653,980**
TOTAL CAPITAL COST FOR ALTERNATIVE 5A					**$1,961,941**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Beacon Point AOC 3 Property.
[2] Complete excavation of Raymark waste will not require transactional fees due to deed management.
[3] Assume fencing and signage to be temporary and required during construction activities for site security only.
[4] Represents in situ estimate of RW and additional soil (to be excavated for safety benching/sloping) to be excavated to a depth of 10 ft below ground surface.
[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.
[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).
[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).
[8] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.
[9] A conversion factor of 1.5 was used to convert CY to TON.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.
[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for sediment dewatering and potential water treatment is not included in this estimate.

TABLE H-2-8c
OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	20	HR	$110	$2,200	see cost assumptions
OM.1.3	Sampling Labor - Sampler	10	HR	$90	$900	see cost assumptions
OM.1.4	Analytical Costs	5	EA	$697	$3,486	see cost assumptions
OM.1.5	Data Validation	5	HR	$110	$550	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$10,408**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)[2]						
OM.2.1	Inspection	0	HR	$110.00	$0	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation	0.00	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	0	LS	$2,250.00	$0	see cost assumptions
OM.2.8	Contractor mobilizations	0	EA	$321.75	$0	see cost assumptions
	Subtotal				**$0**	
OM.3.0 Deed Restrictions[2]						
OM.3.1	Inspection (annual)	0	LS	$1,100.00	$0	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	0	EA	$5,000.00	$0	see cost assumptions
	Subtotal				**$0**	
ANNUAL O&M COST (YEARS 1-2)[3]					**$41,633**	
ANNUAL O&M COST (YEARS 3-30)[4]					**$0**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Beacon Point AOC 3 Property.

[2] Assumed that O&M for ground surfaces and deed maintenance would not be required following complete excavation of all Raymark waste.

[3] O&M for Years 1 and 2 include quarterly groundwater monitoring with annual reporting.

[4] O&M for Years 3 - 30 will not be required pending analytical data and concurrence from the State following the first 2 years of groundwater data collection.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

TABLE H-2-8d
PRESENT VALUE ANALYSIS
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$8,548,429	$0	$0	$8,548,429	7.0%	$8,548,429
1	$0	$41,633	$0	$41,633	7.0%	$38,909
2	$0	$41,633	$0	$41,633	7.0%	$36,364
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$8,548,429**	**$83,265**	**$0**	**$8,631,695**		**$8,623,702**
					PV O&M	**$75,273**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal; Reviews not required following complete excavation of Raymark waste at a property group.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE H-2-8e
CAPITAL COSTS
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	60	LF	$35.79	$2,147
2.3	Install PVC Well Screens (2" diameter)	40	LF	$19.69	$788
2.4	Install PVC Well Casing (2" diameter)	20	LF	$14.79	$296
2.5	Install Filter Pack	48	LF	$15.52	$745
2.6	Install Bentonite Seal	4	EA	$57.23	$229
2.7	Install Annular Seal	8	LF	$69.04	$552
2.8	PVC Well Plugs	4	EA	$27.86	$111
2.9	Flush-Mount Protective Cover with Locking Cap	4	EA	$451.55	$1,806
2.10	Surface Pad, Concrete 2' x 2'	4	EA	$154.79	$619
2.11	Well Development (2 HR/WELL)	8	EA	$228.23	$1,826
2.12	IDW Transportation/Disposal (drums)	4	EA	$508.52	$2,034
	Subtotal				**$13,906**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	600	LF	$27.57	$16,542
3.2	Signage	6	EA	$73.93	$444
	Subtotal				**$16,986**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	5	MONTH	$4,531	$22,655
	Subtotal				**$52,105**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	600	LF	$8.97	$5,380
	Subtotal				**$26,051**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[4]	11,680	CY	$2.12	$24,803
6.2	Haul RW/Soil to Stockpile Area[5]	14,016	CY	$4.00	$56,071
6.3	Perimeter Air Sampling	263	EA	$243.76	$64,064
6.4	Equipment Decontamination	584	HR	$54.56	$31,866
6.5	Stockpile Management	14,016	CY	$1.44	$20,143
6.6	Stockpile Characterization[6]	4	EA	$1,535.00	$6,140
	Subtotal				**$203,087**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	12,000	CY	$2.44	$29,305
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	584	HR	$54.56	$31,866
7.4	Out-of-Town Transportation of Waste[8]	18,000	TON	$170.00	$3,060,000
7.5	Out-of-Town Disposal of RW (no treatment)[8, 9]	16,200	TON	$107.10	$1,735,020
7.6	Out-of-Town Disposal of RW (treatment)[8, 9]	1,800	TON	$192.00	$345,600
	Subtotal				**$5,201,791**

TABLE H-2-8e
CAPITAL COSTS
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
BEACON POINT (AOC) 3
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	1814	CY	$2.40	$4,359
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	704	CY	$34.65	$24,393
8.9	Hydroseeding with Mulch and Fertilizer	35	MSF	$43.97	$1,520
8.10	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	10330	CY	$11.83	$122,197
8.14	Install Nonwoven Geotextile Fabric	3000	SY	$2.21	$6,630
	Subtotal				**$185,027**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$171,602	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$5,698,953**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$341,937
10.2	Engineering and Design (12%)				$683,874
10.3	Construction management (8%)				$455,916
10.4	Location Adjustment (9%)				$512,906
10.5	Contingency (15%)				$854,843
TOTAL OTHER COSTS					**$2,849,476**
TOTAL CAPITAL COST FOR ALTERNATIVE 6A					**$8,548,429**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Beacon Point AOC 3 Property.
[2] Deed restrictions not required for complete excavation of all Raymark waste.
[3] Assume fencing and signage to be temporary and required during construction activities for site security only.
[4] Represents in situ estimate of RW and additional soil (to be excavated for safety benching/sloping) to be excavated to a depth of 10 ft below ground surface.
[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.
[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).
[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).
[8] A conversion factor of 1.5 was used to convert CY to TON.
[9] Volume of RW for Out-of-Town assumes that 10% would be hazardous requiring treatment prior to disposal.
[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.
[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for sediment dewatering and potential water treatment is not included in this estimate.

TABLE H-2-9a
PRESENT VALUE ANALYSIS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$2,085,129	$0	$0	$2,085,129	7.0%	$2,085,129
1	$0	$35,924	$0	$35,924	7.0%	$33,574
2	$0	$35,924	$0	$35,924	7.0%	$31,378
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$2,085,129**	**$71,848**	**$0**	**$2,156,977**		**$2,150,080**
					PV O&M	**$64,952**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal; Reviews not required following complete excavation of Raymark waste at a property group.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE H-2-9b
CAPITAL COSTS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.1	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	1,560	LF	$27.57	$43,009
3.2	Signage	16	EA	$73.93	$1,183
	Subtotal				**$44,192**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	7	MONTH	$4,531	$31,716
	Subtotal				**$61,167**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	1,560	LF	$8.97	$13,987
	Subtotal				**$34,658**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[4]	11,200	CY	$2.12	$23,784
6.2	Haul RW/Soil to Stockpile Area[5]	13,440	CY	$4.00	$53,766
6.3	Perimeter Air Sampling	252	EA	$243.76	$61,431
6.4	Equipment Decontamination	560	HR	$54.56	$30,556
6.5	Stockpile Management	13,440	CY	$1.44	$19,315
6.6	Stockpile Characterization[6]	27	EA	$1,535.00	$41,445
	Subtotal				**$230,298**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	12,533	CY	$2.44	$30,608
7.2	Transport RW to in-town consolidation[8]	11,280	CY	$5.52	$62,304
7.3	Equipment Decontamination	560	HR	$54.56	$30,556
7.4	Out-of-Town Transportation of Waste[8, 9]	1,880	TON	$170.00	$319,600
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Diposal of RW (treatment)[8, 9]	1,880	TON	$192.00	$360,960
	Subtotal				**$804,028**

TABLE H-2-9b
CAPITAL COSTS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	816	CY	$2.40	$1,960
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	1,165	CY	$34.65	$40,373
8.9	Hydroseeding with Mulch and Fertilizer	57	MSF	$43.97	$2,515
8.1	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	10,339	CY	$11.83	$122,306
8.14	Install Nonwoven Geotextile Fabric	5,222	SY	$2.21	$11,541
	Subtotal				**$204,624**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$1,390,086**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$83,405
10.2	Engineering and Design (12%)				$166,810
10.3	Construction management (8%)				$111,207
10.4	Location Adjustment (9%)				$125,108
10.5	Contingency (15%)				$208,513
TOTAL OTHER COSTS					**$695,043**
TOTAL CAPITAL COST FOR ALTERNATIVE 5A					**$2,085,129**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Airport Property North of Marine Basin Property.

[2] Complete excavation of Raymark waste will not require transactional fees due to deed management.

[3] Assume fencing and signage to be temporary and required during construction activities for site security only.

[4] Represents in situ estimate of RW and additional soil (to be excavated for safety benching/sloping) to be excavated to a depth of 6 ft below ground surface.

[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[8] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[9] A conversion factor of 1.5 was used to convert CY to TON.

[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for sediment dewatering and potential water treatment is not included in this estimate.

TABLE H-2-9c
OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0	**Groundwater Monitoring (per event)**					
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0	**Ground Surface Inspections, Maintenance, and Repairs (per year)[2]**					
OM.2.1	Inspection	0	HR	$110.00	$0	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation	0.00	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	0	LS	$2,250.00	$0	see cost assumptions
OM.2.8	Contractor mobilizations	0	EA	$321.75	$0	see cost assumptions
	Subtotal				**$0**	
OM.3.0	**Deed Restrictions[2]**					
OM.3.1	Inspection (annual)	0	LS	$1,100.00	$0	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	0	EA	$5,000.00	$0	see cost assumptions
	Subtotal				**$0**	
ANNUAL O&M COST (YEARS 1-2)[3]					**$35,924**	
ANNUAL O&M COST (YEARS 3-30)[4]					**$0**	

Notes:
[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Airport Property North of Marine Basin Property.
[2] Assumed that O&M for ground surfaces and deed maintenance would not be required following complete excavation of all Raymark waste.
[3] O&M for Years 1 and 2 include quarterly groundwater monitoring with annual reporting.
[4] O&M for Years 3 - 30 will not be required pending analytical data and concurrence from the State following the first 2 years of groundwater data collection.
Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

TABLE H-2-9d
PRESENT VALUE ANALYSIS
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$8,966,908	$0	$0	$8,966,908	7.0%	$8,966,908
1	$0	$35,924	$0	$35,924	7.0%	$33,574
2	$0	$35,924	$0	$35,924	7.0%	$31,378
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$8,966,908**	**$71,848**	**$0**	**$9,038,756**		**$9,031,859**
					PV O&M	**$64,952**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal; Reviews not required following complete excavation of Raymark waste at a property group.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE H-2-9e
CAPITAL COSTS
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.1	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	1,560	LF	$27.57	$43,009
3.2	Signage	16	EA	$73.93	$1,183
	Subtotal				**$44,192**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	7	MONTH	$4,531	$31,716
	Subtotal				**$61,167**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$0
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	1560	LF	$8.97	$13,987
	Subtotal				**$34,658**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[4]	11,200	CY	$2.12	$23,784
6.2	Haul RW/Soil to Stockpile Area[5]	13,440	CY	$4.00	$53,766
6.3	Perimeter Air Sampling	252	EA	$243.76	$61,431
6.4	Equipment Decontamination	560	HR	$54.56	$30,556
6.5	Stockpile Management	13,440	CY	$1.44	$19,315
6.6	Stockpile Characterization[6]	2	EA	$1,535.00	$3,070
	Subtotal				**$191,923**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	12,533	CY	$2.44	$30,608
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	560	HR	$54.56	$30,556
7.4	Out-of-Town Transportation of Waste[8]	18,800	TON	$170.00	$3,196,000
7.5	Out-of-Town Disposal of RW (no treatment)[8, 9]	16,920	TON	$107.10	$1,812,132
7.6	Out-of-Town Disposal of RW (treatment)[8, 9]	1,880	TON	$192.00	$360,960
	Subtotal				**$5,430,256**

TABLE H-2-9e
CAPITAL COSTS
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
AIRPORT PROPERTY NORTH OF MARINE BASIN
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Deliver, Place and Compact Non-RW Excavated Material[10]	816	CY	$2.40	$1,960
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	1165	CY	$34.65	$40,373
8.9	Hydroseeding with Mulch and Fertilizer	57	MSF	$43.97	$2,515
8.1	Place, Spread, and Compact Asphalt Base Course (12")	0	ECY	$9.35	$0
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	0	SF	$2.27	$0
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	10339	CY	$11.83	$122,306
8.14	Install Nonwoven Geotextile Fabric	5222	SY	$2.21	$11,541
	Subtotal				**$204,624**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$5,977,938**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$358,676
10.2	Engineering and Design (12%)				$717,353
10.3	Construction management (8%)				$478,235
10.4	Location Adjustment (9%)				$538,014
10.5	Contingency (15%)				$896,691
TOTAL OTHER COSTS					**$2,988,969**
TOTAL CAPITAL COST FOR ALTERNATIVE 6A					**$8,966,908**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Airport Property North of Marine Basin Property

[2] Deed restrictions not required for complete excavation of all Raymark waste.

[3] Assume fencing and signage to be temporary and required during construction activities for site security only.

[4] Represents in situ estimate of RW and additional soil (to be excavated for safety benching/sloping) to be excavated to a depth of 6 ft below ground surface.

[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[8] A conversion factor of 1.5 was used to convert CY to TON.

[9] Volume of RW for Out-of-Town assumes that 10% would be hazardous requiring treatment prior to disposal.

[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for sediment dewatering and potential water treatment is not included in this estimate.

TABLE H-2-10a
PRESENT VALUE ANALYSIS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate[2]	Present Value
0	$305,581	$0	$0	$305,581	7.0%	$305,581
1	$0	$35,924	$0	$35,924	7.0%	$33,574
2	$0	$35,924	$0	$35,924	7.0%	$31,378
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$305,581**	**$71,848**	**$0**	**$377,430**		**$370,533**
					PV O&M	**$64,952**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal; Reviews not required following complete excavation of Raymark waste at a property group.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE H-2-10b
CAPITAL COSTS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	312	LF	$27.57	$8,602
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$8,898**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	3	MONTH	$4,531	$13,593
	Subtotal				**$43,044**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0.3	ACRE	$3,968.29	$1,190
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	312	LF	$8.97	$2,797
	Subtotal				**$24,659**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[4]	1,141	CY	$2.12	$2,422
6.2	Haul RW/Soil to Stockpile Area[5]	1,369	CY	$4.00	$5,476
6.3	Perimeter Air Sampling	42	EA	$243.76	$10,203
6.4	Equipment Decontamination	57	HR	$54.56	$3,112
6.5	Stockpile Management	1,369	CY	$1.44	$1,967
6.6	Stockpile Characterization[6]	3	EA	$1,535.00	$4,605
	Subtotal				**$27,786**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	756	CY	$2.44	$1,845
7.2	Transport RW to in-town consolidation[8]	680	CY	$5.52	$3,756
7.3	Equipment Decontamination	57	HR	$54.56	$3,112
7.4	Out-of-Town Transportation of Waste[8, 9]	113	TON	$170.00	$19,267
7.5	Out-of-Town Disposal of RW (no treatment)	0	TON	$107.10	$0
7.6	Out-of-Town Diposal of RW (treatment)[8, 9]	113	TON	$192.00	$21,760
	Subtotal				**$49,740**

TABLE H-2-10b
CAPITAL COSTS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material[10]	552	CY	$2.40	$1,326
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	75	CY	$34.65	$2,583
8.9	Hydroseeding with Mulch and Fertilizer	4	MSF	$43.97	$161
8.10	Place, Spread, and Compact Asphalt Base Course (12")	13	ECY	$9.35	$118
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	340	SF	$2.27	$772
8.12	Site Cleanup	64	HR	$405	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	606	CY	$11.83	$7,171
8.14	Install Nonwoven Geotextile Fabric	189	SY	$2.21	$417
	Subtotal				**$38,477**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$203,721**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$12,223
10.2	Engineering and Design (12%)				$24,446
10.3	Construction management (8%)				$16,298
10.4	Location Adjustment (9%)				$18,335
10.5	Contingency (15%)				$30,558
TOTAL OTHER COSTS					**$101,860**
TOTAL CAPITAL COST FOR ALTERNATIVE 5A					**$305,581**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Third Avenue Property.

[2] Complete excavation of Raymark waste will not require transactional fees due to deed management.

[3] Assume fencing and signage to be temporary and required during construction activities for site security only.

[4] Represents in situ estimate of RW and additional soil (to be excavated for safety benching/sloping) to be excavated to a depth of 10 ft below ground surface.

[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support diposal and/or potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[8] Volume of RW for In-Town consolidation excludes 10% assumed to be hazardous requiring treatment prior to disposal.

[9] A conversion factor of 1.5 was used to convert CY to TON.

[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Cost for sediment dewatering and potential water treatment is not included in this estimate.

TABLE H-2-10c
OPERATIONS AND MAINTENANCE COSTS
ALTERNATIVE 5A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH IN-TOWN CONSOLIDATION
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

DESCRIPTION		QUANTITY	UNIT	UNIT COST[1]	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring (per event)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,073	$1,073	see cost assumptions
OM.1.2	Sampling Labor - FOL	16	HR	$110	$1,760	see cost assumptions
OM.1.3	Sampling Labor - Sampler	8	HR	$90	$720	see cost assumptions
OM.1.4	Analytical Costs	4	EA	$697	$2,789	see cost assumptions
OM.1.5	Data Validation	4	HR	$110	$440	see cost assumptions
OM.1.6	Report Preparation	1	LS	$2,200	$2,200	see cost assumptions
	Subtotal				**$8,981**	
OM.2.0 Ground Surface Inspections, Maintenance, and Repairs (per year)[2]						
OM.2.1	Inspection (annual)	0	HR	$110.00	$0	see cost assumptions
OM.2.2	Mowing (twice per year)	0	MSF	$7.34	$0	Means HC 2008, 32 01 90.19 4100
OM.2.3	Revegetation	0	MSF	$56.31	$0	Means HC 2008, 32 92 19.14 4600
OM.2.4	Asphalt Repairs	0	SF	$1.81	$0	Means HC 2008, 32 12 16.14 1100
OM 2.5	Fence Repair	0	LF	$27.57	$0	see cost assumptions
OM 2.6	Sign Replacement	0	EA	$73.95	$0	see cost assumptions
OM.2.7	Reporting (annual)	0	LS	$2,250.00	$0	see cost assumptions
OM.2.8	Contractor mobilizations	0	EA	$321.75	$0	see cost assumptions
	Subtotal				**$0**	
OM.3.0 Deed Restrictions[2]						
OM.3.1	Inspection (annual)	0	LS	$1,100.00	$0	Assume 10 HR/inspection
OM.3.2	Deed Restriction Reporting (annual)	0	EA	$5,000.00	$0	see cost assumptions
	Subtotal				**$0**	
ANNUAL O&M COST (YEARS 1-2)[3]					**$35,924**	
ANNUAL O&M COST (YEARS 3-30)[4]					**$0**	

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Third Avenue Property.

[2] Assumed that O&M for ground surfaces and deed maintenance would not be required following complete excavation of all Raymark waste.

[3] O&M for Years 1 and 2 include quarterly groundwater monitoring with annual reporting.

[4] O&M for Years 3 - 30 will not be required pending analytical data and concurrence from the State following the first 2 years of groundwater data collection.

Means 2008 HC: R.S. Means Heavy Construction Cost Data, 22nd Annual Edition, 2008.

LS = lump sum
HR = hour
EA = each
MSF = thousand square feet
SF = square feet
LF = linear foot
FOL = field operations leader
O&M = operations and maintenance

TABLE H-2-10d
PRESENT VALUE ANALYSIS
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
THIRD AVENUE PROPERTY
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

Year	Capital	O&M	5-Yr Review[1]	Total	Discount Rate[2]	Present Value
0	$721,608	$0	$0	$721,608	7.0%	$721,608
1	$0	$35,924	$0	$35,924	7.0%	$33,574
2	$0	$35,924	$0	$35,924	7.0%	$31,378
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$0	$0	7.0%	$0
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$0	$0	7.0%	$0
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$0	$0	7.0%	$0
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$0	$0	7.0%	$0
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$0	$0	7.0%	$0
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$0	$0	7.0%	$0
TOTAL	**$721,608**	**$71,848**	**$0**	**$793,456**		**$786,559**
					PV O&M	**$64,952**

Notes:

[1] Five-year reviews include $10,000 for a single property and $5,000 for each additional property within a property group and are included in the Present Value O&M subtotal; Reviews not required following complete excavation of Raymark waste at a property group.

[2] Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

O&M = operations and maintenance

TABLE H-2-10e
CAPITAL COSTS
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
1.0 Deed Restrictions					
1.1	Transactional Fees[2]	0	LS	$22,655	$0
	Subtotal				**$0**
2.0 Monitoring Well Construction					
2.1	Mobilize Drill Rig and Crew	1	LS	$2,752.75	$2,753
2.2	Drilling (Assume 1 Wells, 15 LF Avg Depth)	45	LF	$35.79	$1,610
2.3	Install PVC Well Screens (2" diameter)	30	LF	$19.69	$591
2.4	Install PVC Well Casing (2" diameter)	15	LF	$14.79	$222
2.5	Install Filter Pack	36	LF	$15.52	$559
2.6	Install Bentonite Seal	3	EA	$57.23	$172
2.7	Install Annular Seal	6	LF	$69.04	$414
2.8	PVC Well Plugs	3	EA	$27.86	$84
2.9	Flush-Mount Protective Cover with Locking Cap	3	EA	$451.55	$1,355
2.10	Surface Pad, Concrete 2' x 2'	3	EA	$154.79	$464
2.11	Well Development (2 HR/WELL)	6	EA	$228.23	$1,369
2.12	IDW Transportation/Disposal (drums)	3	EA	$508.52	$1,526
	Subtotal				**$11,118**
3.0 Fencing and Signage[3]					
3.1	Chain Link Fence	312	LF	$27.57	$8,602
3.2	Signage	4	EA	$73.95	$296
	Subtotal				**$8,898**
4.0 Mobilization/Demobilization					
4.1	Equipment Mobilization/Demobilization	2	LS	$11,327	$22,655
4.2	Field Support Facilities	1	LS	$6,796	$6,796
4.3	Monthly Costs associated with Field Support	3	MONTH	$4,531	$13,593
	Subtotal				**$43,044**
5.0 Site Preparation					
5.1	Site Access Road Construction	0	SY	$23.06	$0
5.2	Clear and Grub	0	ACRE	$3,968.29	$1,190
5.3	Site Survey	1	EA	$5,945.37	$5,945
5.4	Construct Equipment Decontamination Pad	1	LS	$8,495.44	$8,495
5.5	Construct Soil Stockpiling/Staging Areas	1	LS	$6,229.99	$6,230
5.6	Install Erosion and Sedimentation Controls	312	LF	$8.97	$2,797
	Subtotal				**$24,659**
6.0 Excavation of Raymark Waste/Soil to Prepare Property for Cap Construction or Backfill					
6.1	Excavate and Load RW/Soil[4]	1,141	CY	$2.12	$2,422
6.2	Haul RW/Soil to Stockpile Area[5]	1,369	CY	$4.00	$5,476
6.3	Perimeter Air Sampling	42	EA	$243.76	$10,203
6.4	Equipment Decontamination	57	HR	$54.56	$3,112
6.5	Stockpile Management	1,369	CY	$1.44	$1,967
6.6	Stockpile Characterization[6]	2	EA	$1,535.00	$3,070
	Subtotal				**$26,251**
7.0 Transportation and Treatment/Disposal of Raymark Waste					
7.1	Load RW into Trucks[7]	756	CY	$2.44	$1,845
7.2	Transport RW to in-town consolidation	0	CY	$5.52	$0
7.3	Equipment Decontamination	57	HR	$54.56	$3,112
7.4	Out-of-Town Transportation of Waste[8]	1,133	TON	$170.00	$192,667
7.5	Out-of-Town Disposal of RW (no treatment)[8, 9]	1,020	TON	$107.10	$109,242
7.6	Out-of-Town Disposal of RW (treatment)[8, 9]	113	TON	$192.00	$21,760
	Subtotal				**$328,626**

TABLE H-2-10e
CAPITAL COSTS
ALTERNATIVE 6A - COMPLETE EXCAVATION OF RAYMARK WASTE WITH OUT-OF-TOWN DISPOSAL
RAYMARK INDUSTRIES, INC. SUPERFUND SITE
STRATFORD, CONNECTICUT

	DESCRIPTION	QUANTITY	UNIT	UNIT COST[1]	TOTAL COST
8.0	**Construction of Low-Permeability Cap or Backfill and Site Restoration**				
8.1	Spread and Compact Non-RW Excavated Material[10]	552	CY	$2.40	$1,326
8.2	Deliver, Dump, Spread, and Compact Sand Subbase (6")	0	CY	$27.00	$0
8.3	Install Geosynthetic Clay Liner (bottom layer)	0	SF	$2.86	$0
8.4	Install 60 mil HDPE liner	0	SF	$2.84	$0
8.5	Install Geosynthetic Drainage Layer	0	SF	$0.65	$0
8.6	Furnish, Spread, and Compact Soil Layer (24")	0	CY	$11.83	$0
8.7	Install Nonwoven Geotextile Delineation/Warning Layer	0	SF	$1.29	$0
8.8	Furnish, Place, and Spread Topsoil (6")[10]	75	CY	$34.65	$2,583
8.9	Hydroseeding with Mulch and Fertilizer	4	MSF	$43.97	$161
8.10	Place, Spread, and Compact Asphalt Base Course (12")	13	ECY	$9.35	$118
8.11	Place Asphalt Concrete (6" base, 2" binder, 1" topping)	340	SF	$2.27	$772
8.12	Site Cleanup	64	HR	$405.12	$25,928
8.13	Clean Fill, Delivered, Dumped, Spread, and Compacted[10]	606	CY	$11.83	$7,171
8.14	Install Nonwoven Geotextile Fabric	189	SY	$2.21	$417
	Subtotal				**$38,477**
9.0	**Flood Storage Mitigation/Stormwater Management[11]**				
9.1	Flood Storage Mitigation/Restoration	0	LS	$0	$0
9.2	Wetland Mitigation/Restoration	0	LS	$0	$0
	Subtotal				**$0**
TOTAL DIRECT COSTS					**$481,072**
10.0	**OTHER COSTS**				
10.1	Project Management (6%)				$28,864
10.2	Engineering and Design (12%)				$57,729
10.3	Construction management (8%)				$38,486
10.4	Location Adjustment (9%)				$43,296
10.5	Contingency (15%)				$72,161
TOTAL OTHER COSTS					**$240,536**
TOTAL CAPITAL COST FOR ALTERNATIVE 6A					**$721,608**

Notes:

[1] For source information regarding unit pricing - refer to Capital Costs Unit Prices Table for the Third Avenue Property.

[2] Deed restrictions not required for complete excavation of all Raymark waste.

[3] Assume fencing and signage to be temporary and required during construction activities for site security only.

[4] Represents in situ estimate of RW and additional soil (to be excavated for safety benching/sloping) to be excavated to a depth of 10 ft below ground surface.

[5] Volume for hauling RW/Soil to the stockpile area includes a bulking factor of 1.2.

[6] Characterization includes labor and analytical required to test for Primary Hazardous Constituents (PHC) to support potential onsite re-use of additionally excavated soil (assume 1 sample per 500 CY).

[7] Volume includes all RW intended for disposal (i.e.; total excavation volume with applied bulking factor less excess soil removed to facilitate safety sloping/benching).

[8] A conversion factor of 1.5 was used to convert CY to TON.

[9] Volume of RW for Out-of-Town assumes that 10% would be hazardous requiring treatment prior to disposal.

[10] Backfill volumes were estimated volumetrically and include a 10% increase to account for compaction during placement; Remedial Design will specify fill type to be placed in 100-year floodplains to retain pre-existing hydraulic characteristics and function of the floodplain; additionally excavated soil is intended for re-use onsite pending analytical results for PHCs and was deducted from backfill estimates.

[11] All impacts to floodplains will be temporary and restoration will ensure no loss of flood storage capacity will be incurred; no wetlands will be impacted.

PVC = polyvinyl chloride
IDW = investigation derived waste
HDPE = high density polyethylene
RW = Raymark Waste
LS = lump sum
HR = hour
EA = each
MSF = thousand square feet

SF = square feet
LF = linear foot
CY = cubic yard
ECY = embankment cubic yard (compacted)
SY = square yard
Actual volumes may vary during implementation based upon the final extent of excavation.
Excavation below the groundwater table may require dewatering and treatment prior to discharge (not included in current cost estimate).