Cover Certification Report

Resources for Responsible Site Management, Inc.,
as Trustee for the Industri-Plex Site Custodial Trust
Tax Map 10-1-6
30 Atlantic Avenue
Woburn, Massachusetts 01801

April 25, 2008

Prepared for:

Industri-Plex Site Remedial Trust
c/o Timothy Cosgrave, Project Coordinator
Harvard Project Services, LLC
249 Ayer Road, Suite 206
Harvard, Massachusetts 01451

Prepared by:

ROUX ASSOCIATES, INC.
67 South Bedford Street, Suite 101W
Burlington, Massachusetts 01803

MERIDIAN LAND SERVICES, INC.
31 Old Nashua Road
Amherst, New Hampshire 03031

SDMS 284840

IPS119401M06.101/R.Rev3

TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 Site Description and History 1
1.2 Scope of the Remedial Action 5
1.3 Report Format 6

2.0 PROJECT PARTICIPANTS 7

3.0 CONSTRUCTION DOCUMENTS 10
3.1 Consent Decree 10
3.2 100% Design Report and Addenda 10
3.3 Remedial Action Work Plan 11
3.4 Health and Safety Plan 13

4.0 REMEDIAL DESIGN/ACTIONS 14
4.1 Soil Remedy 14
4.1.1 Soil Remedy - Consent Decree Requirements 14
4.2 Sediment Remedy 16
4.2.1 Sediment Remedy - Consent Decree Requirements 16
4.3 Air Remedy [Not Applicable To This Property] 16

5.0 SITE CONTROLS AND DOCUMENTATION 17
5.1 Survey Control 17
5.2 Construction Control 17
5.3 Decontamination 20
5.4 Facility Documentation for Off-Site Disposal 20

6.0 SOURCE AND CONFORMANCE TESTING 22
6.1 Soil and Soil Products 22
6.1.1 Compacted Fill 22
6.1.2 Cover Soil 22
6.1.3 Topsoil 23
6.1.4 Subangular Stone 23
6.1.5 Stone Riprap 23
6.1.6 Subbase 24
6.2 Geosynthetics 24
6.2.1 Geotextile 24
6.2.1.1 Materials 24
6.2.1.2 Quality Control Testing 24
6.2.1.3 Quality Assurance Testing 25
6.2.2 Geomembrane 25
6.2.2.1 Material 25
6.2.2.2 Quality Control Testing 25
6.2.2.3 Quality Assurance Testing 25
6.2.3 Geocomposite 26
6.2.3.1 Material 26
6.2.3.2 Quality Control Testing 26
6.2.3.3 Quality Assurance Testing 26

6.2.4 Geogrid 26
6.2.4.1 Material 26
6.2.4.2 Quality Control Testing 27
6.2.4.3 Quality Assurance Testing 27
6.2.5 Interface Friction 27
6.3 Bituminous Materials [Not Applicable To This Property] 27

7.0 REMEDY CONSTRUCTION 28
7.1 Construction Sequence 28
7.1.1 Decommissioning 28
7.1.1.1 Decommissioning Wells 28
7.1.1.2 Decommissioning Utilities and Structures 29
7.1.2 Soil Remedy 29
7.1.2.1 Subgrade and Drainage 29
7.1.2.2 Geosynthetics 30
7.1.2.3 Cover Soil 31
7.1.2.4 Topsoil and Vegetation 32
7.1.3 Sediment Remedy 32
7.1.3.1 Dredging and Subgrade 33
7.1.3.2 Stormwater Structures 33
7.1.3.3 Revegetation 33
7.1.4 Air Remedy [Not Applicable To This Property] 34

8.0 DESIGN CHANGES 35
8.1 Change Management 35
8.2 Site Wide Design Changes 36
8.3 Property-Specific Design Changes 37

9.0 QUALITY ASSURANCE OBSERVATION AND TESTING 39
9.1 Decommissioning 39
9.2 Compacted Fill 40
9.3 Subgrade Preparation 40
9.4 Permeable Cover 40
9.5 Impermeable Liner Installation 40
9.6 Geocomposite Drainage 43
9.7 Geogrid Reinforcing 43
9.8 Manholes and Culverts 43
9.9 Seeding and Wetland Vegetation 44

10.0 RECORD DRAWINGS 45

11.0 CERTIFICATION 46

TABLES

1. ISRT Clean Soil Thresholds
2. Testing Methods for Soils and Geosynthetics
3. Abbreviations

APPENDICES

Appendix A – 100% Final Design Report Specifications

Appendix B – Submittal Log

Appendix C – Modifications

- C.1 Design/Specification Change Requests (DSCRs)
- C.2 Corrective Action Requests (CARs)
- C.3 Variance Requests (VRs)
- C.4 Corrective Request Authorizations (CRAs)

Appendix D – Contractor Controls

- D.1 Air Monitoring
- D.2 Surface Water Monitoring Exceedances

Appendix E – Monitoring Wells and Piezometers Decommissioning

Appendix F – Fill Soil, Aggregate, Riprap, and Topsoil Materials

- F.1 Source Test Results
- F.2 Soil Laboratory Test Results
  - F.2.1 Cover Soil and Granular Subbase Materials
  - F.2.2 Subangular Stone and Riprap Materials
  - F.2.3 Topsoil
- F.3 Soil Moisture Density Tests Summary
  [Not Applicable To This Property]

Appendix G – Bituminous Materials
[Not Applicable To This Property]

Appendix H – Geosynthetic Materials

- H.1 Geotextile
  - H.1.1 Geotextile Inventory Summary
  - H.1.2 Geotextile Quality Control Certificates
  - H.1.3 Geotextile Conformance Tests
- H.2 Geomembrane
  - H.2.1 Geomembrane Inventory Summary
  - H.2.2 Resin Manufacturers Quality Control Certificates
  - H.2.3 Resin & Roll Quality Control Certificates
  - H.2.4 Roll Conformance Tests
- H.3 Geocomposite

H.3.1 Geocomposite Inventory Summary
H.3.2 Geocomposite Quality Control Certificates
H.3.3 Geocomposite Conformance Tests
H.4 Geogrid
H.4.1 Geogrid Inventory Summary
H.4.2 Geogrid Quality Control Certificates
H.4.3 Geogrid Conformance Tests
H.5 Impermeable Cover Installation
H.5.1 GAI and NSC Personnel
H.5.2 Deployment Summary
H.5.3 Fusion Trial Seam Summary
H.5.4 Extrusion Trial Seam Summary
H.5.5 Fusion Seam Summary
H.5.6 Extrusion Seam Summary
H.5.7 Pressure Test Summary
H.5.8 Vacuum Test Summary
H.5.9 Repair Summary
H.5.9.1 Repair Abbreviation Codes
H.5.10 Destructive Test Summary
H.6 Interface Friction Test Summary
Appendix I – Field Monitoring
I.1 Subgrade Inspection Forms
I.2 Geotextile Inspection Forms
I.3 Geocomposite Inspection Summary
I.4 Geogrid Inspection Summary
I.5 Concrete Testing
[Not Applicable To This Property]
I.6 HDPE Pipe Pressure Test Summary
[Not Applicable To This Property]
I.7 East Central Hide Pile Amendment
[Not Applicable To This Property]

Appendix J – Created Wetland Cover System/Final Vegetation Establishment and Soil Stabilization Plan

J.1 Hydraulic Conductivity Testing Summary

[Not Applicable To This Property]

J.2 Coastal Environmental Services, Inc. As-built

J.3 Normandeau Final Vegetation As-built

Appendix K – Thermal Oxidation Unit

[Not Applicable To This Property]

Appendix L – EPA Comments

[Not Applicable To This Property]

ATTACHMENTS

Attachment 1 – Record Drawings C-56 – C-62 – Resources for Responsible Site Management, Inc., as Trustee for the Industri-Plex Site Custodial Trust (Tax Map 10-1-6)

1.0 INTRODUCTION

The Industri-Plex Site Remedial Trust (Remedial Trust) is required by the Consent Decree entered on April 24, 1989 by the United States District Court for the District of Massachusetts in the matter styled United States v. Stauffer Chemical Company et al., Civil Action No. 89-0195-MC, and Commonwealth of Massachusetts v. Stauffer Chemical Company et al., Civil Action No. 89-0196-MC, and recorded at the Middlesex South Registry of Deeds in Book 19837, Page 476 (Consent Decree) to fund and administer the obligations of the Consent Decree. At the request of the Remedial Trust, Roux Associates, Inc. (Roux Associates) has prepared this property-specific Final Cover Certification Report (Cover Certification Report) in compliance with the Consent Decree requirements. This Cover Certification Report documents completion of a portion of the Remedial Action for soil, sediments, and air at the Industri-Plex Superfund Site (Industri-Plex Site), Woburn, Massachusetts. The specific property addressed in this report is owned by Resources for Responsible Site Management, Inc., as Trustee for the Industri-Plex Site Custodial Trust, and located at 30 Atlantic Avenue in Woburn, Massachusetts (Tax Map 10-1-6). Within the report text herein, Resources for Responsible Site Management, Inc., as Trustee for the Industri-Plex Site Custodial Trust, is referred to as RRSM. Construction of the Remedial Action for soil, sediment, and air was completed on June 28, 1996. Changes to the cover at this property may have been made since that date. Approved changes to the cover are documented in the Administrative Record for the Industri-Plex Site.

In accordance with the Consent Decree and the Contract Documents for the Remedial Action, a certification report must be prepared by a registered professional engineer certifying that all remedial activities have been completed in full satisfaction of the requirements of the Consent Decree. As defined by EPA, (Federal Register, July 26, 1982) certification does not constitute a guarantee or warranty, but a “rendering of a professional opinion concerning compliance with a requirement of the regulations by a qualified professional in the field.”

1.1 Site Description and History

The Industri-Plex Site is a 245 (+/-) acre area, located about 10 miles northwest of Boston, Massachusetts in the north part of Woburn, within the Aberjona River Valley. The Site is bounded on the east side by Interstate 93, and Interstate 95/State Route 128 is located about one half mile south of the Site. The Boston Edison Power Company right-of-way No. 9 is the

southwest boundary of the Site. The Massachusetts Bay Transportation Authority (MBTA) railway transects roughly the western third of the Site in a northwest-southeast direction. The Industri-Plex Site was surveyed by SAIC Engineering, Inc. and Liu Aerial Surveys in 1990 and 1991.

Since the mid-1800s, the Industri-Plex Site has been used primarily by companies producing chemicals for textile, leather, and paper. Chemical manufacturing operations occurred at the Site from 1853 to 1931, producing sulfuric acid and related chemicals, arsenic insecticides, acetic acid, dry colors, phenol, benzene, picric acid, toluene and trinitrotoluene (TNT). By 1929, the Merrimac Chemical Company, which occupied the Industri-Plex Site, had become one of the leading producers of insecticides and other chemicals in the United States. The Merrimac Chemical Company plant included 90 buildings on 417 acres, many of which were within the current Industri-Plex Site. Early operations included disposal of wastes in pits or low-lying wetlands. Liquid wastes were discharged into streams and later sewers. As a result, heavy metal wastes from the chemical operations contaminated Site soils and wetland sediments.

From 1934 to 1969, the property was used by several companies to manufacture glues and gelatins from animal hides. Raw, salted or limed hides, hide fleshings, or chrome tanned leather scraps from cattle, hogs, sheep or other animals were used to manufacture glue by extracting a protein called collagen from animal tissues or bones. Animal hide waste products from the rendering process were disposed of in mounds or hide piles on-Site. A developer purchased the plant property in the early 1970s intending to build a complex of industrial buildings (hence Industri-Plex) and began grading operations. During hide pile excavation, noxious gases and odors, attributable to the decomposing hide wastes, were released. The distinctive odor became known as the “Woburn odor.” Complaints from local residents and encroachment on wetland areas stopped further development of the Site.

In 1981, the United States Environmental Protection Agency (EPA) proposed the Industri-Plex Site for the National Priorities List (NPL), also known as Superfund. The Industri-Plex Site was finalized on the NPL in 1983. In May 1982, EPA and the Massachusetts Department of Environmental Quality Engineering [DEQE – currently known as the Massachusetts Department

of Environmental Protection (MassDEP)] entered into a Consent Order with Stauffer Chemical Company to undertake a Remedial Investigation/Feasibility Study (RI/FS). In April 1985, Phase II of the RI/FS was completed. The Remedial Investigation identified arsenic, lead, and chromium in Site soils and wetland sediments as well as impacts to the ground water and odors due to hydrogen sulfide and methyl mercaptans emitted from the hide piles. Abandoned buildings and waste lagoons were also present on the Site. Based on the RI/FS, EPA, along with MassDEP, established a Record of Decision (ROD) in 1986 for the first phase of the cleanup at the Industri-Plex Site (known as Operable Unit 1, OU-1), which included a protective cover over more than 100 acres of soil contaminated with heavy metals and animal wastes, a gas collection and treatment system, institutional controls, an interim groundwater remedy, as well as further investigations of Site-related contamination at and downstream of the Site to support a future second phase (known as Operable Unit 2, OU-2). The location of the protective cover is illustrated in **Attachment 1**, which includes an impermeable cover for the gas collection and treatment system situated at what is known as the East Hide Pile.

Further details of the Industri-Plex Site history can be found in the 1986 Record of Decision.

In a 1989 Consent Decree between EPA, MassDEP and the current and former property owners, two Trusts were established which set in motion the remediation and reuse of the Industri-Plex Site. The Remedial Trust was formed to prepare and implement the remedy according to the ROD. The Industri-Plex Site Custodial Trust (Custodial Trust) was formed to hold, manage, and sell a portion of the Site.

Golder Associates, Inc. (Golder) was selected in 1989 by the Remedial Trust to design the remediation for the Industri-Plex Site. The remedial design included pre-design investigations of the soils, wetlands, air, and groundwater.

The pre-design investigations included sampling analysis and studies to determine the extent of contamination and, in accordance with the Consent Decree, to evaluate cover types. Designs were needed to prepare the ground surface for cover. The remedial design included:

1. Plans for the demolition or decommissioning of abandoned buildings, railroad tracks, underground utilities, a personnel tunnel, and over 120 existing observation wells and piezometers used during the preliminary investigation.

2. Plans for controlling odors, fugitive dusts, and surface water runoff during construction to prevent off-Site impacts.

3. Evaluation of, and considerations for the future stability of, the hide pile slopes.

4. Plans for collecting and treating waste gases in a Thermal Oxidation Unit.

5. Plans for dredging, remediating, and revitalizing streams and wetlands.

The remedial design for contaminated soils and air included both permeable (soil and geotextile) and impermeable (soil and geomembrane) covers. A permeable cover system was designed for 60 acres of upland soils and three hide piles (known as the West, East-Central and South Hide Piles) contaminated with high concentrations of heavy metals and decomposing organic wastes. The permeable cover included a geotextile base to maintain separation between contaminated soils and clean cover material, a clean grading fill, and topsoil with vegetation. An impermeable cover was designed for a fourth hide pile (known as the East Hide Pile) which was approximately four acres in size and an active odor source. The impermeable cover included a high permeability gas collection layer, geomembrane, cover grading fill, topsoil, and vegetation. An active gas collection system was designed to collect gases trapped by the impermeable cover and convey the gases to a Thermal Oxidation Unit for treatment. The permeable cover system for the Site was further divided into two categories: “Engineered Cover”; and “Equivalent Cover”. The Engineered Cover was designed and constructed by the Industri-Plex Site Remedial Trust as part of the response activities at the Site to prevent exposure to contaminated soil, and may be comprised of one or more of the following materials: geotextile, geomembrane, soil, gravel, bituminous concrete and/or asphalt. The Equivalent Cover represents existing structures serving as an adequate permeable cover. Equivalent Cover, although not designed as part of the Engineered Cover, functions to prevent exposure to contaminated soil, and may be comprised of one or more of the following ground covering structures or features, or portions of such structures or features: buildings; foundations; slabs; paved driveways, walkways, parking lots and/or roads; or other such ground covering structures or features. The location of Engineered and Equivalent Covers are illustrated in the Record Drawings.

Site remediation also required capping approximately five acres of contaminated streams and wetland sediment. Approximately seven acres of wetland enhancement, restoration, and creation were designed to compensate for wetland losses. Normandeau Associates, Inc. of Bedford, New Hampshire, was a key designer of the wetland mitigation plans.

A revised final (100%) Design Report was issued on May 8, 1992. Approval for the 100% Design Report was issued by EPA in consultation with the MassDEP on May 18, 1992. A Remedial Action Work Plan for Soil, Sediment and Air Remedy was issued on June 22, 1994, and approved by EPA, in consultation with MassDEP, on July 11, 1994.

1.2 Scope of the Remedial Action

The Remedial Action (RA) implemented the Remedial Design prepared by Golder and distributed for bidding in April 1992. The RA included covering metal-contaminated soils encountered over an approximately 100-acre portion of the 245-acre Site, a portion of which this property represents, as shown on Sheet C-56 of **Attachment 1**. This certification addresses the remedial action performed on the RRSM Property (Tax Map 10-1-6). The remedial action on this property included a designed permeable cover of clean soil overlying a geotextile layer that was placed directly on prepared existing ground, fill soil, and the South Hide Pile. The remedial action also included a designed impermeable cover of clean aggregate overlying geotextile and 60-mil HDPE geomembrane layers that were placed directly on prepared existing ground or fill soil.

Work conducted between 1992 and December 1997 is addressed in this report.

This report includes the following information as it pertains to the remedial action performed on the RRSM Property:

- Relevant portions of the Final 100% Design Report (**Appendix A**);
- The submittal log (**Appendix B**);
- Modifications of specifications and plans (**Appendix C**);
- Results of Site air and surface water monitoring (**Appendix D**);

- Decommissioning of wells, piezometers, gas vents, and unidentified wells ("UIDs") (**Appendix E**);
- Results of soil conformance and in-place material testing during the Remedial Action (**Appendix F**);
- Results of geosynthetics conformance material testing (**Appendix H**);
- Observation and testing associated with the installation of the impermeable cover (**Appendix H**);
- Observations of subgrade preparation, and geosynthetic installation (**Appendix I**);
- Created Wetland Cover System and Final Vegetation Establishment and Soil Stabilization Plans (**Appendix J**);
- Review of lines and grade control.

1.3 Report Format

This property-specific Cover Certification Report was derived from the Master Cover Certification Report documenting the completion of the soil, sediment and air remedies at the Site [excluding MassPort Authority property documented in the April 1998 Regional Transportation Center (RTC) Cover Certification Report]. Other property-specific Cover Certification Reports will be produced for the remaining properties at the Site. This property-specific Cover Certification Report presents a generic description of all work performed to complete the soil, sediment and air remedies, some of which are applicable to this property. For those portions/sections which are not relevant to this property-specific Cover Certification Report, those sections have be identified as "[Not Applicable to This Property]" and left vacant. The Master Cover Certification Report contains property-specific details and record drawings for 31 Tax Map lots at the Site including additional general and Woburn Roads/Right of Way information. Please reference the Master Cover Certification Report for this additional Site-wide information.

2.0 PROJECT PARTICIPANTS

In July of 1989 Golder was retained by the Remedial Trust to prepare the Remedial Design for the Site. The Consent Decree included the Remedial Design/Remedial Action Plan (RDAP). The RDAP required the preparation of Pre-Design Investigations and a Remedial Design. The design was executed in accordance with the requirements of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) as amended and re-authorized. From 1990 to 1992 Golder prepared Preliminary, Intermediate, Pre-Final, and Final Design Reports in conformance with the RDAP.

The Remedial Trust entered into an agreement with Chemical Waste Management, Inc. Remediation Services Group of Princeton, New Jersey, (CWM, also Contractor) to perform the Remedial Action in accordance with the RDAP and the Remedial Design plans and specifications. The name of the Contractor changed January 1, 1993 when CWM was acquired by Rust Remedial Services Inc. (Rust), then again in May of 1995 when OHM acquired Rust. The name Chemical Waste Management was retained as the legal name of the Contractor throughout the period covered by this report.

Several subcontractors assisted the Contractor with specific tasks during the remedial work. A list of the subcontractors and the services they provided is presented below:

Rust Environment and Infrastructure, formerly SEC Donohue Inc., of Burlington, Massachusetts provided engineering support;

Earth Tech Inc. (Earth Tech), formerly HMM Associates Inc., of Concord, Massachusetts provided surveying services from 1992 to 1993 and Meridian Land Services Inc. (Meridian) of Milford, New Hampshire provided surveying services from 1993 to 2001. Both surveying companies collected field documentation that would be used to establish the as-built drawings for this report;

- Eastmont Environmental Inc. of Walpole, Massachusetts conducted perimeter air monitoring;
- Beattie Enterprises of Lancaster, New Hampshire assisted with clearing and grubbing the Site;

- Maher Environmental Services (Maher), formerly D.L. Maher Company, of Reading, Massachusetts decommissioned the wells and piezometers;
- Barbella Environmental Technology Inc. of Whitehouse, New Jersey assisted in the hide pile remediation;
- National Seal Company of Galesburg, Illinois installed the 60-mil high density polyethylene (HDPE) geomembrane;
- Toxikon Laboratories, of Woburn, Massachusetts, and 21st Century Environmental Inc. of Bridgeport, New Jersey, assisted the Contractor with water and soil analytical testing; and,
- Reliable Fence Company of Woburn, Massachusetts installed chain link fence on the Site.

In accordance with the Consent Decree, EPA contracted with Halliburton NUS (HNUS) of Wilmington, Massachusetts to provide technical oversight. Representatives of EPA and the (MassDEP) met with the Remedial Trust monthly (approximately) throughout the Remedial Action to oversee the performance of the work. Minutes of the meetings were recorded but are not included in this report.

Golder provided engineering quality assurance (QA) for the Remedial Action from September 1992 through December 1995. QA included examining and testing materials and procedures to verify and assure the Remedial Trust that the construction conformed to the specifications and drawings. The Remedial Trust directed Golder to perform a geophysical investigation during May 1993. Golder Construction Services Inc. (Golder Construction) provided on-Site construction management services for the Remedial Trust from March 1995 through December 1995.

The Remedial Trust contracted with Professional Service Industries, Inc. (PSI) of Canton, Massachusetts to perform soil moisture/density testing of compacted soils, soil laboratory testing, and asphalt testing. PSI also performed on-Site QA testing from August 1993 through December 1995.

During 1995, the Remedial Trust contracted with *de maximis, inc.* to be the Site manager for the Remedial Trust and to coordinate the work conducted by Golder, CWM, and other contractors. In 1998, the Site manager role was assumed by Maverick Construction Management Services,

Inc. (Maverick). Following remedial construction activities, the Remedial Trust contracted directly with Maverick to coordinate the documentation of as-built cover conditions, to manage construction activities necessary to bring the cover into compliance with the 100% Design and to prepare a Draft Cover Certification Report. In 2007, the Remedial Trust contracted with Roux Associates to complete the certification of the cover, including the completion of the draft and final Cover Certification Report.

3.0 CONSTRUCTION DOCUMENTS

RD/RA Work performed for the Remedial Trust was completed according to the documents, plans, and specifications described in Sections 3.1 through 3.4.

3.1 Consent Decree

The Consent Decree (EPA, 1989) entered into between the Plaintiffs [i.e., EPA and the MassDEP (Agencies)] and the Settlers defined the work that was to be undertaken at the Site. This definition is within the Consent Decree as well as the RDAP. The Consent Decree was based on the Record of Decision (ROD) for the Site (EPA, 1986). While the Consent Decree, the RDAP, and the ROD were consulted for the specific definition of the remedies to be implemented at the Site, the RDAP generalized the remedy and formed the basis for Golder's preparation of the Remedial Design Work Plan and ultimately the Final 100% Design Report. This certification applies to the Consent Decree but the primary component is the RDAP.

3.2 100% Design Report and Addenda

Golder developed the design and specifications and produced the "Final 100% Design Report, Part I" for the Industri-Plex Site (**Appendix A**), which was submitted to EPA and MassDEP in December 1991. This report applied to the remedy for soil, sediments, and air for the Site. Other Consent Decree requirements were deferred in accordance with the Agencies' instructions. The Agencies provided comments on the 100% Design Report, and responses to those comments were submitted April 3, 1992. A revised final 100% Design Report was issued April 3, 1992. The 100% Design was issued for bid April 25, 1992. The 100% Design Report was approved on May 18, 1992.

Subsequent addenda were issued for the 100% Design Report including the following:

Addendum 1 issued May 1992 (EPA/MassDEP Approval March 11, 1993)

Addendum 2 issued June 1992 (EPA/MassDEP Approval March 11, 1993)

Addendum 3 issued May 14, 1993 (EPA/MassDEP Approval May 27, 1993)

Addendum 3 revision 1 August 27, 1993 (EPA/MassDEP Approval September 10, 1993)

Addendum 3 revision 2 October 18, 1993 (EPA/MassDEP Approval November 2, 1993)

On October 1, 1996, EPA approved an alternative permeable cover design for the RTC entitled RTC Alternate Cover Design (Golder, 1996). Details of the construction and certification of the RTC Alternative Cover Design are presented in the RTC Cover Certification Report (Golder, 1998), which was approved by EPA on April 29, 1998. The remedy design for a portion of the RRSM Property (Tax Map 10-1-6) was altered from the 100% Design Report in accordance with the RTC Alternative Cover Design (Golder, 1996) and RTC Cover Certification Report (Golder, 1998). For example, portions of the Atlantic Avenue drainway were covered with a geomembrane to prevent groundwater plume discharge into the stream channel, and the sedimentation structure and detention basin were constructed for controlling surface water drainage from the RTC.

3.3 Remedial Action Work Plan

According to the Consent Decree, the Remedial Action Work Plan (RAWP) was to be submitted to the Agencies within sixty (60) days after EPA and the Commonwealth received notification of the selected Remedial Action Contractor. The RAWP was prepared by the Remedial Action Contractor for the Remedial Trust to implement the Site remedy consistent with the approved design for each Site area. The Consent Decree required that the RAWP contain:

(1) A description of all the activities necessary to implement the Remedial Actions; and,

(2) A timetable for the completion of all these activities, which shall also identify major and minor milestone events in the Remedial Action process. The schedule of significant events shall be consistent with Attachment D, [Project Schedule and Remedial Design/Action Milestones].

On August 18, 1992, prior to EPA's receipt, review, and acceptance of the RAWP, the Remedial Trust requested EPA and MassDEP approval of a preparatory, non-intrusive work plan for work that would begin in September. Submittal of this work plan allowed the Contractor to maximize the construction work season while awaiting final approval of the RAWP. An addendum to the August request was submitted to EPA and MassDEP on October 9, 1992 expanding the earlier request to include debris removal and non-intrusive work and above ground structure demolition. Both the August 18 and October 9 requests were tacitly approved by EPA in consultation with MassDEP. As required, the Remedial Trust submitted a RAWP to EPA on October 5, 1992 (Consent Decree Attachment, Section B, Subsection 3B).

An interim RAWP was submitted to EPA on October 22, 1992 with a request to begin work west of the MBTA railroad tracks. EPA in consultation with MassDEP provided comments on the interim RAWP on November 25, 1992 and a revised interim work plan was submitted to EPA in December 1992. With EPA and MassDEP concurrence, the Remedial Trust authorized the Contractor to begin remediation of the Site on December 2, 1992.

EPA's review of the original RAWP, in consultation with MassDEP, continued through the first half of 1993. EPA, in consultation with MassDEP, provided a conditional approval of the RAWP on March 11, 1993. The Agencies had two main concerns, 1) "the effect of the proposed groundwater treatment changes on the 'Created Wetlands' (CW); and 2) the maintenance of air and stream water quality (ARARs) during the construction of the Remedy." EPA, after consultation with MassDEP, requested the following: 1) a revised CW design with a buffer and separation from the groundwater; and 2) implementation of a program for surface water sampling for contaminants.

Following the Remedial Trust's responses, EPA after consultation with MassDEP, presented an approval of the RAWP on May 19, 1993, contingent upon: 1) sampling of surface water to measure water quality; 2) resolution of water treatment design questions; 3) provision of a copy of the Contractor drilling and blasting plan; and 4) a requirement to cover all frequently used roads with a minimum of 4 inches of crushed stone. On July 2, 1993, EPA, after consultation with MassDEP and the Remedial Trust, reached an agreement on procedures for testing surface water and revisions to the CW.

Erosion and sediment control issues prompted further revisions to the RAWP. On March 1, 1994, a major revision to the RAWP was submitted to EPA. EPA, after consultation with MassDEP, approved the revision on July 11, 1994. Subsequent revisions were submitted and the latest version of the RAWP at the preparation of this report is August 21, 1995.

3.4 Health and Safety Plan

A Health and Safety Plan (HASP), prepared by CWM and dated August 1992, for the remediation of the Site was transmitted to EPA, after consultation with MassDEP, on September 2, 1992. The submission was made in fulfillment of the requirements to the Consent Decree Appendix I, Section F. The Remedial Trust was informed at the March 22, 1993 meeting that EPA, after consultation with MassDEP**,** would not approve the HASP but would provide comments. The HASP was revised on March 16, 1994; December 20, 1994; May 5, 1995; and June 29, 1995 largely to address changes to the Emergency Response Plan. In accordance with the Agencies' policy, the HASP was reviewed but not approved. The latest version of the HASP as of this report is June 29, 1995.

4.0 REMEDIAL DESIGN/ACTIONS

4.1 Soil Remedy

The soil remedy for the Site involved covering on-Site soils containing lead, arsenic, or chromium at or above the action levels established by the Consent Decree with permeable soil cover. An impermeable cover was designed for a four-acre hide pile (East Hide Pile) on Site, which was an active odor source. The RRSM Property (Tax Map 10-1-6), however; does not include the East Hide Pile and therefore required only permeable soil cover.

4.1.1 Soil Remedy - Consent Decree Requirements

The RDAP is included as Appendix I of the Consent Decree. Throughout the RDAP, the remedy for the Site is referred to as the "cap". However, the 100% Design refers to the Site remedy as the "cover". The term "cover" has been retained for the text of this report, excluding the RDAP.

Page 1 of the RDAP states the following:

"The remedial action for soils, sediments, and sludges contaminated with Hazardous Substances, other than those emitting odors (the East Hide Pile), shall include site grading, capping with a permeable soil cover, excavation, dredging, and/or consolidation for all areas containing Hazardous Substances at concentrations above established action levels (arsenic = 300 ppm, lead = 600 ppm, chromium = 1,000 ppm)...."

Furthermore the RDAP states, "Settlers shall design and implement remedial action for soils contaminated with Hazardous Substances above the action level for metals that shall consist of site grading and capping together with Institutional Controls. Areas already covered adequately by buildings, roadways, parking lots, or other ground covering features, would not receive cover material, instead allowing the structures themselves to act as the protective cap.

For small areas on-Site, such as the landscaped areas between buildings and parking lots, Settlers may propose location-specific alternatives to capping consisting of excavation of contaminated soil and consolidation on-site with similarly contaminated soils, or placement of a protective layer such as asphalt to cap the contaminated soils.

Settlers shall design and implement the remedial actions for contaminated soils in accordance with the following requirements:

(1) cap design and construction activities shall be in accordance with regulations and/or guidance on cap design for permeable covers as summarized in [RDAP] Attachment A ... provided that an alternative permeable cap design including a permeable synthetic fabric and a soil layer less than 30 inches in depth, may be used in all areas of the Site where Settlers demonstrate to EPA and the Commonwealth that the alternative cap design will perform as well as or better than the permeable cap design summarized in Attachment A."

Attachment A to the RDAP states that:

"Permeable covers shall be designed and constructed to include at a minimum the following:

A. A vegetated top layer which shall be:

    1. of a minimum thickness of six (6) inches;

    2. capable of supporting vegetation that minimizes erosion and minimizes continued maintenance;

    3. planted with a persistent species with roots that will not penetrate into the contaminated soils;

    4. designed and constructed with a top slope of between 3 percent and 5 percent after settling and subsidence or, if designed and constructed with less than 3 percent, a drainage plan to ensure that the ponding of surface water does not occur or, if designed and constructed with a slope of greater than 5 percent, an expected soil loss of less than 2 tons/acre/year using the USDA universal soil loss equation; and,

    5. designed and constructed with a surface drainage system capable of conducting effective run-off across the cap.

B. A base layer that shall be:

    1. of a minimum thickness of twenty-four (24) inches of appropriate fill material; and,

    2. designed and constructed to prevent clogging."

Two alternative permeable covers were designed as part of the remedy under the Consent Decree. The first alternative permeable cover design concept utilizing a 16-inch thick borrow cover overlaying a geotextile was developed in the Alternative Cover Design Report (Golder, 1989). This design was subsequently approved by the EPA and MassDEP in a letter dated September 11, 1989. The second alternative permeable cover design was the design to accommodate the RTC Alternative Cover (VHB/Golder, 1996). The EPA, in consultation with the MassDEP, approved the RTC Alternate Cover design in a letter dated October 1, 1996. The RTC Alternative Cover was properly constructed and documented in the RTC Cover Certification Report (Golder, 1998), approved by EPA on April 28, 1998.

4.2 Sediment Remedy

4.2.1 Sediment Remedy - Consent Decree Requirements

The Consent Decree (EPA, 1989) briefly explains the work to be performed and establishes the requirements for remediation of sediments presented in the RDAP. Sediments within streams and wetlands where there are "no odor-emitting Hazardous Substances (e.g. hide wastes), Settlers shall dredge the Hazardous Substances or remove them by another method shown to be environmentally protective and approved by EPA in consultation with the Commonwealth."

The RDAP mandates "an in-situ cover for areas with sediments containing Arsenic, Lead, and/or Chromium at or above Consent Decree action levels, and hide residues, stipulating that these capping activities will be consistent with other technical requirements of the RDAP."

The RDAP also requires that excavated sediments be "consolidated in other areas of the Site which contain such Hazardous Substances and which will be covered as part of the approved remedial action".

4.3 Air Remedy [Not Applicable To This Property]

5.0 SITE CONTROLS AND DOCUMENTATION

5.1 Survey Control

The Contractor utilized Meridian and Earth Tech to provide record survey documentation of the extent of cover, configuration of grading and general as-built conditions of the cover and any buried or concealed construction. The results of these record surveys are provided in **Attachment 1** (Sheets C-56 through C-62). The record drawings are based on the survey control provided in the 100% Design Report plans.

5.2 Construction Control

During the RA work, the Contractor was required by the project specifications to provide controls to maintain a safe work environment and protect the public health and safety. Such controls included air monitoring and surface water monitoring (**Appendix D**).

Air Monitoring

The objective of the ambient air monitoring program was to monitor total reduced sulfur (TRS) compounds and total suspended particulate (TSP) and inhalable particulate (PM10) as well as heavy metals (arsenic, lead, and chromium) in TSP at fenceline locations during remediation efforts.

Specification section 01562 - Dust Control of the 100% Design Report required the contractor to employ construction methods and means that would keep airborne particulates below the following action levels:

- PM10 particulates were to be limited to an annual average of less than 150 micrograms per cubic meter (µg/m3) at Site monitoring points; and
- Respirable dust concentrations were limited to 90 µg/m3 at Site monitoring points and 5,000 µg/m3 in the worker's breathing zone.

Data gathered by dust monitoring devices was used to monitor metals in the particulates to ensure that they were below the following threshold limit values (TLVs) outlined in the American Council of Governmental and Industrial Hygienists:

Arsenic	Chromium	Lead
0.02 $\mu g/m^3$ (of air)	1.36 $\mu g/m^3$ (of air)	1.36 $\mu g/m^3$ (of air)

Appendix B to Volume 6 of the 100% Design Report provides a detailed Odor Control Plan which specifies that TRS compounds in air at the perimeter of the Site may not exceed 47 parts per billion (ppb).

Eastmount Environmental Inc. conducted ambient air quality testing, beginning in September 1992. The particulates and heavy metals were sampled at four perimeter monitoring locations. TRS sampling was conducted at seven perimeter monitoring locations. See **Appendix D.1** for a map indicating sample points.

TSP and PM10 Sampling

TSP and PM10 samples were collected using Hi-Volume samplers. Each Hi-Volume sampler was programmed to sample at each of the four sample locations from midnight to midnight on six day intervals. In addition to the four sample locations, a duplicate TSP sampler was stationed at Location 4 and a duplicate PM10 sampler was stationed at Location 2. The duplicate TSP sample was also analyzed for metals (arsenic, chromium, and lead).

Eastmount Environmental prepared Hi-Volume Sampling Summary reports. The Summary of Hi-Volume Results tables from those reports issued for periods during performance of work on the RA are included in **Appendix D.1**. Analytical results showed levels of TSP, PM10, and metals below the action levels.

TRS Sampling

The ambient TRS sampling was conducted using a Photovac 10S Plus portable gas chromatograph capable of measuring odorous sulfur compounds in the low part per billion range. Ambient TRS sampling was conducted twice a week from the beginning of the sampling program up until December 1992. After that, the sampling frequency was reduced to once every six days.

Eastmount Environmental prepared Ambient Air Sampling Summary reports. The Summary of Ambient TRS Results tables from those reports issued for periods during performance of work on the RA are included in **Appendix D.1**. The majority of TRS results were non-detects. Hydrogen sulfide was detected on a few occasions; however, there were no exceedances of the 47 ppb action level.

Surface Water Monitoring

CWM was also required to monitor surface water during remedial activities. According to the Site Surface Water Monitoring Plan (RAWP, Section 5.2), the following Ambient Water Quality Control (AWQC) concentrations were used as the response action levels for the Industri-Plex Site:

- AWQC chronic concentration for arsenic = 0.190 milligrams per liter (mg/L);
- AWQC chronic concentration for chromium = 0.210 mg/L; and
- AWQC acute concentration for lead = 0.082 mg/L.

The above-tabulated AWQC limits correspond to a hardness of 100 parts per million (ppm). Water hardness values on-Site indicated moderately hard to very hard conditions (EPA, 1986). Historical background surface water data collected from surface water drainways periodically contained lead concentrations of 0.025 mg/L. Since these background levels routinely exceeded the threshold value of the AWQC chronic concentration for lead, the AWQC acute concentration was approved on June 8, 1994 as the response action level by MassDEP and EPA.

Surface water sampling was conducted to meet the project specifications and the RAWP requirements. The surface water controls established by EPA and included in the Contractor's RAWP required the following procedures:

- Each work day, field measurements were conducted at various stations (whenever there was flow) for turbidity, dissolved oxygen, temperature, specific conductivity, and pH. The sample from each station with the highest turbidity during the week was submitted for laboratory analyses of total and dissolved arsenic, lead, and chromium, total suspended solids (TSS), and hardness. Any sample with a turbidity greater than or equal to 85 nephelometric turbidity units (NTU) was also submitted for the same laboratory analyses.

- Additional sampling was conducted if a storm and/or a construction event caused the turbidity to rise above 85 NTU at the monitoring stations. The samples were analyzed for total and dissolved metals (arsenic, chromium, and lead), TSS, and hardness. Field measurements for turbidity, dissolved oxygen, temperature, specific conductivity, and pH were conducted at the time of sampling.

HMM conducted surface water quality sampling as a subcontractor to CWM. Test results indicated that the surface water quality remained below the response action thresholds with the exception of exceedances as listed in **Appendix D.2**. Specific reasons and mitigating actions for each exceedance are described in the Quarterly Reports of 1993-1995. Generally, the Agencies were notified and the mitigating actions were performed to the satisfaction of the Agencies.

5.3 Decontamination

CWM was required to decontaminate all equipment that came in contact with contaminated soils, sediments, and sludges during the work. Water used during the pressure washing was collected and treated at the on-Site storage areas. The decontamination was performed in accordance with the specifications and the project work plans. Water generated from decontamination activities was stored in a Modu-tank on the east side (across the MBTA rail lines) of the Site. The water was treated and properly disposed of on-Site as approved by the Agencies.

Personnel entering work areas (exclusion zones) during the RA, wore protective equipment as specified by CWM's Health and Safety Plan (HASP). The HASP also specified personal decontamination procedures. All personnel leaving work areas were required to properly clean or dispose of all protective equipment, small tools and instruments.

5.4 Facility Documentation for Off-Site Disposal

Prior to disposing of any materials off-Site during the RA, EPA was to determine if the proposed facilities were of "acceptable status" and could receive materials from the Site. Only non-hazardous vegetation (cleared/cut above ground surface) was disposed off-Site during the RA. During the work, as previously discussed, wastewater from decontamination activities was stored on the east side of the Site and treated prior to disposal.

All grubbed vegetation (containing soil), and contaminated soil, sediments, and sludges excavated from the Site were consolidated in other areas of the Site in accordance with the

RDAP. All contaminated materials excavated from the Site were placed on the hide piles that were covered as part of the approved RA. However, prior to placement on the hide piles, saturated sediments and sludges were dried over large areas east of the MBTA rail lines on the Site within the remedial cover area.

6.0 SOURCE AND CONFORMANCE TESTING

Testing performed for the Remedial Trust, such as testing of soil and soil products and geosynthetics, is described in Sections 6.1 and 6.2, respectively. The testing methods according to the specifications are summarized in **Table 2** [i.e., Golder's Quality Assurance Procedure Plan (QAPP) Table 1-1]. Abbreviations used in the supporting documentation found in the appendices are summarized in **Table 3**.

6.1 Soil and Soil Products

6.1.1 Compacted Fill

The majority of compacted fill materials were derived from on-Site grubbing and dredging operations. Compacted fills were used as stabilizing fill to flatten hide pile slopes and re-grade low relief areas to promote drainage. A portion of rock and concrete demolition debris generated by crushing and screening operations was also used to a limited degree as compacted fill material. The remaining compacted fill was imported from off-Site borrow areas. Most of the off-Site fill was composed of silty sand from a quarry in Hubbardston, Massachusetts and glacial till from a borrow pit on Deer Island, Boston Harbor, Massachusetts. Compacted fill tests included grain size distribution and primarily Standard Proctor tests with some Modified Proctor tests as needed.

6.1.2 Cover Soil

All cover soil used on-Site was from off-Site sources. Cover soil placed on slopes flatter than 8 horizontal to 1 vertical (8H:1V) was typically a granular silt from a glacial till deposit on Deer Island. Cover soil placed on slopes steeper than 8H:1V and some slopes flatter than 8H:1V was a silty sand from a quarry in Hubbardston. Cover soil tests included grain size distribution, Standard and Modified proctor densities, interface friction, and Atterburg Limits. Results of the testing are provided in **Appendix F**. Analytical testing was performed on Deer Island cover soil materials to verify the levels of potential contaminants. All soil materials tested and placed on-Site met the clean soil thresholds set up by EPA, after consultation with MassDEP, or were otherwise approved by a variance in accordance with EPA in consultation with MassDEP criteria. EPA in consultation with MassDEP clean soil threshold criteria for cover soil used at the Site are summarized in **Table 1**. Analytical test results are provided in **Appendix F.1**.

6.1.3 Topsoil

According to the Consent Decree, topsoil must be capable of supporting vegetation that minimizes both erosion and continued maintenance. Topsoil used for the cover in upland areas and as a wetland vegetative cover soil came from several off-Site sources. Such source locations were from the following Massachusetts towns: Andover, Reading, Salem, and Tewksbury. Other topsoils were sourced from the following New Hampshire towns: Nashua, New Boston, and Manchester. Each source was tested for grain size distributions, organic content, and soil fertility or Baker Soil test. Results of testing are provided in **Appendix F.2.3**. Where the topsoil did not meet some criteria, but would be capable of meeting the Consent Decree requirement for being capable of supporting vegetation, a variance was requested and received from EPA, after consultation with MassDEP.

6.1.4 Subangular Stone

There were several varieties of subangular stone required by the 100% Design Report. Each of the subangular stone materials was a product of off-Site crusher/screener operations from PJ Keating Company of Lunenburg, Massachusetts or Bardon Trimount Inc. of Burlington, Massachusetts. The products required for the RA included American Association of State Highway and Transportation Officials (AASHTO) No. 8, the stone used in the gas collection layer material; AASHTO No. 57, a variety of stone used for bedding and armoring purposes; and both AASHTO 2 and 67, stone materials used in sediment filter construction. Testing of these stone materials consisted of the following: grain size, permeability, and carbonate content. Testing was performed on a per source basis unless the Remedial Trust requested additional testing. Test results are provided in **Appendix F.2.2**.

6.1.5 Stone Riprap

Two average sizes of stone riprap (d50 = 6-inch and d50 = 3-inch by weight) were required by the 100% Design Report. Each of the riprap stone materials was produced at off-Site crusher/screener operations owned by PJ Keating Company of Lunenburg, Massachusetts or Bardon Trimount Inc. of Burlington, Massachusetts. Both types of stone riprap were used as gravel/cobble lining for remediated drainways and hide pile toe drain construction. The 6-inch riprap was also used in permanent erosion control features and as gabion backfill material. Testing of the riprap included a test for abrasion, freeze-thaw susceptibility, and specific gravity.

Gradation tests were also reviewed. Stone riprap materials were tested once per source area unless the Remedial Trust requested additional testing. The stone riprap test results are presented in **Appendix F.2.2**.

6.1.6 Subbase

Road Structural Fill as specified in Section 02223 was used as subbase in the Remedial Action. Tests for the subbase material included gradation and compaction. All subbase materials were supplied by an off-Site quarry. Test results are provided in **Appendix F.2.1**.

6.2 Geosynthetics

6.2.1 Geotextile

6.2.1.1 Materials

Geotextile materials were supplied by the following three manufacturers: Nicolon/Mirafi, Polyfelt Americas Inc., and Synthetic Industries. Nicolon/Mirafi provided 6-ounce (oz), 10-oz, and 16-oz geotextile, Polyfelt Americas Inc. provided 6-oz and 16-oz geotextile and Synthetic Industries provided 16-oz geotextile. All fabrics are permeable, non-woven, needle-punched monofilament and allow percolation. The geotextile was used in the cover to primarily separate the contaminated soil from the clean cover soil (Golder, 1989). The geotextile also precludes upward migration of contaminated material by frost heave effects; provides a drainage capillary break layer at the base of the cover on slopes to prevent sloughing during thaws; and provides further means of reducing the chance of incidental contact through land use.

6.2.1.2 Quality Control Testing

The manufacturers of the geotextile material provided Quality Control certificates for the installed 6-, 10-, and 16-oz materials. Copies of the Quality Control Certificates are presented in **Appendix H.1.2**. As material was delivered to the Site, Golder reviewed the Quality Control Certificates for conformance with the 100% Design through the submittal process.

6.2.1.3 Quality Assurance Testing

Rolls of 6-, 10-, and 16-oz geotextile were tested for conformance to the 100% Design Report specifications. Conformance testing was performed by Golder Construction Service's Geosynthetic Laboratory (Golder Construction's Geosynthetic Laboratory) located in Atlanta, Georgia. Test results are provided in **Appendix H.1.3**. Before individual rolls of geotextile were deployed on-Site, Golder reviewed the test results for conformance with the project specifications.

6.2.2 Geomembrane

6.2.2.1 Material

Rolls of 60-mil HDPE geomembrane liner were supplied by National Seal Company and deployed over the Recharge Basin (i.e. Atlantic Avenue drainway channel).

6.2.2.2 Quality Control Testing

The manufacturer of the geomembrane material provided Quality Control Certificates for each roll of 60-mil HDPE geomembrane liner. These certificates are provided in **Appendix H.2.2**. As submitted by the contractor, Golder reviewed the Quality Control Certificates for conformance with the project specifications before the material was used on-Site. Based on the Quality Control Certificates, the geomembrane liner used was in conformance with the 100% Design Report specifications.

6.2.2.3 Quality Assurance Testing

Rolls of HDPE geomembrane liner were sampled and tested for conformance with the 100% Design Report specifications. The conformance testing frequency exceeded the project specifications requirement of one conformance test for every 100,000 square feet of geomembrane liner delivered to the Site. All of the geomembrane liner conformance test samples passed the minimum project specification requirements. All of the conformance samples were tested by Golder Construction's Geosynthetic Laboratory. These test results are provided in **Appendix H.2.4**.

6.2.3 Geocomposite

6.2.3.1 Material

Rolls of TN3002CN geocomposite, geonet with a factory bonded geotextile on both sides, were supplied by Fluid Systems and delivered to the Site. The geocomposite was used for supplementary drainage in the permeable cover on the South Hide Pile where slopes were 25 percent or steeper.

6.2.3.2 Quality Control Testing

The manufacturer of the geocomposite material provided Quality Control Certificates. Golder initially reviewed the Quality Control Certificates for conformance with the 100% Design Report specifications and determined the material did not meet the project specifications. Consequently, the Contractor provided a letter of evaluation which concluded that the geocomposite was capable of providing drainage per the design. This letter is provided in **Appendix H.3.2**. Golder also evaluated the drainage capability of the material and confirmed the geocomposite would provide the drainage capacity of the design storm. The material was accepted for use.

6.2.3.3 Quality Assurance Testing

Rolls of geocomposite were sampled and tested for conformance with the project specifications; conformance samples were tested by Golder Construction's Geosynthetic Laboratory. Transmissivity tests were performed by TRI/Environmental Inc., Austin, Texas. Test results are provided in **Appendix H.3.3**.

6.2.4 Geogrid

6.2.4.1 Material

Rolls of UX1400 uniaxial geogrid were supplied by Tensor Inc. and delivered to the Site for placement on the South Hide Pile slopes. These geogrid materials were used to reinforce the cover layer only where the slope of the cover was steeper than 33 percent.

6.2.4.2 Quality Control Testing

The manufacturer of the geogrid materials provided Quality Control Certificates. Through submittals, Golder reviewed the Quality Control Certificates for conformance with the 100% Design Report specifications. Copies of the Quality Control Certificates are presented in **Appendix H.4.2**. Based on the Quality Control Certificates, the geogrid used was in conformance with the 100% Design Report specifications.

6.2.4.3 Quality Assurance Testing

Rolls of geogrid were sampled and tested for conformance with the 100% Design Report specifications. All the conformance tests of the geogrid met the minimum 100% Design Report specification requirements and were tested by Golder Construction's Geosynthetic Laboratory. Test results are provided in **Appendix H.4.3**.

6.2.5 Interface Friction

A key design concern for the cover is its internal stability on slopes. The 100% Design Report required testing of the interface friction between the cover soil and the geotextile. Representative tests of cover soil with geotextile or geocomposite materials were required to verify the design friction angle of 26 degrees. The Contractor presented a testing program and provided initial source test results of the interface friction. Through submittals, Golder reviewed the source test results and determined that, based on the Contractor's certification of source representative testing, the cover soil with geotextile or geocomposite met the 100% Design Report specification requirements. Additional testing was performed by Golder on representative samples of cover soil and geotextile or geocomposite materials for interface friction from the South Hide Pile. Conformance testing of interface friction was performed on a 12-inch by 12-inch direct shear apparatus in the Golder testing laboratory in Calgary, Canada. All conformance test results showed the cover soil with geotextile or geocomposite met the 100% Design Report specifications. Test results are provided in **Appendix H.6**.

6.3 Bituminous Materials [Not Applicable To This Property]

7.0 REMEDY CONSTRUCTION

7.1 Construction Sequence

7.1.1 Decommissioning

7.1.1.1 Decommissioning Wells

Various existing wells and piezometers were identified in the 100% Design Report requiring decommissioning or abandonment prior to construction of the cover on the Site. The 100% Design Report identified wells and piezometers to be decommissioned; however, during grubbing operations for the Remedial Action, additional unidentified wells (UID) were located. The Contractor with a subcontractor (Maher) proposed and submitted for review decommissioning methods for each well in accordance with the 100% Design Report specifications. Maher used several drilling rigs during the decommissioning work, including all-terrain vehicles for remote locations, and a Barber dual rotary drill for over drilling wells. A Smeal pump hoist was used to perforate Poly-vinyl chloride (PVC) pipe left in place. All cuttings were retained in water tight roll-offs and later deposited on the west side of the East Central Hide Pile. PVC pipe removed during decommissioning was disposed of off-Site after decontamination. From December 1992 until April 1993, the majority of the wells were decommissioned or abandoned in accordance with the 100% Design Report specifications. All monitoring wells (OW-12, OW-48, and OW-48A) located on the RRSM Property (Tax Map 10-1-6) were decommissioned or abandoned in accordance with the 100% Design Report.

After reviewing the contractor's well decommissioning reports, Roux Associates confirmed that well decommissioning on the Site was substantially compliant with the 100% Design Report and the procedures outlined in Section 4.6 of the January 2001 Standard Reference for Monitoring Wells set forth by MassDEP. Wells were over drilled, pulled, or grouted in place with a grouting mixture of 95% cement and 5% bentonite. Wells were grouted to appropriate depths and plugged with concrete after the time requirement set forth by the standard. Copies of the driller's decommissioning logs are provided in **Appendix E**.

7.1.1.2 Decommissioning Utilities and Structures

The 100% Design Report identified features that required decommissioning or abandonment prior to construction of the cover for the Remedial Action. Other abandoned below grade features that were discovered during construction of the cover were either removed to a depth 2 feet below the placement of the permeable cover or cleaned and backfilled with clean concrete. These features were left in place without any demolition or decommissioning if they did not otherwise impair the long-term effectiveness of the remedy. The general majority of the structure decommissioning occurred during construction of the RTC. A more detailed illustration of this decommissioning can be found in the "Final Report on RTC Cover Certification" dated April 1998 and prepared by Golder.

7.1.2 Soil Remedy

7.1.2.1 Subgrade and Drainage

Existing vegetation was cleared and root matter grubbed to a minimum depth of one foot prior to placement of the permeable cover in areas other than the South Hide Pile. No herbicides were employed to control re-establishment of vegetative growth. Tree roots were grubbed to a depth of two feet. In areas of the hide piles, all existing vegetation was cleared by means of back blading with a dozer, and brush or tree roots were cut to ground surface in order to minimize cutting into the hide pile. Woody material from above ground, roots and other vegetation were chipped and stockpiled for later placement as fill under the permeable cover. Rocks and concrete debris grubbed from the surface were crushed on-Site in order to comply with the fill material specifications. Reinforcing steel was removed from the concrete during the crushing operations and stockpiled for off-Site disposal.

The cover area in the vicinity of bedrock outcrops or exposed concrete structures was grubbed of vegetation and cleaned in accordance with recommendations of the Site Health and Safety Officer and documented by the Contractor. The surrounding soil cover was extended up to the outcrop or structure.

Material excavated on-Site was the primary source of fill to regrade the slopes of the hide pile or regrade flat areas to provide positive drainage. A granular material has less than 12% by weight

passing the #200 sieve. Materials placed to flatten the South Hide Pile were from on-Site sources but were not granular. On-Site soils not meeting the granular criteria were placed as fill in permeable cover areas of the Site flatter than 8H:1V.

Existing subgrade soils were proof rolled prior to placing the cover and fill materials were compacted and tested. The final prepared grade was rolled with a 10-ton smooth wheel compactor or in small areas compacted with a hand operated plate vibratory compactor. Where positive drainage was called for in the 100% Design Report plans, such drainage was achieved in the finish grade of the cover. Throughout construction, erosion and sedimentation measures were generally utilized and maintained in accordance with the 100% Design Report specifications to control soil loss. Any deficiencies in the erosion and sedimentation measures were corrected in accordance with EPA in consultation with MassDEP guidelines.

7.1.2.2 Geosynthetics

After proof rolling, the prepared subgrade was inspected and any protruding debris or roots greater than ½-inch in diameter were manually removed prior to placing geosynthetics. After geosynthetics were placed, filling was performed to reach final elevations.

6-oz and 16-oz per square yard non-woven geotextiles were used in permeable cover (other than on the South Hide Pile) where slopes were less than and more than 25 percent respectively.

A 16-oz per square yard non-woven geotextile was used in the South Hide Pile permeable cover where slopes were less than 25 percent. The TX3002CN geocomposite was used in the South Hide Pile permeable cover where slopes were steeper than 25 percent and the UX1400 geogrid was added over the geocomposite where slopes exceeded 33 percent. The geocomposite drain material extended to an elevation approximately 10 feet above the toe of the hide pile slopes to intercept any seepage from potential groundwater mounding within the hide pile.

A 60-mil HDPE geomembrane and 6-oz per square yard non-woven geotextile were used in the Recharge Basin (i.e. drainage swale) impermeable cover.

The geotextile materials were sewn together using white nylon thread for dark fabric and black thread for white fabric. Geocomposite was joined at the net with nylon cable ties and then sewn or thermal bonded with another piece of geotextile to minimize cover soil infiltration into the net.

The geotextile seam was initially placed with a minimum slack along the seam to protect it and allow for movement in the geotextile during placement of cover soil. This procedure was primarily practiced in the developed areas of the Site with little topographic relief. Subsequent reviews of the procedure and the 100% Design Report concluded the extra slack was unnecessary and the procedure was discontinued for the remainder of the Remedial Action.

The geomembrane was seamed by welding and the seams were subjected to quality control and quality assurance testing as described in Sections 6.2.2.2, 6.2.2.3, and 9.5.

7.1.2.3 Cover Soil

Cover soils placed over the geotextile on slopes greater than 8H:1V were granular materials from off-Site sources that had an inherently low potential to clog the geotextile. For slopes flatter than 8H:1V, the cover soil from off-Site sources could contain more than 12 percent by weight passing the #200 sieve. In all areas where the remediated slope was steeper than 33 percent, a geogrid reinforcement layer was included at the base of the cover soil immediately above the geosynthetic layer. The cover soil was placed in a manner that minimized imposed stresses on the underlying geosynthetics by using low ground pressure earth moving equipment and maintaining a minimum thickness of 12 inches of soil between the rubber tire equipment and the geosynthetic. Cover soil placed in unpaved areas with permeable cover was nominally compacted by the action of the placing equipment only.

Other cover sections used in limited areas or for access roads were comprised of various combinations of cover soil and dense graded aggregate subbase or riprap. Each modified section of cover is designed to be a minimum of 16 inches in accordance with the specifications of the 100% Design Report. The types and locations of these modified sections are included in the record drawing documentation, **Attachment 1**.

Minimum thicknesses of cover soil are detailed in Section 02242 of the 100% Design Report. Generally, the permeable cover consists of 12 inches of select soil fill and 4 inches of topsoil. Generally, the drainage swale impermeable cover consists of 16 inches of riprap. The tolerance, in thickness is -0.0 feet and +0.3 feet. Based upon survey data collected both at the time of construction, as well as post construction data collected, the vast majority of the Site meets the design thickness within the tolerances.

Any isolated areas identified by multiple post construction survey data points to be below the acceptable tolerances, were corrected by the placement of additional cover fill to meet the required thickness. This repair of cover fill was performed during the summer of 1999 by Maverick.

Based on analysis of the relevant survey data points on RRSM Parcel No. 10-1-6, the minimum thickness of cover soil specified in Section 02242 of the 100% Design Report was met at all locations surveyed throughout the subject parcel.

7.1.2.4 Topsoil and Vegetation

Topsoil was placed over the cover soil in 4-, 6-, or 8-inch thicknesses as specified by the 100% Design Report. After placing the top soil, lime and fertilizer were applied to the topsoil by a York rake in larger areas and by a walk-behind drop-spreader for small areas. Seed was broadcast by the hydroseed method in all other areas using fertilizer mulch and seed according to the 100% Design Report, or approved variances.

7.1.3 Sediment Remedy

The main Remedial Actions for the drainage swales consisted of dredging and capping with an impermeable cover. Where dredging and capping was not part of the design, the alternative of culvertization was implemented. Cleaning of existing culverts was also part of the sediment remedy.

7.1.3.1 Dredging and Subgrade

The 400-foot reach of the Atlantic Avenue drainway south of Atlantic Avenue was dredged to a depth of 16 inches or more by a Gradall and dozer. Dredged sediments were segregated to control runoff and dewatered in a dewatering facility as described in the RAWP.

Prior to dredging, the Contractor installed pump-around systems to maintain flow along the drainway. The pump-around system included temporary drains or inflatable rubber bladders placed in existing culverts to block the flow in the drainway. Water upstream of the work was pumped through flexible or solid conduit to a downstream discharge point. Sediment filters composed of granular materials were constructed downstream of the discharge to minimize sediment transport away from the Site in accordance with the 100% Design Report.

Existing culverts connecting drainways were cleaned in accordance with the Contractor's RAWP and certified clean by the Site Health and Safety Officer. Existing culverts cleaned and left in-place included a triple barrel 48-inch culvert beneath Atlantic Avenue.

The remedy design portion for a portion of the RRSM Property (Tax Map 10-1-6) was altered from the 100% Design Report in accordance with the RTC Alternative Cover Design (Golder, 1996) and RTC Cover Certification Report (Golder, 1998). For example, portions of the Atlantic Avenue drainway were covered with a geomembrane to prevent groundwater plume discharge into the stream channel, and the sedimentation structure and detention basin were constructed for controlling surface water drainage from the RTC. Details of the construction and certification of the RTC alternative cover design are located in the RTC Cover Certification Report (Golder, 1998), approved by EPA on April 28, 1998.

7.1.3.2 Stormwater Structures

To supplement the stormwater management of on-Site wetlands and drainways for the sediment remedy, sedimentation and outlet control structures were constructed.

7.1.3.3 Revegetation

The vegetation on the upland soil covers of the Site has been restored to an herbaceous meadow to protect the underlying geotextile from penetration of large, woody roots of trees and shrubs.

Drainways adjacent to upland covers have been revegetated with shallow-rooted overhanging vegetation which will eventually provide cooling shade and organic input in the form of leaves.

Criteria for selecting the revegetation plants and seeds in the 100% Design Report included:

- endemic to Central Massachusetts;
- tolerant of full sun and water levels;
- easily established, with fibrous root systems rather than tap roots; and,
- perennials, or prolific annuals.

7.1.4 Air Remedy [Not Applicable To This Property]

8.0 DESIGN CHANGES

Section 8.0 describes design changes associated with the Alternative Cover Design Report (Golder, 1989), approved by EPA on September 11, 1989, and the RTC Cover Certification Report (VHB/Golder, 1996), approved by EPA on October 1, 1996.

8.1 Change Management

During the Remedial Action from 1992 to 1994 for the Site, changes were managed through the Remedial Trust. At the start of 1995, the Remedial Trust and Contractor agreed to a new scope and cost contract for the remaining remedial work. The Construction Management contractor, Golder Construction, performed change management during 1995 as an agent for the Remedial Trust.

Managing changes for the Remedial Action primarily included changing the agreed upon scope of work or technical details of the 100% Design Report. Requirements identified in the Consent Decree were not changed unless approved by EPA, after consultation with MassDEP. Changes could be initiated from any of the following: EPA or MassDEP, the Contractor, the Remedial Trust, or Golder as the designer, and later, Golder Construction in the role of Construction Managers.

Changes were divided into two categories, design specification changes and administrative, cost, and schedule changes. Design specification changes were usually technical in nature and involved specific changes to the details of the specifications and plans presented in the 100% Design Report. Generally these changes were minor and EPA, after consultation with MassDEP, initially wanted only to review significant changes. Design changes were originally documented as design/specification change requests (DSCR). Impacts to cost and schedule were handled by another system administered by the Remedial Trust.

Early in 1994, the Contractor made several management revisions including a new method for managing changes. The Contractor introduced a change management system that included Variance Requests (VRs), Change Request Authorizations (CRAs), Corrective Action Requests (CARs), and Requests for Information (RFIs), procedures that subsequently were accepted by the Remedial Trust. The DSCR system was phased out by mid 1994 with the introduction of this

change management system. Copies of all the associated forms pertaining to this Cover Certification Report are included in **Appendix C**.

8.2 Site Wide Design Changes

A series of DSCRs and CARs were adopted for Site wide application.

The Site wide design changes listed below were approved by the resident design engineer, project manager, EPA and/or MassDEP. The design changes generally related to grubbing, geotextile selection, geotextile installation, fill materials selection, and fill materials sampling. Several design changes applied to design details that required revision to match the 100% Design Report. The approved design changes included:

- DSCR-001
- DSCR-002
- DSCR-003
- DSCR-023
- DSCR-027
- DSCR-030
- DSCR-056
- DSCR-069

Additional Site wide design changes were identified as requiring further review in order to verify compliance with the 100% Design Specifications. These design changes included:

- CAR-053 involved a request for resampling of Deer Island Stockpile materials due to incorrect initial sampling procedures. The stockpile was resampled on March 30, 1994 and approved by the Agencies on April 28, 1994. The CAR was not signed completely by the design engineer, which appears to be an administrative discrepancy that does not affect the integrity of the cover.

- CAR-071 involved a request for resampling of soil Stockpiles 5 and 6. Hold times for volatiles in the soils were exceeded. The Remedial Trust decided to accept data for Stockpile 5, but requested Stockpile 6 be resampled. Stockpile 6 was resampled on March 30, 1994, and test results were approved by the Agencies on April 28, 1994. The CAR was not signed completely by the design engineer, which appears to be an administrative discrepancy that does not affect the integrity of the cover.

8.3 Property-Specific Design Changes

A series of DSCRs, CARs, VRs, and CRAs were adopted for application on the subject property.

The property-specific design changes listed below were approved by the resident design engineer, project manager, EPA and/or MassDEP. The design changes generally related to materials, materials testing, materials placement, and drainage design. The approved design changes included:

- DSCR-011
- DSCR-012
- DSCR-013
- DSCR-024
- DSCR-032
- DSCR-034
- DSCR-050
- DSCR-053
- DSCR-060
- CAR-001
- VR-008
- VR-009
- VR-034
- VR-056
- VR-064
- VR-067
- VR-076
- VR-077
- VR-079
- VR-086
- VR-089
- VR-090
- CRA-016

Additional property-specific design changes were identified as requiring further review in order to verify compliance with the 100% Design Specifications. These design changes included:

- VR-031 indicates that RUST Remedial Services Inc. requested a variation of DSCR-030-R1 to change the method of placement of riprap over 16-ounce geotextile. The riprap placement was to be performed in accordance with Section 02271-3.01(b) of the 100% Design Report specifications. The Remedial Trust and Design Engineers reviewed this variance request and modified the request, but did not approve it. Their modification required testing of the procedures to be conducted prior to approval of the variance request. Based on Roux Associates' research of available records,

including Design Engineer Field Books and Quality Assurance Documents, no evidence was identified that the required testing was conducted or that this design modification was implemented on the Site. Therefore, the tasks discussed in this variance request do not affect the integrity of the cover.

- VR-080 involved a request to modify the geocomposite/geotextile tie-in detail at the plateau of the South Hide Pile. The VR was signed, indicating approval. However, the corresponding approval box was not checked, which appears to be an administrative discrepancy that does not affect the integrity of the cover.

Additional details and documentation of property-specific design changes are located in **Appendix C**.

9.0 QUALITY ASSURANCE OBSERVATION AND TESTING

Construction documentation includes daily field reports and weekly reports to the Remedial Trust. Inspection field diaries were also prepared, and photographs were taken on a regular basis throughout construction. The Golder reports and diaries are not included in this document, but are available for review at Golder's Manchester, New Hampshire office.

9.1 Decommissioning

Wells and piezometer abandonment operations were conducted under intermittent field observation by Golder as a representative of the Remedial Trust. The well decommissioning observations included:

- Verifying the submitted method and equipment to seal the well;
- Verifying the well depth and depth drilled;
- Verifying the diameter of overdrill;
- Verifying the grout mix and volume used; and
- Verifying the final concrete cap.

A report of well decommissioning for each well on the property (OW-12, OW-48, and OW-48A) was prepared by Maher. The individual decommission logs are presented in **Appendix E**. Roux Associates reviewed the reports for conformance with the decommissioning procedures. Based on the well decommissioning records prepared by Maher, the wells were decommissioned in conformance with the 100% Design Report specifications.

Decommissioning of underground concrete tanks, steel tanks, abandoned pipelines, vaults or pits, concrete slabs, above ground steel tanks, gas pumps, above ground structures, and the features listed on the decommissioning plan, Sheet 11-5 of the 100% Design Report were intermittently observed by Golder as a representative for the Remedial Trust. These features were decommissioned as part of the RTC cover installation and are addressed in the "Final Report on RTC Cover Certification" dated April 1998 by Golder.

9.2 Compacted Fill

Field moisture-density tests were generally performed at least once per 5,000 square feet per lift using a Troxler Model 3440 Nuclear Density gauge. Golder periodically monitored the soil testing operations performed by PSI. Failing tests were retested. During 1993 to 1994 the Contractor performed soil moisture density tests as quality control testing. The QC testing was performed by Express Geotesting, Concord, Massachusetts.

9.3 Subgrade Preparation

Subgrade preparation was inspected by Golder or PSI and the Contractor prior to geotextile deployment. A subgrade inspection form was prepared by Golder, PSI, or the Contractor for areas in which deployment would take place. Subgrade inspection forms are provided in **Appendix I.1**.

9.4 Permeable Cover

Geotextile was deployed over the prepared subgrade and seamed. The seams were inspected by Golder or PSI and the Contractor to verify the connection. A geotextile seam inspection form was prepared by Golder, PSI, or the Contractor. Geotextile seam inspection forms are provided in **Appendix I.2**.

Cover soil was placed as permeable cover over the geotextile in accordance with the 100% Design Report, and was nominally compacted by the placing equipment. No inspection or testing was required according to the 100% Design Report. Surveyors verified the cover thickness prior to placing topsoil or gravel. Topsoil, soil amendments, and seeds were then added, and the seed germinated with rainfall or water applied from water trucks. The quality of vegetative cover was evaluated. Erosion control matting was utilized in areas where seed did not germinate well.

9.5 Impermeable Liner Installation

Material used in construction of the drainage swale impermeable cover consisted of a 60-mil thick HDPE geomembrane liner. The HDPE was manufactured by NSC at NSC's Galesburg, Illinois facility.

The geomembrane liner installer for the project was NSC located in Reno, Nevada.

During deployment of the geomembrane liner panels, the following services were provided by Golder personnel:

- Measurement of the panel thickness;
- Confirmation of panel overlap;
- Visual observation of overall sheet quality; and,
- Assignment of a unique identification number to each panel deployment.

A nominal overlap of 6 inches was maintained between adjoining panels. The average panel thickness was determined by averaging five measurements made along each of the leading edge and trailing edge. A summary of Golder's deployment observations is presented in **Appendix H.5.2.**

Trial seams were made by each welding apparatus at the start of each day, and at least once every five hours while seaming. Sample coupons were cut from each end of the trial seam and tested in the peel and shear test modes using a calibrated tensiometer supplied by NSC.

If a trial seam failed the field testing, the welder and welding apparatus associated with the failing trial seam were not allowed to weld on the geomembrane liner until a passing trial seam had been made in accordance with the 100% Design Report specifications. A summary of the trial seam results is presented in **Appendix H.5.3** and **H.5.4.**

The geomembrane liner panel seaming process proceeded concurrently with the panel deployment. The majority of the seams were made using a dual, hot-wedge fusion welding apparatus. Repairs and some of the butt-seams between panels were made using an extrusion welding apparatus. The seaming operations were observed and documented by Golder personnel. The entire length of all seams, patches, or other repairs were observed and documented either during or shortly after completion. A summary of seaming operations, fusion and extrusion welds, is presented in **Appendix H.5.5** and **H.5.6**.

Samples for destructive testing were obtained from the seams of the 60-mil geomembrane liner system at an average frequency of at least one destructive test sample for each 500 feet of welding for each seaming apparatus. The test locations were selected by Golder personnel based

on either completion of approximately 500 feet of welding or by observations of the welded seams. Destructive samples were tested off-Site by Golder Construction's Geosynthetic Laboratory.

Ten test coupons were cut from each destructive test sample. Five coupons were tested for adhesion (peel test mode) and five coupons were tested for bonded seam strength (shear test mode). In the event that a destructive test sample failed, the path of the welder was traced in both directions from the location of the failed test sample and the seam was re-sampled and retested at intervals that generally ranged from 10 to 20 feet until the failed destructive test was bounded in both directions by passing test samples. The section of seam between the passing test samples were then reconstructed between the test samples.

All nondestructive seam continuity testing was performed by NSC personnel and observed by Golder personnel. Three types of non-destructive testing were used for this project.

- Vacuum box testing on extrusion welds;
- Air pressure testing on dual, hot-wedge fusion welds; and,
- Electric spark testing on extrusion welds used particularly around the vaults.

A vacuum box is a rigid wall box with a clear Plexiglas top and neoprene gasket around the bottom of the box that acts as a seal between the box and the HDPE liner. Vacuum box testing consisted of:

- Applying a soapy water solution to the seam;
- Placing the vacuum box over the seam;
- Applying a vacuum of at least two to four pounds per square inch (psi) to the inside of the box for 10 seconds; and,
- Observing the seam for bubbles, indicating a discontinuity in the seam.

Air pressure testing consisted of:

- Sealing off the air channel between the inside and outside tracks of the fusion weld;
- Inserting a needle with a pressure gauge attached into the air channel;

- Using an air compressor, inflating the air channel to between 25 to 30 psi; and,
- Observing the air pressure gauge over a period of 5 minutes to see if it maintains minimum pressure.

Electric spark testing consisted of:

- Embedding a copper wire in the extruded seam;
- Charging the embedded wire with a high voltage;
- Passing a brass bristled brush from the test unit over the entire seam length; and,
- Observing an audible sound from the unit or a spark at any point of leakage where the current in the wire grounds to the brass brush.

Defects in the geomembrane liner were assigned unique identification numbers and were located and marked in the field by Golder personnel for repair. The defects were repaired and non-destructively tested by NSC in accordance with the 100% Design Report specifications.

9.6 Geocomposite Drainage

Geocomposite provided additional drainage capacity in the permeable cover on the South Hide Pile where slopes were steeper than 25 percent. A geocomposite seam inspection form was prepared by Golder, PSI, or the Contractor for geocomposite seams. Geocomposite forms are provided in **Appendix I.3**.

9.7 Geogrid Reinforcing

Geogrid was deployed for use in the permeable cover for securing the cover soil veneer on the South Hide Pile where slopes were steeper than 33 percent. A geogrid inspection form was prepared by Golder, PSI, or the Contractor for seaming the geogrid together. Geogrid inspection forms are provided in **Appendix I.4**.

9.8 Manholes and Culverts

Pre-cast reinforced concrete culverts, outlet control structures, drain inlets, and trench drains were installed as part of the Remedial Action to redirect surface and stream flows. Golder intermittently observed construction of these concrete features. Alignment and elevation of culverts were verified by survey. Golder inspections of pre-cast concrete structures consisted of:

- Observing the material dimensions and condition;
- Confirming the joint connections; and,
- Confirming joint or void mortaring.

Part of the Remedial Design required cleaning and removing sediments that collected in existing culverts. Culverts to be cleaned were located in the Atlantic Avenue drainway.

9.9 Seeding and Wetland Vegetation

Calculations for soil loss, based on the United States Department of Agriculture (USDA) Soil Loss Equation, verify assumptions of the topsoil type, anticipated rainfall, vegetative cover type, and slope steepness are still valid with a calculated loss of less than 2 tons per acre per year. Erosion control matting was installed as a temporary measure to supplement the vegetated cover when the remaining growing season was too short to establish protective vegetative growth.

10.0 RECORD DRAWINGS

Based on the Survey Control (Section 5.0) established for the Industri-Plex Site, Record Drawings of the as-built conditions were established for the soil, sediment and air remedies constructed at the Site, and certified by a Massachusetts Land Surveyor (Meridian Land Services, Inc.). The Record Drawings for this property at the Site are included in **Attachment 1**.

The Record Drawings include an elaborate survey network and extensive details on the horizontal and vertical locations of the various protective covers installed for the soil, sediment and air remedies. These details may aid in the future monitoring and management of the remedy, and Institutional Controls/Grant of Environmental Restrictions for the Site. The Record Drawings also illustrate the Institutional Controls/Grant of Environmental Restrictions boundaries denoted as Class A, B, C, and D Lands.

Where located in Class C lands, existing concrete structures such as concrete pads, stairways, ramps, and loading docks remained in-place as an equivalent cover. These structures are similar to cover types 4, paved equivalent cover, and 5, building equivalent cover. However, because they were not specifically identified in the 100% Design Report, they have not been identified as a specific equivalent cover type herein.

The Record Drawings have plan views and points charts. The plan view shows grid points and intermediate point locations. The points chart shows elevation data collected at each point shown on the plan view. The plan views include contour lines for subgrade and finish grade. A summary of the separate sections of the Record Drawings is as follows:

- Sheet C-56: Specific Property Location;
- Sheet C-57: Boundary Lines, Land Classifications, Easements and As-Built Drainage;
- Sheet C-58: Record Points, Topography & Limits of Engineer Cover;
- Sheet C-59: Record Points Table;
- Sheet C-60: Cover Types and Transitions;
- Sheet C-61: Detention Basin Liner and Membrane Points; and,
- Sheet C-62: Details and Transitions.

11.0 CERTIFICATION

On behalf of the Remedial Trust, Roux Associates certifies that the Resources for Responsible Site Management, Inc., as Trustee for the Industri-Plex Site Custodial Trust (Tax Map 10-1-6) remedial action was completed in compliance with the approved remedial design and work plans, approved design variances, and the Consent Decree. Any exceptions to the design are noted within this Cover Certification Report. Changes to the cover made following construction completion on June 28, 1996 are not addressed in this report. Approved changes to the cover made since that date are documented in the Administrative Record. The Professional Engineer's certification (below) comprises a declaration of his professional judgment. It does not constitute a warranty or guarantee, expressed or implied, nor does it release any other party of their responsibility to abide by contract documents or applicable codes, standards, regulations, and ordinances.

The Professional Engineer's certification is based upon a review of the remedial action documentation. Roux Associates' certification relies upon the accuracy of the as-built survey and record drawings prepared by Meridian and upon the representations made and information provided by the Remedial Trust and its representatives, contractors and consultants involved with the remedial action effort. These contractors and consultants include CWM, Golder, PSI, and Maverick.

Respectfully Submitted,

ROUX ASSOCIATES, INC.

Glen Gordon, P.E.
Certifying Engineer for Roux Associates, Inc.
MA License No. 41819

COMMONWEALTH OF MASSACHUSETTS
GLEN P. GORDON
ENVIRONMENTAL
No. 41819
REGISTERED
PROFESSIONAL ENGINEER
4-24-08

Lawrence McTiernan, LSP
Project Principal

Table 1
ISRT Clean Soil Thresholds
in milligrams per kilogram (mg/kg)

Adapted from Table 02223-1

The following table is presented as the clean soil guideline for the Industri-Plex (I-Plex) Site. Metals which are naturally rock-forming compounds may vary from the guideline values on a case by case basis.

Tests	Proposed Threshold Levels for Clean Soil Used at I-Plex				
Volatile Organic (TCL)	Non-detectable (3)			EPA Method	8240
Acid/Base Neutrals (TCL)	Non-detectable (3)			EPA Method	3550/8270/8270
Pesticides/PCBs (TCL)	Non-detectable			EPA Method	3550/8080
Metals - Target Analyte List (TAL) (4)					
Aluminum	<	100,000	mg/kg	EPA Method	3050/6010
Antimony	<	10	mg/kg	EPA Method	3050/6010
Arsenic	<	25	mg/kg	EPA Method	3050/7060
Barium	<	500	mg/kg	EPA Method	3050/6010
Beryllium	<	1	mg/kg	EPA Method	3050/6010
Cadmium	<	10	mg/kg	EPA Method	3050/6010
Calcium	<	50,000	mg/kg	EPA Method	3050/6010
Chromium	<	23	mg/kg	EPA Method	3050/6010
Cobalt	<	20	mg/kg	EPA Method	3050/6010
Copper	<	50	mg/kg	EPA Method	3050/6010
Iron	<	70,000	mg/kg	EPA Method	3050/7420
Lead	<	87	mg/kg	EPA Method	3050/6010
Magnesium	<	10,000	mg/kg	EPA Method	3050/6010
Manganese	<	1,000	mg/kg	EPA Method	3050/6010
Mercury	<	1	mg/kg	EPA Method	3050/7470
Nickel	<	100	mg/kg	EPA Method	3050/6010
Potassium	<	10,000	mg/kg	EPA Method	3050/6010
Selenium	<	20	mg/kg	EPA Method	3050/7740
Silver	<	20	mg/kg	EPA Method	3050/6010
Sodium	<	4,000	mg/kg	EPA Method	3050/6010
Thallium	<	5	mg/kg	EPA Method	3050/7840
Vanadium	<	150	mg/kg	EPA Method	3050/6010
Zinc	<	200	mg/kg	EPA Method	3050/6010
Cyanide	<	10	mg/kg	EPA Method	9010
TPH (Total Petroleum Hydrocarbon)	<	200	mg/kg	EPA Method	418.1

Notes:

1) At any time the Trust may revise this list to include testing for additional constituents which may pose a health threat.
2) TCL = Target Compound List
3) Excludes common laboratory contaminants given in the EPA Region 1 Contract Laboratory Program Data Validation Functional Guidelines.
4) TAL Metals by Inductively Coupled Plasma (ICP) and Atomic Absorption (AA) Methods, Test 6010, except run the following constituents by the following methods: (As) 7060, (Pb) 7420, (SE) 7740, (Th) 7840, (Hg) 7470. The 7000's are "furnace and cold vapor AA" methods.

Table 2
Testing Methods for Soil and Geosynthetics
adapted from Golder's QAPP Table 1-1

7.2 TESTING METHODS	STANDARD	PRECONSTRUCTION FREQUENCY	CONSTRUCTION FREQUENCY
BACKFILL & FILL (Specification Section 02223)			
Backfill and fill tests will be performed by Professional Service Industries, Inc.			
Compacted Fill			
Gradation Test	ASTM D422	1/Source	1/5,000 CY
Plasticity Index	ASTM D4318	1/Source	1/5,000 CY
Standard Compaction	ASTM D698	1/Source	1/5,000 CY
Modified Compaction	ASTM D1557	1/Source	1/5,000 CY
Field Moisture/Density	ASTM D2922	Not Required	9/Lift or 1/100 LF
In-Place Methods	ASTM D1556 or D2167	Not Required	1/Day
Sand Bedding			
Gradation Test	ASTM D422	1/Source	1/5,000 CY
Carbonate Content	ASTM D3042	1/Source	Not Required
SUBANGULAR STONE (Specification Section 02233)			
Subangular stone tests will be performed by Professional Service Industries, Inc.			
AASHTO No. 2, 57, 67			
Gradation Test	ASTM D422	1/Source	1/1,000 CY
Carbonate Content	ASTM D3042	1/Source	Not Required
AASHTO No. 8			
Gradation Test	ASTM D422	1/Source	1/1,000 CY
Carbonate Content	ASTM D3042	1/Source	Not Required
Permeability Test	USCO EM1110-2-1906	1/Source	Not Required
IMPERMEABLE & PERMEABLE COVER FILL (Specification Section 02242)			
Impermeable and permeable cover fill test will be performed by Professional Service Industries, Inc. unless designated with **			
Cover Soil (Select Cover Fill)			
Gradation Test	ASTM D422	1/Source	1/2,000 CY
Plasticity Index	ASTM D4318	1/Source	1/5,000 CY
Direct Shear Test**	Section 02242	1/Source	1/2,000 CY
** Test to be performed by Golder Associates Ltd.			
Top Soil			
Gradation Test	ASTM D422	1/Source	1/2,000 CY
pH Test	ASTM D4972	1/Source	Not Required
Baker Soil Fertility Test**	Section 02242	1/Source	1/2,000 CY
** Test to be performed by Land Management Decisions, Inc.			
WETLANDS SEDIMENT REMEDIATION COVER SOILS (Specification Section 02243)			
Wetland sediment cover soil tests will be performed by Professional Service Industries, Inc. unless designated with **			
Wetland Gravel (Road Structural Fill: Section 02223)			
Gradation Test	ASTM D422	1/Source	1/5,000 CY
Wetland Topsoil (Topsoil: Section 02937)			
Gradation Test	ASTM D422	1/Source	1/5,000 CY
pH Test	ASTM D4972	1/Source	1/5,000 CY
Organic Matter Content	Section 02937, Tbl 2	1/Source	1/5,000 CY
Soil Fertility Test**	Section 02937, Tbl 2	1/Source	1/5,000 CY
** Test to be performed by Land Management Decisions, Inc.			
STREAM SEDIMENT REMEDIATION COVER (Specification Section 02244)			
Stream sediment cover tests will be performed by Professional Service Industries, Inc.			
Gravel/Cobble (Section 02271)			
Abrasion Test	ASTM C535	Not Required	Not Required
Freeze Thaw Test	AASHTO T103	Not Required	Not Required
Specific Gravity	ASTM C127	Not Required	Not Required
Gradation Test-Aggregate	ASTM C136	1/Source	Not Required

Table 2
Testing Methods for Soil and Geosynthetics
adapted from Golder's QAPP Table 1-1

7.2 TESTING METHODS	STANDARD	PRECONSTRUCTION FREQUENCY	CONSTRUCTION FREQUENCY
STONE RIPRAP (Specification Section 02271)			
Stone riprap tests will be performed by Professional Service Industries, Inc.			
Gravel/Cobble (d_{50}=3 inches) (Section 02271)			
Abrasion Test	ASTM C535	Not Required	Not Required
Freeze Thaw Test	AASHTO T103	Not Required	Not Required
Specific Gravity	ASTM C127	Not Required	Not Required
Gradation Test-Aggregate	ASTM C136	1/Source	Not Required
Streambed Sediment Filter and Gabion Rock (d_{50}=6 inches)			
Abrasion Test	ASTM C535	Not Required	Not Required
Freeze Thaw Test	AASHTO T103	Not Required	Not Required
Specific Gravity	ASTM C127	Not Required	Not Required
Gradation Test-Aggregate	ASTM C136	1/Source	Not Required
SUBBASE AND PAVEMENT (Specification Section 02575)			
Subbase and Pavement tests will be performed by Professional Service Industries, Inc.			
Graded Aggregate Base Course			
Gradation Test	AASHTO T11 & T27	1/Source	1/5,000 SY or 1 Day
Compacted Density	AASHTO T180 Method D	1/Source	1/5,000 SY or 1 Day
Abrasion Test*	AASHTO T96	1/Source	1/5,000 SY or 1 Day
Freeze Thaw Test*	AASHTO T103	1/Source	1/5,000 SY or 1 Day
(* as required by MDPW specifications)			
Binding and Wearing Asphalt Courses			
Extraction Test (Plant)	AASHTO T168	Not Required	1/500 Tons
Gradation Test (Plant)	AASHTO T11 or T27	Not Required	1/500 Tons
Density/Stability (Plant)	AASHTO T209, T245, T246, T247	Not Required	1/500 Tons
Max. Theoretical Density	ASTM D2041	Not Required	1/500 Tons
Max. Density - Marshall	AASHTO T209 or T245	Not Required	2/500 Tons
In place Density	ASTM D2950	Not Required	1/100 LF
In place Density (Core)	AASHTO T166	Not Required	1Core/500 SY
In place Thickness (Core)	AASHTO T166	Not Required	1 Core/500 SY
In place Smoothness Test	Section 02575	Not Required	1/100 LF
GEOTEXTILE (Specification Section 02595)			
Geotextile tests will be performed by Golder Construction Services, Inc.			
Non-woven, 6, 10, and 16 ounces/square yard			
Mass Per Unit Area	ASTM D5261	1/100,000 SF	Not Required
Grab Strength	ASTM D4632	1/100,000 SF	Not Required
Trapezoidal Tear Strength	ASTM D4533	1/100,000 SF	Not Required
Burst Strength	ASTM D3786	1/100,000 SF	Not Required
Puncture Strength	ASTM D4833	1/100,000 SF	Not Required
Thickness	ASTM D5199	1/100,000 SF	Not Required
Apparent Opening Size	ASTM D4751	1/100,000 SF	Not Required
GEOMEMBRANE (Specification Section 02597)			
Geomembrane tests will be performed by Golder Construction Services, Inc.			
Textured HDPE			
Thickness	ASTM D5199	1/100,000 SF	Not Required
Density	ASTM D1505	1/100,000 SF	Not Required
Minimum Tensile Properties:	ASTM D638	1/100,000 SF	Not Required
Tensile Strength, Yield			
Tensile Strength, Break			
Elongation at Yield			
Elongation at Break			
Tear Resistance	ASTM D1004 Die C	Not Required	Not Required
Low Temperature Brittleness	ASTM D746 Proc. B	Not Required	Not Required
Dimensional Stability	ASTM D1204	1/100,000 SF	Not Required
Environmental Stress Crack	ASTM D1693	Not Required	Not Required
Puncture Resistance	FTMS 101C Method 2065	Not Required	Not Required
Carbon Black Content	ASTM D1603	1/100,000 SF	Not Required
Carbon Black Dispersion	ASTM D3015	1/100,000 SF	Not Required
Shear Test	ASTM D4437 NSF Mod.	Not Required	1/500 LF
Peel Adhesion (Hot Wedge Fusion Weld)	ASTM D4437 NSF Mod.	Not Required	1/500 LF
Peel Adhesion (Fillet Extrusion Weld)	ASTM D4437 NSF Mod.	Not Required	1/500 LF

Table 2
Testing Methods for Soil and Geosynthetics
adapted from Golder's QAPP Table 1-1

7.2 TESTING METHODS	STANDARD	PRECONSTRUCTION FREQUENCY	CONSTRUCTION FREQUENCY
GEOCOMPOSITE (Specification Section 02598)			
Geocomposite tests will be performed by Golder Construction Services, Inc.			
Geocomposite (TEX-NET TN3002CN)			
Geocomposite Transmissivity @ 500 psf; Gradient = 1	ASTM D4716	1/100,000 SF	Not Required
Geocomposite Transmissivity @ 20,000 psf; Gradient = 1	ASTM D4716	1/100,000 SF	Not Required
Tensile Strength - Net only (prior to lamination)	ASTM D5035	Not Required	Not Required
Tensile Strength - Geotextile only (prior to lamination)	ASTM D4632	Not Required	Not Required
Geocomposite Peel Strength	ASTM D413	1/100,000 SF	Not Required
Density - Net only (prior to lamination)	ASTM D1505	Not Required	Not Required
Carbon Black Content - Net only (prior to lamination)	ASTM D1603	Not Required	Not Required
Thickness - Net only (prior to lamination)	ASTM D5199	Not Required	Not Required
Thickness - Geotextile only (prior to lamination)	ASTM D5199	Not Required	Not Required
Geotextile Mass/Unit Area	ASTM D5261	1/100,000 SF	Not Required
Apparent Opening Size - Geotextile only (prior to lamination)	ASTM D4751	Not Required	Not Required
GEOGRID (Specification Section 02599)			
Geocomposite tests will be performed by Golder Construction Services, Inc.			
Geocomposite (TEX-NET TN3002CN)			
Open Area	COE CW 02215-89	1/100,000 SF	Not Required
Thickness:	ASTM D5199	1/100,000 SF	Not Required
Ribs			
Junctions			
Long Term Design Load (MD)	ASTM D5262	Not Required	Not Required
Flexural Rigidity	ASTM D1388	1/100,000 SF	Not Required
Geogrid Rib Tensile Strength	GRI GG1	1/100,000 SF	Not Required
Junction Node Strength	GRI GG2	1/100,000 SF	Not Required
Strength			
Efficiency			
Density	ASTM D1248	1/100,000 SF	Not Required
Carbon Black Content	ASTM D1603	1/100,000 SF	Not Required
WETLAND MITIGATION (Specification Section 02937)			
Wetland sediment cover soil tests will be performed by Professional Service Industries, Inc. unless designated with **			
Wetland Cover Soil			
Gradation Test	ASTM D422	1/Source	1/Acre/Lift
Plasticity Index	ASTM D4318	1/Source	1/Acre/Lift
Standard Compaction	ASTM D698	1/Source	1/Source
Flexible Wall Perm Test **	ASTM D5084	1/Source	1/Acre/Lift
Field Moisture/Density	ASTM D2922	Not Required	1/10,000 SF
** Test will be performed by Golder Associates, Inc.			
CAST IN PLACE CONCRETE (Specification Section 03300)			
Cast in place concrete tests will be performed by Professional Service Industries, Inc.			
Compression Test Cylinders	ASTM C39	Not Required	4/Class/100 CY to
Making of Test Cylinders	ASTM C31	Not Required	4/Class/5,000 SF of
Testing of Aggregate	ASTM C33	Not Required	Conrete Place As

Notes:
QAPP = Quality Assurance Project Plan
ASTM = American Society for Testing and Materials
CY = cubic yard
LF = linear feet
AASHTO = American Association of State Highway and Transportation Officials
Tbl = Table
MDPW = Massachusetts Department of Public Works
SF = square foot
PSF = pounds per square foot

Table 3
Summary of Abbreviations
Property-Specific Cover Certification Reports
Industri-Plex Site

Mapping Location:

@	=	at
AAD	=	Atlantic Avenue Drainway
AL	=	Above Geotextile
AP	=	Above Pipe
BECO	=	Boston Edison Company right of way
BLDG	=	Building
BRD	=	Bradford
BSG	=	Below Subgrade
BTOB	=	Below Top of berm
CO	=	Company
COMM	=	Commerce (Way Extension)
DET	=	Detention Basin
E	=	East
EEOS	=	East End of Seam
ECHP	=	East Central Hide Pile
EXT	=	Extension
HUB	=	Hubbardston
MID	=	Middle
N	=	North
PLYM	=	Plymouth
PRES	=	Presidential (Way Extension)
REV	=	Revere
S	=	South
SEOS	=	South End of Seam
SG	=	Subgrade
STK	=	Stock (yard)
UGT	=	Under Ground Tank
UTIL	=	Utility
W	=	West
w/	=	with
WEOS	=	West End of Seam
WIL	=	Wilmington
WOB	=	Woburn

Cover Materials:

GB	=	Gravel Borrow (Subbase)
LL	=	Liquid Limit
MOIST	=	Optimum Moisture Content
NP	=	Non-Plastic
PCF	=	Pounds per Cubic Foot
PL	=	Plastic Limit
PSI	=	Pounds per Square Inch
PROC	=	Processed
SCRND	=	Screened
SD	=	Sand
SS	=	Site Soil
TRI	=	(Bardon) Trimount

INDUSTRI-PLEX SITE
OU-1 COVER CERTIFICATION REPORT
LOCUS OF TAX MAP LOT 10-1-6 (AKA LOT IC-30)
N/F RESOURCES FOR RESPONSIBLE SITE MANAGEMENT, INC., AS TRUSTEE FOR THE INDUSTRI-PLEX SITE CUSTODIAL TRUST
(SOUTH HIDE PILE & DETENTION BASIN)

RECORD DRAWINGS

WOBURN, MASSACHUSETTS
AUGUST 8, 2000

REFERENCE PLANS:

1. "REGIONAL TRANSPORTATION CENTER– WOBURN, MASSACHUSETTS" ALTERNATE COVER DESIGN– ISSUED FOR EPA/DEP APPROVAL, DATE ISSUED: MAY 16, 1995 LATEST ISSUE: JULY 26, 1996, BY VANASSE HANGEN BRUSTLIN, INC., WATERTOWN, MA

2. "INDUSTRIAL–PLEX SITE – WOBURN, MASSACHUSETTS – 100% DESIGN REPORT, PART I – REMEDIAL WORK FOR SOIL, SEDIMENTS AND AIR– VOLUME 7 OF 8", PREPARED BY GOLDER ASSOCIATES, MT. LAUREL, N.J., APRIL 25, 1992.

3a. "SUBDIVISION PLAN OF LAND IN WOBURN – MASSPORT SURVEY UNIT, SURVEYORS – OCTOBER 21, 1996", SCALE 1"=120', CERT. OF TITLE NO. 211736 BOOK 1188 PAGE 186 RECORDED AS PLAN NO. 7312–1 ON DECEMBER 13, 1999 AT SOUTH REGISTRY DISTRICT OF MIDDLESEX COUNTY.

3b. "ALTA/ACSM – LAND TITLE SURVEY – 112 COMMERCE WAY – WOBURN, MA. – PREPARED FOR NATIONAL DEVELOPMENT – 2310 WASHINGTON STREET – NEWTON LOWER FALLS, MA. 02462", SCALE: 1"=40' DATED MAY 1, 2006 BY ALLEN & MAJOR ASSOCIATES, INC.

3c. "PLAN OF LAND IN WOBURN, MA.", SCALE: 1"=100', DATED MARCH 2, 1977 BY DANA F. PERKINS & SONS, INC. (RECORDED IN MSRD AS PLAN NO. 301 OF 1977).

4. "INDEX PLAN OF – LAND COURT SUBDIVISION – IN – WOBURN, MA" PREPARED FOR THE NORTHEAST REGIONAL TRANSPORTATION CENTER BY MASSACHUSETTS PORT AUTHORITY, DATED OCTOBER 21, 1996, SHEETS 1–6. LCC 7312.

SURVEY CONTROL NETWORK POINTS

POINT #	NORTHING (FEET)	EASTING (FEET)	ELEVATION (FEET)	DESC.
8	555829.94	696197.41	88.93	PIN/C(s)
9	554787.93	695334.79	93.29	MAGNL(s)
117	554935.71	696605.05	119.44	LPIN(f)
118	554997.69	696744.31	124.49	LPIN(f)
119	554977.42	696743.93	125.72	LPIN(f)
120	556005.46	696613.05	95.27	C.B.(f)
128	555312.88	696740.29	115.51	LPIN(f)
129	555279.16	696890.59	117.47	LPIN(f)
130	555370.20	696889.50	118.61	C.B.(f)
132	554847.71	694915.95	78.43	LPIN(f)
133	555058.90	695126.18	96.01	P.K.(f)
134	555102.46	695256.34	96.55	LPIN(f)
135	555142.01	695222.63	90.28	P.K.(f)
157	555902.41	696284.78	90.59	C.B.(f)
216	553575.07	697396.19	72.34	DISK
218	554038.23	696400.64	91.30	LPIN(s)
219	554833.75	696498.97	113.51	DISK
220	554921.67	696584.06	73.06	D.H.(f)
221	554863.96	695486.38	98.35	P.K.(f)
245	553801.79	695102.81	70.74	PIN/C(s)
301	552991.99	695650.71	67.70	G.B.(f)
302	552983.08	695726.35	68.00	G.B.(f)
303	552824.40	695720.82	66.92	G.B.(f)
751	550314.48	698866.23	58.42	G.B.(f)
752	550363.63	698811.51	57.52	G.B.(f)
754	550089.43	697819.49	53.51	G.B.(f)
755	550155.77	697925.27	54.70	G.B.(f)
756	550192.19	698080.56	56.08	PIN/C(f)
828	552989.66	695204.98	72.68	RR/PK(S)
831	555171.27	696067.95	92.16	PIN/C(s)
832	555602.29	695870.66	86.06	P.K.(s)
833	555464.48	695350.57	78.24	PIN/C(s)
834	555080.77	695290.39	96.82	PIN/C(s)
850	553166.01	695458.74	66.79	P.K.(f)
857	554268.42	694914.00	73.19	PIN/C(S)
858	553407.27	694721.18	73.66	P.K.(S)
871	553005.63	694889.59	75.27	P.K.(s)
872	553190.49	694871.47	74.38	P.K.(s)
873	553293.14	694886.21	73.74	PIN/C(s)
874	553152.45	695225.83	72.96	P.K.(s)
887	553569.05	697762.19	74.67	G.B.(s)
888	553762.69	698208.18	75.46	G.B.(F)
889	553895.58	698391.10	74.41	PIN/C(s)
890	553542.21	698649.64	72.97	G.B.(S)
891	552879.28	699142.48	69.34	PIN/C(s)
892	552674.56	699013.57	68.58	G.B.(S)
893	552536.04	698702.70	69.67	G.B.(S)
894	553002.10	698412.19	69.40	MAGNL(s)
895	552730.89	697787.70	67.50	MAGNL(s)
919	554648.09	696120.30	106.02	PIN/C(s)
920	553826.01	695995.76	79.40	PIN/C(s)
921	553411.21	696193.36	78.92	PIN/C(s)
922	552932.88	696420.08	71.72	DISK
923	553120.20	696816.46	72.78	DISK
924	553462.61	697331.77	68.39	DISK
925	553842.55	697009.22	94.88	PIN/C(s)
926	554203.87	697060.28	79.00	DISK
927	553812.75	696737.39	107.69	PIN/C(s)
928	552561.74	696815.28	88.15	PIN/C(s)
929	552790.55	697119.09	71.75	PIN/C(s)
930	553018.55	697429.53	68.02	DISK
931	554521.49	694626.27	87.39	D.H.(f)
932	554421.26	694348.31	101.39	G.B.(f)
933	554251.87	694364.55	90.95	PIN/C(s)
934	553498.56	694623.81	69.94	PIN/C(s)
935	553378.01	694317.96	72.10	PIN/C(s)
936	553290.51	694245.09	81.03	PIN/C(s)
937	553114.85	694221.58	97.94	PIN/C(s)
938	552836.93	694953.72	80.60	DISK
944	550614.66	697637.80	N/A	G.B.(F)
945	554503.77	694825.96	74.68	P.K.(f)
947	552692.72	695376.15	65.92	DISK
948	552343.09	695555.77	63.57	G.B.(s)
949	552438.47	696030.92	71.73	DISK
950	552035.73	696313.53	68.40	G.B.(s)
951	551631.65	697151.14	65.87	DISK
952	551433.89	697800.32	73.68	DISK
953	551087.91	698466.50	63.64	DISK
954	550919.29	698709.73	60.45	DISK
955	551532.44	698410.23	63.71	DISK
956	551861.31	698260.16	65.21	DISK
957	552364.26	698003.18	67.73	G.B.(F)
960	554579.37	695677.56	96.32	G.B.(s)
961	554434.15	695071.84	85.91	G.B.(s)
962	553960.20	695295.87	79.76	G.B.(s)
963	553612.09	695462.70	78.81	DISK
964	553810.04	696003.71	79.67	G.B.(s)
965	553424.46	696186.34	79.67	G.B.(s)
966	553373.67	695576.30	77.68	DISK
967	553108.66	695695.24	76.92	DISK
968	552790.10	695766.11	73.69	DISK
971	554878.15	696698.61	129.11	PIN/C(s)
972	555073.02	696822.69	125.79	PIN/C(s)
973	555324.98	697186.40	117.15	PIN/C(s)
974	555328.29	697548.91	96.63	G.B.(f)
975	555468.38	697809.50	92.45	DISK
976	555640.49	697867.72	72.09	G.B.(s)
977	555411.42	697997.77	85.47	PIN/C(s)
978	555238.37	697940.64	70.49	G.B.(S)
979	555115.28	698015.18	87.78	PIN/C(s)
980	554928.03	698008.18	80.93	PIN/C(s)
981	554828.02	697781.52	67.51	G.B.(S)
982	554608.27	697651.96	76.95	DISK
983	554337.91	697697.91	77.28	MAGNL(s)
984	554073.15	697638.96	76.58	PIN/C(s)
985	554090.37	697850.88	75.15	PIN/C(s)

SURVEY CONTROL NETWORK POINTS

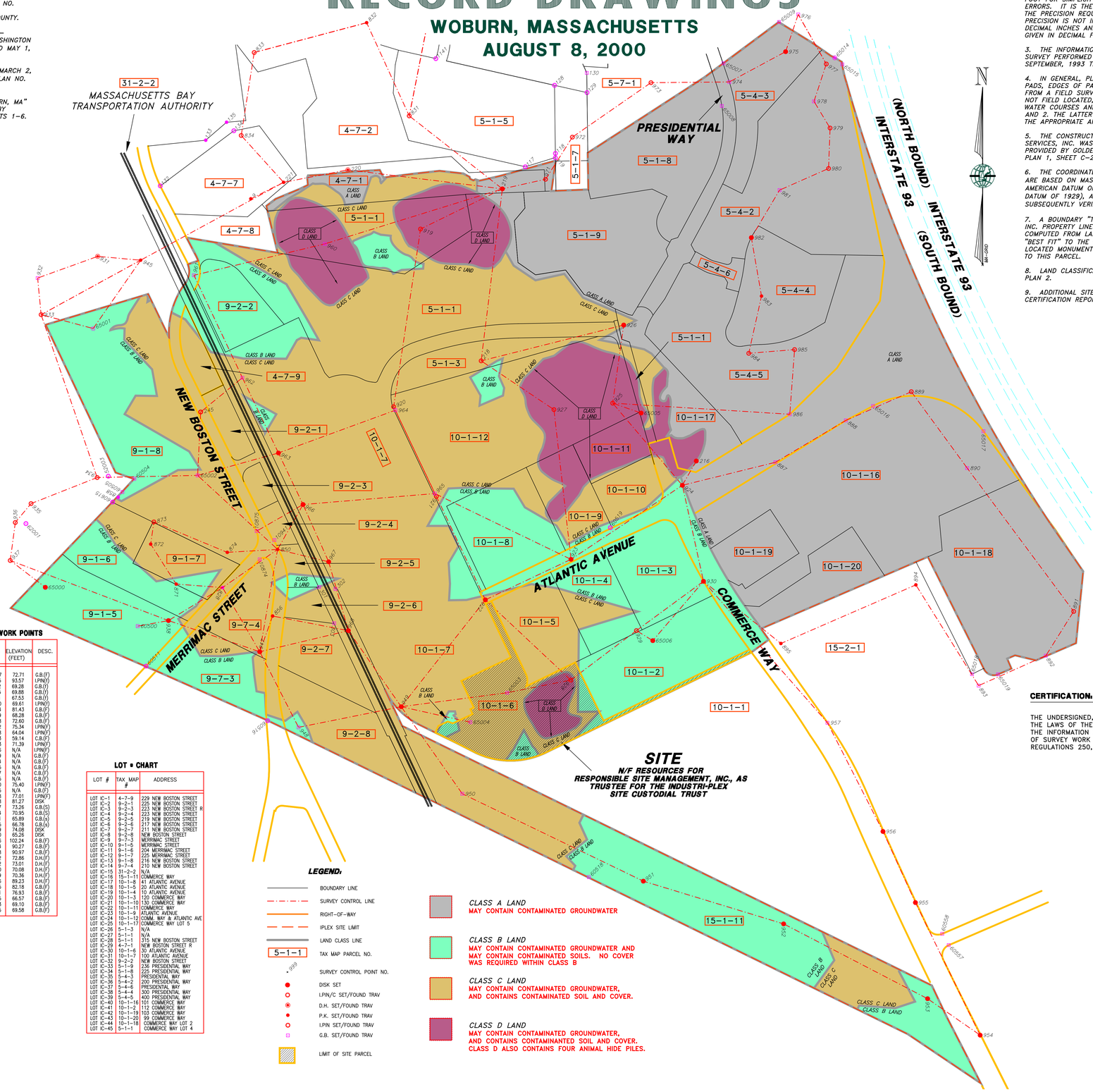
POINT #	NORTHING (FEET)	EASTING (FEET)	ELEVATION (FEET)	DESC.
986	553791.19	697828.87	72.71	G.B.(F)
1141	555436.21	696190.95	93.57	LPIN(f)
10874	553119.80	695375.82	69.28	G.B.(f)
10875	553250.96	695361.95	69.88	G.B.(f)
10941	553209.59	695443.61	67.53	G.B.(f)
52003	553504.76	694675.40	69.61	LPIN(f)
60500	552811.04	694811.44	81.43	G.B.(F)
60504	553493.08	694795.99	68.28	G.B.(F)
60506	553431.74	694740.48	72.60	G.B.(F)
60511	552626.22	694850.12	75.34	LPIN(F)
60516	552373.95	695412.38	64.04	LPIN(F)
60518	551650.24	696899.13	59.14	C.B.(F)
60519	553266.67	696998.63	71.39	LPIN(F)
60545	550535.42	698962.56	N/A	LPIN(F)
60549	550646.41	699172.79	N/A	G.B.(F)
60551	550588.82	697583.34	N/A	G.B.(F)
60552	550611.64	697561.55	N/A	G.B.(F)
60557	551335.71	698564.07	N/A	C.B.(F)
60558	551388.23	698534.25	N/A	G.B.(F)
60615	553385.09	694695.50	75.40	LPIN(F)
60950	550705.00	699289.45	N/A	G.B.(F)
62001	553285.48	694294.18	77.01	LPIN(F)
65000	552990.73	694384.08	81.27	DISK
65001	554187.89	694605.57	73.26	G.B.(S)
65002	553508.43	695088.74	70.95	G.B.(S)
65003	552503.26	696521.21	65.89	G.B.(s)
65004	552366.69	696350.85	66.78	G.B.(s)
65005	553796.88	697140.89	74.08	DISK
65006	552744.10	697194.90	65.26	DISK
65007	555414.66	697522.06	102.24	G.B.(F)
65008	555217.20	697514.54	90.27	G.B.(F)
65009	555605.36	697779.98	90.97	G.B.(F)
65010	555803.93	697977.42	72.86	D.H.(F)
65011	555708.75	697858.52	73.01	D.H.(F)
65012	555702.94	697888.20	70.08	D.H.(F)
65013	555745.19	697945.39	70.36	D.H.(F)
65014	555440.08	698036.86	89.23	D.H.(F)
65015	555409.32	698071.85	82.18	G.B.(F)
65016	553829.73	698214.01	76.83	G.B.(F)
65017	553712.31	698725.05	66.57	G.B.(F)
65018	552588.82	698672.03	69.10	G.B.(F)
65019	552588.11	698792.15	69.58	G.B.(F)

LOT • CHART

LOT #	TAX MAP #	ADDRESS
LOT IC–1	4–7–9	229 NEW BOSTON STREET
LOT IC–2	9–2–1	225 NEW BOSTON STREET
LOT IC–3	9–2–3	223 NEW BOSTON STREET R
LOT IC–4	9–2–4	223 NEW BOSTON STREET
LOT IC–5	9–2–5	219 NEW BOSTON STREET
LOT IC–6	9–2–6	217 NEW BOSTON STREET
LOT IC–7	9–2–7	211 NEW BOSTON STREET
LOT IC–8	9–2–8	NEW BOSTON STREET
LOT IC–9	9–7–3	MERRIMAC STREET
LOT IC–10	9–1–5	MERRIMAC STREET
LOT IC–11	9–1–6	204 MERRIMAC STREET
LOT IC–12	9–1–7	225 MERRIMAC STREET
LOT IC–13	9–1–8	216 NEW BOSTON STREET
LOT IC–14	9–7–4	210 NEW BOSTON STREET
LOT IC–15	31–2–2	N/A
LOT IC–16	15–1–11	COMMERCE WAY
LOT IC–17	10–1–8	41 ATLANTIC AVENUE
LOT IC–18	10–1–5	20 ATLANTIC AVENUE
LOT IC–19	10–1–4	10 ATLANTIC AVENUE
LOT IC–20	10–1–3	120 COMMERCE WAY
LOT IC–21	10–1–10	130 COMMERCE WAY
LOT IC–22	10–1–11	COMMERCE WAY
LOT IC–23	10–1–9	ATLANTIC AVENUE
LOT IC–24	10–1–12	COMM. WAY & ATLANTIC AVE
LOT IC–25	10–1–17	COMMERCE WAY LOT 5
LOT IC–26	5–1–3	N/A
LOT IC–27	5–1–1	N/A
LOT IC–28	5–1–1	315 NEW BOSTON STREET
LOT IC–29	4–7–1	NEW BOSTON STREET R
LOT IC–30	10–1–6	30 ATLANTIC AVENUE
LOT IC–31	10–1–7	100 ATLANTIC AVENUE
LOT IC–32	9–2–2	NEW BOSTON STREET
LOT IC–33	5–1–9	236 PRESIDENTIAL WAY
LOT IC–34	5–1–8	225 PRESIDENTIAL WAY
LOT IC–35	5–4–3	PRESIDENTIAL WAY
LOT IC–36	5–4–2	200 PRESIDENTIAL WAY
LOT IC–37	5–4–6	PRESIDENTIAL WAY
LOT IC–38	5–4–4	300 PRESIDENTIAL WAY
LOT IC–39	5–4–5	400 PRESIDENTIAL WAY
LOT IC–40	10–1–16	101 COMMERCE WAY
LOT IC–41	10–1–2	112 COMMERCE WAY
LOT IC–42	10–1–19	103 COMMERCE WAY
LOT IC–43	10–1–20	99 COMMERCE WAY
LOT IC–44	10–1–18	COMMERCE WAY LOT 2
LOT IC–45	5–1–1	COMMERCE WAY LOT 4

RESTRICTED AREAS BY CLASSES OF LAND

CLASS OF LAND	DESCRIPTION
A	MAY CONTAIN CONTAMINATED GROUNDWATER
B	MAY CONTAIN CONTAMINATED GROUNDWATER, AND MAY CONTAIN CONTAMINATED SOILS. NO COVER WAS REQUIRED WITHIN CLASS B.
C	MAY CONTAIN CONTAMINATED GROUNDWATER, AND CONTAINS CONTAMINATED SOIL AND COVER.
D	MAY CONTAIN CONTAMINATED GROUNDWATER, AND CONTAINS CONTAMINATED SOIL AND COVER. CLASS D ALSO CONTAINS FOUR ANIMAL HIDE PILES.



LEGEND:

- BOUNDARY LINE
- SURVEY CONTROL LINE
- RIGHT–OF–WAY
- IPLEX SITE LIMIT
- LAND CLASS LINE
- 5–1–1 TAX MAP PARCEL NO.
- 999 SURVEY CONTROL POINT NO.
- DISK SET
- I.PIN/C SET/FOUND TRAV
- D.H. SET/FOUND TRAV
- P.K. SET/FOUND TRAV
- I.PIN SET/FOUND TRAV
- G.B. SET/FOUND TRAV
- LIMIT OF SITE PARCEL

CLASS A LAND
MAY CONTAIN CONTAMINATED GROUNDWATER

CLASS B LAND
MAY CONTAIN CONTAMINATED GROUNDWATER AND MAY CONTAIN CONTAMINATED SOILS. NO COVER WAS REQUIRED WITHIN CLASS B

CLASS C LAND
MAY CONTAIN CONTAMINATED GROUNDWATER, AND CONTAINS CONTAMINATED SOIL AND COVER.

CLASS D LAND
MAY CONTAIN CONTAMINATED GROUNDWATER, AND CONTAINS CONTAMINANTED SOIL AND COVER. CLASS D ALSO CONTAINS FOUR ANIMAL HIDE PILES.

NOTES:

1. THE OWNER OF RECORD FOR LOT IC–30 IS IS RESOURCES FOR RESPONSIBLE SITE MANAGEMENT, INC., AS TRUSTEE FOR THE INDUSTRI–PLEX SITE CUSTODIAL TRUST – P.O. BOX 487, CHESTNUT HILL, MA. 02467. DEED REFERENCE TO PARCEL IS TRANSFER CERTIFICATE #209596 BOOK 1177 PAGE 46, DATED AUGUST 1, 1997 (REGISTERED LAND) AND BOOK 27665 PAGE 602 DATED AUGUST 1, 1997 (RECORDED LAND). FILED IN THE LAND REGISTRATION OFFICE OF THE SOUTH REGISTRY DISTRICT OF MIDDLESEX COUNTY.

2. ELEVATION RECORDS TABULATED ON THESE DRAWINGS WERE COMPILED FROM FIELD OBSERVATIONS COLLECTED BY ELECTRONIC TOTAL STATION AND DATA COLLECTION TECHNIQUES. ELEVATIONS ARE SHOWN TO ONE HUNDREDTH OF A FOOT FOR SIMPLICITY OF TABULATION AND TO REDUCE COMPOUNDING ROUNDING ERRORS. IT IS THE INTENTION OF THE SURVEY TO REFLECT ELEVATIONS ONLY TO THE PRECISION REQUIRED BY THE PROJECT SPECIFICATIONS. ADDITIONAL PRECISION IS NOT IMPLIED BY THE TABULATION. COVER DEPTHS ARE GIVEN IN DECIMAL INCHES AND CALCULATED BY MULTIPLYING THE ELEVATION DIFFERENCES GIVEN IN DECIMAL FEET BY 12.

3. THE INFORMATION CONTAINED HEREIN IS THE RESULT OF AN ON–SITE FIELD SURVEY PERFORMED BY MERIDIAN LAND SERVICES, INC. DURING THE PERIOD OF SEPTEMBER, 1993 THROUGH JANUARY, 2000.

4. IN GENERAL, PLAN GRAPHICS SUCH AS BUILDINGS, WALKWAYS, CONCRETE PADS, EDGES OF PAVEMENT, CURBING, DRAINAGE FEATURES, ETC. WERE LOCATED FROM A FIELD SURVEY BY THIS OFFICE. ADDITIONAL GRAPHIC REPRESENTATIONS, NOT FIELD LOCATED, SUCH AS NON–GERMANE EDGES OF PAVEMENT, FENCE LINES, WATER COURSES AND ABUTTING DETAIL WERE TAKEN FROM REFERENCE PLANS 1 AND 2. THE LATTER MENTIONED DETAIL WILL BE REFERENCED ON THE PLAN WITHIN THE APPROPRIATE AREAS.

5. THE CONSTRUCTION SURVEY CONTROL NETWORK USED BY MERIDIAN LAND SERVICES, INC. WAS DERIVED ENTIRELY FROM THE EXISTING SITE CONTROL POINTS PROVIDED BY GOLDER ASSOCIATES AND VHB, INC., AS SHOWN ON REFERENCE PLAN 1, SHEET C–2 AND REFERENCE PLAN 2, SHEETS 11–1A THRU 11–1D.

6. THE COORDINATES AND ELEVATIONS OF THE EXISTING SITE CONTROL POINTS ARE BASED ON MASSACHUSETTS GRID COORDINATE SYSTEM/NAD–27 (NORTH AMERICAN DATUM OF 1927) AND NGVD–29 (THE NATIONAL GEODETIC VERTICAL DATUM OF 1929), AS STATED IN THE REFERENCE PLAN 2 NOTE 3 & SUBSEQUENTLY VERIFIED BY THIS OFFICE VIA GPS (GLOBAL POSITIONING) IN 2001.

7. A BOUNDARY "TIE IN" SURVEY WAS PERFORMED BY MERIDIAN LAND SERVICES, INC. PROPERTY LINES SHOWN HEREON WERE COMPILED AND MATHEMATICALLY COMPUTED FROM LAND COURT CASE NUMBER 7312. THESE COMPUTED PLANS WERE "BEST FIT" TO THE PROJECT COORDINATE SYSTEM USING NUMEROUS FIELD LOCATED MONUMENTS. SEE REFERENCE PLAN #3 FOR BOUNDARY LINES PERTAINING TO THIS PARCEL.

8. LAND CLASSIFICATION LINES SHOWN HEREON WERE TAKEN FROM REFERENCE PLAN 2.

9. ADDITIONAL SITE–WIDE INFORMATION CAN BE FOUND IN THE MASTER COVER CERTIFICATION REPORT, INCLUDING, MASTER RECORD DRAWINGS.

CERTIFICATION:

THE UNDERSIGNED, A DULY REGISTERED PROFESSIONAL LAND SURVEYOR UNDER THE LAWS OF THE COMMONWEALTH OF MASSACHUSETTS, HEREBY CERTIFIES THAT THE INFORMATION ON THESE RECORD PLANS CONTAINED HEREIN IS THE RESULT OF SURVEY WORK PERFORMED IN CONFORMANCE WITH THE CODE OF MASSACHUSETTS REGULATIONS 250, SECTION 6.03.

FINAL

PROFESSIONAL LAND SURVEYOR DATE

GRAPHIC SCALE
200' 100' 0 200' 400' 600'

REV.	DATE	DESCRIPTION	DR	CK
I	4/24/08	FINAL SUBMISSION	TC DBH	MDP
H	2/28/08	EPA & DEP COMMENTS OF 2/8/08	TC DBH	MDP
G	9/26/07	EPA & DEP COMMENTS OF 8/29/07	JF CAC	MDP
F	5/15/07	EPA & DEP COMMENTS OF 8/3/06	JF CAC	MDP
E	9/21/05	EPA & DEP COMMENTS OF 7/12/04	KL MDP	JGK
D	6/11/04	EPA & DEP COMMENTS OF 10/30/03	JF MDP	JGK
C	8/16/03	DEP REVISIONS	JF MDP	JGK
B	8/21/00	EPA REVISIONS	MDP	JGK
A	8/8/00	ISSUE FOR REVIEW	MDP	JGK

FINAL

PROFESSIONAL LAND SURVEYOR

PROFESSIONAL ENGINEER

PREPARED FOR: ROUX ASSOCIATES, INC. Environmental Consulting & Management

PREPARED BY: MERIDIAN Land Services, Inc. 400 Commercial Street, Manchester, NH 03101 • 603-668-0880 • FAX 603-668-1199 • www.meridianlandservices.com • info@meridianlandservices.com ENGINEERS • LAND SURVEYORS • ECORISTS • LAND PLANNERS

Golder Associates Manchester, New Hampshire 400 Commercial Street Manchester, NH, USA 03101 603-668-0880 • FAX 603-668-1199

DESIGNED BY:

PROJECT RECORD (TAX MAP LOTS 10-1-6)

N/F R.R.S.M. SOUTH HIDE PILE & DET. BASIN

INDUSTRI-PLEX SITE REMEDIAL TRUST
WOBURN, MASSACHUSETTS

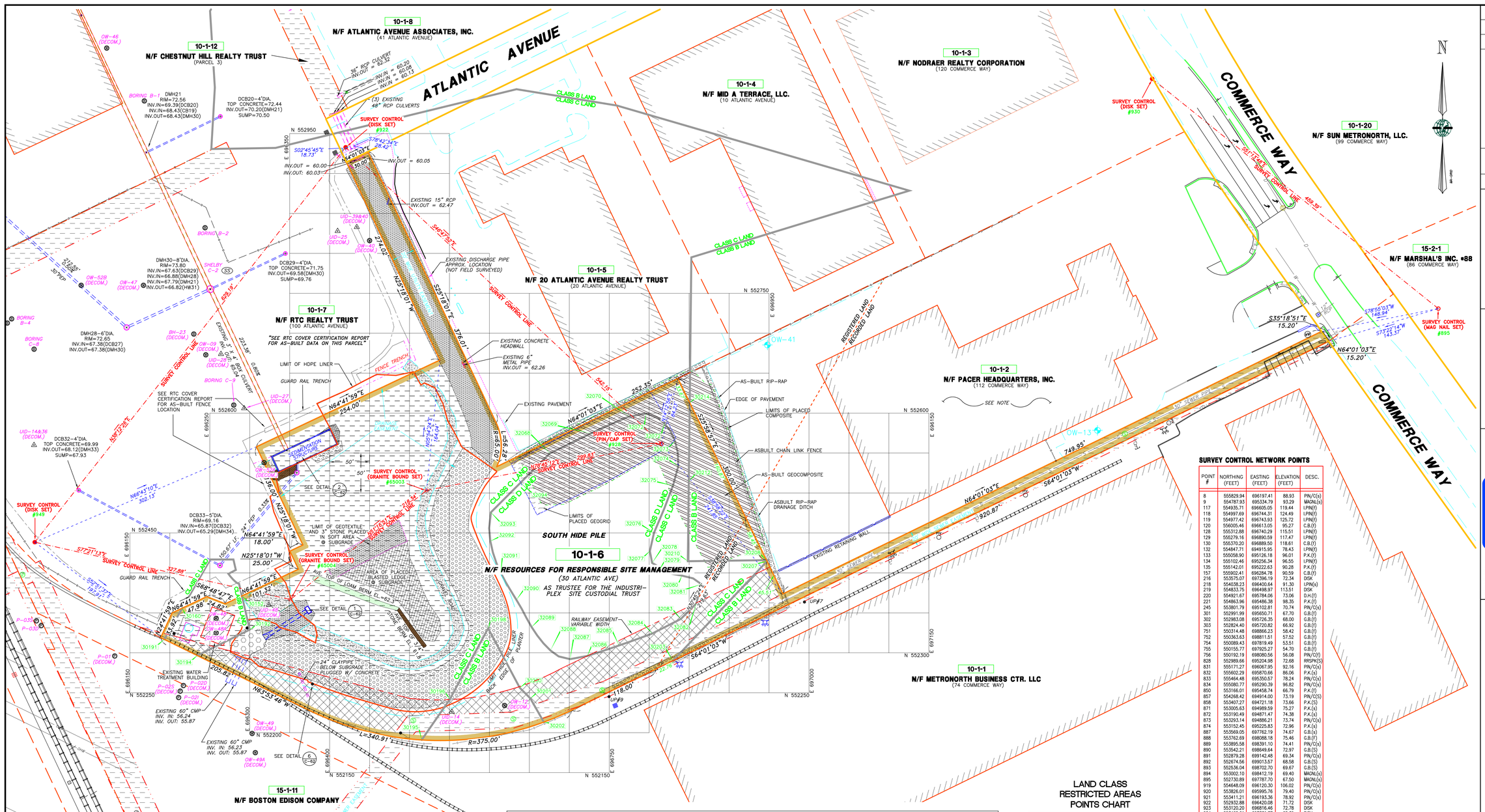
AUGUST 8, 2000

SCALE: 1" = 200'

DESIGNED BY: MDP
DRAFTED BY: MDP
CHECKED BY: JGK
FILE: 290038111.dwg
DO NOT SCALE DRAWING

C-56
SHEET NO.
PROJECT: 2900.00
SHEET 1 OF 7

Apr 24, 2008 – 10:34am MDP Land Desktop 2004 – LOT4
H:\(mis\(2900-0-48\2900.38\AS-BUILTS\0-PARCEL-1\



SURVEY CONTROL NETWORK POINTS

POINT #	NORTHING (FEET)	EASTING (FEET)	ELEVATION (FEET)	DESC.
8	555829.94	696197.41	88.93	PIN/C(a)
9	554787.93	695334.79	93.29	MAGNL(a)
117	554935.71	696605.05	119.44	LPIN(f)
118	554997.69	696744.31	124.49	LPIN(f)
119	554977.42	696743.93	125.72	LPIN(f)
120	556005.46	696613.05	95.27	C.B.(f)
128	555312.88	696740.29	115.51	LPIN(f)
129	555279.16	696890.59	117.47	LPIN(f)
130	555370.20	696889.50	118.61	C.B.(f)
132	554847.71	694915.95	78.43	LPIN(f)
133	555058.90	695126.18	96.01	P.X.(f)
134	555102.46	695256.34	96.55	LPIN(f)
135	555142.01	695222.63	90.28	P.X.(f)
157	555902.41	696284.78	90.59	C.B.(f)
216	553575.07	697396.19	72.34	DISK
218	554038.23	696400.64	91.30	LPIN(s)
219	554833.75	696498.97	113.51	DISK
220	554921.67	695784.06	73.06	D.H.(f)
221	554863.96	695486.38	98.35	P.X.(f)
245	553801.79	695102.81	70.74	PIN/C(s)
301	552991.99	695650.71	67.70	G.B.(f)
302	552983.08	695726.35	68.00	G.B.(f)
303	552824.40	695720.82	66.92	G.B.(f)
751	550314.48	698866.23	58.42	G.B.(f)
752	550363.63	698811.51	57.52	G.B.(f)
754	550089.43	697819.49	53.51	G.B.(f)
755	550155.77	697925.27	54.70	G.B.(f)
756	550192.19	698080.56	56.08	PIN/C(f)
828	552989.66	695204.98	72.68	RRSPK(S)
831	555171.27	696067.95	92.16	PIN/C(s)
832	555602.29	695870.66	86.06	P.X.(s)
833	555464.48	695350.57	78.24	PIN/C(s)
834	555086.77	695290.39	96.82	PIN/C(s)
850	553166.01	695458.74	66.79	P.X.(f)
857	554268.42	694914.00	73.19	PIN/C(S)
858	553407.27	694721.18	73.66	P.X.(S)
871	553005.63	694989.59	75.27	P.X.(s)
872	553190.49	694871.47	74.38	P.X.(s)
873	553293.14	694886.21	73.74	PIN/C(s)
874	553152.45	695225.83	72.96	P.X.(s)
887	553569.05	697762.19	74.67	G.B.(s)
888	553762.69	698088.18	75.46	G.B.(f)
889	553895.58	698391.10	74.41	PIN/C(s)
890	553542.21	698649.64	72.97	G.B.(S)
891	552879.28	699142.48	69.34	PIN/C(s)
892	552674.56	699013.57	68.58	G.B.(S)
893	552636.04	698702.70	69.67	G.B.(S)
894	553002.10	698412.19	69.40	MAGNL(a)
895	552730.89	697787.70	67.50	MAGNL(a)
919	554648.09	696120.30	106.02	PIN/C(s)
920	553826.01	695995.76	79.40	PIN/C(s)
921	553411.21	696193.36	78.92	PIN/C(s)
922	552932.88	696420.08	71.72	DISK
923	553120.20	696816.46	72.78	DISK
924	553462.61	697331.77	68.39	DISK
925	553842.55	697009.22	94.88	PIN/C(s)
926	554203.87	697060.28	79.00	DISK
927	553812.75	696737.39	107.69	PIN/C(s)
928	552561.74	696815.28	88.15	PIN/C(s)
929	552760.55	697119.09	71.75	PIN/C(s)
930	553018.55	697429.53	68.02	DISK
931	554521.49	694626.27	87.39	D.H.(f)
932	554421.26	694346.31	101.39	G.B.(f)
933	554251.87	694364.55	90.95	PIN/C(s)
934	553498.56	694623.81	69.94	PIN/C(s)
935	553378.01	694317.96	72.10	PIN/C(s)
936	553290.51	694245.09	81.03	PIN/C(s)
937	553114.85	694221.58	97.94	PIN/C(s)
938	552836.93	694953.72	80.60	DISK
944	550614.66	697637.80	N/A	G.B.(f)
945	554503.77	694825.96	74.68	P.X.(f)
947	552692.72	695376.15	65.92	DISK
948	552343.09	695555.77	63.57	G.B.(s)
949	552438.47	696030.92	71.73	DISK
950	552035.73	696313.53	68.40	G.B.(s)
951	551631.65	697151.14	65.87	DISK
952	551433.89	697800.32	73.68	DISK
953	551087.91	698466.50	63.64	DISK
954	550919.29	698709.73	60.45	DISK
955	551532.44	698410.23	63.71	DISK
956	551861.31	698260.14	65.01	DISK
957	552364.26	698003.18	67.73	G.B.(F)
960	554579.37	695677.56	96.32	G.B.(s)
961	554434.15	695071.84	85.91	G.B.(s)
962	553960.20	695295.87	79.76	G.B.(s)
963	553612.09	695462.70	78.81	DISK
964	553810.04	696003.71	79.67	G.B.(s)
965	553424.46	696186.34	79.67	G.B.(s)
966	553373.67	695576.30	77.68	DISK
967	553108.66	695695.24	76.92	DISK
968	552790.10	695786.11	73.69	DISK
971	554878.15	696698.61	129.11	PIN/C(s)
972	555073.02	696822.69	125.79	PIN/C(s)
973	555324.98	697186.40	117.15	PIN/C(s)
974	555328.29	697548.91	96.63	G.B.(f)
975	555468.38	697809.50	92.45	DISK
976	555640.49	697867.72	72.09	G.B.(s)
977	555411.42	697997.77	85.47	PIN/C(s)
978	555238.37	697940.64	70.49	G.B.(S)
979	555115.28	698015.18	87.78	PIN/C(s)
980	554928.03	698008.18	80.93	PIN/C(s)
981	554828.02	697781.52	67.51	G.B.(S)
982	554608.27	697651.96	76.95	DISK
983	554337.91	697697.91	77.28	MAGNL(a)
984	554073.15	697638.96	76.58	PIN/C(s)
985	554090.37	697850.88	75.15	PIN/C(s)

SURVEY CONTROL NETWORK POINTS

POINT #	NORTHING (FEET)	EASTING (FEET)	ELEVATION (FEET)	DESC.
986	553791.19	697828.87	72.71	G.B.(f)
1141	555436.21	696190.95	93.57	LPIN(f)
10874	553119.80	695375.82	69.28	G.B.(f)
10875	553250.96	695361.95	69.88	G.B.(f)
10941	553209.59	695443.61	67.53	G.B.(f)
52003	553504.76	694675.40	69.61	LPIN(f)
60500	552811.04	694811.44	81.43	G.B.(f)
60504	553493.08	694795.99	68.28	G.B.(f)
60505	553431.74	694740.48	72.60	G.B.(f)
60511	552626.22	694850.12	75.34	LPIN(f)
60516	552373.95	695412.39	64.04	LPIN(f)
60518	551650.24	696899.13	59.14	C.B.(f)
60519	553268.67	696998.43	71.39	LPIN(f)
60545	550535.42	698962.56	N/A	LPIN(f)
60549	550646.41	699172.79	N/A	G.B.(F)
60551	550588.82	697583.34	N/A	G.B.(F)
60552	550611.64	697561.55	N/A	G.B.(F)
60557	551335.11	698544.07	N/A	G.B.(F)
60558	551388.23	698534.25	N/A	G.B.(F)
60615	553385.09	694695.50	75.40	LPIN(F)
60950	550705.00	699289.45	N/A	G.B.(F)
62001	553285.48	694294.18	77.01	LPIN(F)
65000	552990.73	694384.08	81.27	DISK
65001	554187.89	694605.57	73.26	G.B.(S)
65002	553506.43	695086.74	70.95	G.B.(S)
65003	552503.26	696521.21	65.89	G.B.(s)
65004	552366.69	696350.85	66.78	G.B.(s)
65005	553796.88	697140.89	74.08	DISK
65006	552744.10	697194.90	65.26	DISK
65007	555414.68	697522.06	102.24	G.B.(F)
65008	555217.20	697514.54	90.27	G.B.(F)
65009	555605.36	697779.98	90.97	G.B.(F)
65010	555803.93	697977.42	72.86	D.H.(f)
65011	555708.75	697858.52	73.01	D.H.(f)
65012	555702.94	697888.20	70.08	D.H.(f)
65013	555745.19	697945.39	70.36	D.H.(f)
65014	555440.08	698536.86	89.23	D.H.(f)
65015	555409.32	698071.85	82.18	G.B.(F)
65016	553829.73	698214.01	76.93	G.B.(F)
65017	553712.31	698725.05	66.57	G.B.(F)
65018	552588.82	698672.03	69.10	G.B.(F)
65019	552588.11	698792.16	69.58	G.B.(F)

LAND CLASS RESTRICTED AREAS POINTS CHART

NUMBER	NORTHING*	EASTING*	BEARING	LENGTH
32063	552352.7 1	696255.3 7		
32069	552575.6 6	696727.2 7	N44°08'26"E	57.19'
32070	552595.9	696775.0	N80°39'40"E	52.10'
32071	552599.6	696796.1	S61°53'32"E	21.44'
32072	552587.1	696819.2	S61°53'32"E	26.13'
32073	552564.4	696832.6	S30°45'13"E	26.19'
32074	552533.6	696836.6	S02°20'13"E	31.58'
32075	552509.2	696829.7	S15°09'21"W	25.25'
32076	552452.2	696806.0	S21°52'35"W	63.66'
32077	552427.3	696800.8	S12°44'49"W	23.42'
32078	552412.4	696803.6	S10°40'21"E	15.14'
32079	552403.9	696812.7	S44°41'06"E	12.51'
32080	552399.6	696840.9	S55°34'28"E	29.04'
32081	552385.8	696865.6	S66°15'50"E	28.93'
32082	552361.7	696858.9	S15°00'57"W	25.01'
32083	552342.4	696839.7	S45°00'00"W	27.28'
32084	552324.0	696803.6	S62°59'00"W	40.49'
32085	552309.2	696762.2	S71°45'00"W	43.93'
32086	552296.0	696722.6	S71°40'57"W	41.75'
32087	552292.0	696700.9	S73°22'28"W	22.05'
32088	552292.9	696676.5	N44°08'56"W	26.81'
32089	552332.3	696652.8	N38°47'32"W	37.72'
32090	552336.3	696633.8	N52°40'43"W	38.49'
32091	552397.6	696616.3	N30°08'00"W	38.80'
32092	552439.8	696601.1	N18°16'07"W	45.99'
32093	552478.8	696591.8	N01°06'42"E	36.06'
32094	552512.8	696638.8	N45°00'00"E	52.25'
32068	552549.7	696675.7	N45°00'00"E	52.25'
30152	552337.1 2	696200.2		
30192	552329.0	696300.1	S13°07'26"E	63.36'
30194	552296.6	696334.3	S42°45'02"W	33.27'
30195	552316.8	696193.1	N42°53'46"W	45.91'
30160	552355.8	696215.5	N29°56'02"E	44.95'
30195	552190.9	696515.2		
30196	552217.7	696550.6	N34°40'16"E	61.10'
30198	552330.6	696598.6	N28°27'18"E	101.02'
30202	552342.2	696638.0	S32°08'02"E	84.35'
30201	552252.9	696651.2	S44°58'28"E	18.68'
30202	552213.3	696668.1	S20°34'41"E	32.16'
30208	552416.0	696946.8		
30210	552415.7	696848.3	S89°14'10"W	98.46'
30212	552514.6	696848.1	N00°41'21"E	00.00'
30214	552613.7	696850.7	N00°00'28"E	98.68'
30208	552416.0	696946.8	S25°58'57"E	219.32'
30203	552289.7	696829.3		
30207	552414.4	696947.5	N43°26'30"E	165.36'

LEGEND

ASBUILT COVER TYPE
TEST PIT
MONITOR WELL
BORING LOCATION
MICRO WELL LOCATION
PIEZOMETER LOCATION
SOIL SAMPLE LOCATION
STAFF GUAGE LOCATION
TENSIOMETER LOCATION
UID LOCATION
MONITORING WELL LOCATION
HYDRANT
GATE VALVE
CATCH BASIN (SQUARE)
CATCH BASIN (ROUND)
DRAIN MANHOLE
SEWER MANHOLE
UTILITY POLE
GUY WIRE
ASBUILT POINT NO. & LOCATION
GAS METER
GAS SHUT OFF
WATER SHUT OFF
WATER CONTROL BOX
SIGN
BOLLARD
TELEPHONE MANHOLE

BOUNDARY LINE
RIGHT-OF-WAY
ABUTTING PROPERTY LINES
ASPHALT, CONCRETE, GRANITE CURB
TRANSITION ZONE
LAND CLASS LINE
GRID LINE (N 551,000)
EDGE OF EXISTING PAVEMENT
LIMIT OF GEOTEXTILE
A.T.&T. FIBER OPTIC CABLE
TOE OF SLOPE
TOP OF SLOPE
LIMIT CHAIN LINK FENCE
EDGE OF ASBUILT GRAVEL ROAD
BACK EDGE OF PLANTER
EDGE OF PROPOSED PAVEMENT
EXISTING EASEMENT
ASBUILT CULVERT
LIMIT OF TREELINE
EXISTING CONCRETE STRUCTURE
IPLEX SITE LIMIT
TIE COURSE
SURVEY CONTROL LINE
LIMITS OF GEOCOMPOSITE
LIMITS OF GEOGRID
SURVEY CONTROL MONUMENT (GRANITE BOUND SET)
SURVEY CONTROL MONUMENT (DISK SET)
SURVEY CONTROL MONUMENT (PIN/CAP SET)

LIMITS OF RAILWAY EASEMENT
LIMITS OF EXISTING EASEMENTS
EDGE OF EXISTING BUILDINGS
AREA OF LEDGE AT SUBGRADE
HIDE PILES BASED ON CONSENT DECREE
AREA OF ENGINEERED COVER (COMPLIES WITH TOOR DESIGN PLANS UNLESS OTHERWISE STATED)
LIMITS OF RIPRAP = 3/4" STONE
LIMITS OF RIPRAP = 3" STONE
LIMITS OF RIPRAP = 6" STONE
LIMITS OF RIPRAP = 12" STONE
ASBUILT FINISH GRADE CONTOUR 5' INTERVAL
ASBUILT FINISH GRADE CONTOUR 1' INTERVAL
OVERHEAD WIRES (OHW)
UNDERGROUND GAS LINE (UGG)
POINT MARKER (SEE POINTS CHART) (99999)
DECOMMISSIONED WELL PER REFERENCE PLAN #2 (OW-50)

NOTE:

1. EXISTING IMPROVEMENTS SHOWN (OUTSIDE THE ENGINEERED COVER) FOR LOT 10-1-2 ARE PER REFERENCE PLAN #3b AND ARE NOT THE RESULT OF A FIELD SURVEY BY THIS OFFICE.

RESTRICTED AREAS BY CLASSES OF LAND

CLASS OF LAND	DESCRIPTION
A	MAY CONTAIN CONTAMINATED GROUNDWATER
B	MAY CONTAIN CONTAMINATED GROUNDWATER, AND MAY CONTAIN CONTAMINATED SOILS. NO COVER WAS REQUIRED WITHIN CLASS B.
C	MAY CONTAIN CONTAMINATED GROUNDWATER, AND CONTAINS CONTAMINATED SOIL AND COVER.
D	MAY CONTAIN CONTAMINATED GROUNDWATER, AND CONTAINS CONTAMINATED SOIL AND COVER. CLASS D ALSO CONTAINS FOUR ANIMAL HIDE PILES.

DECOMMISSIONED STRUCTURES POINTS TABLE

Point	Northing	Easting	Elevation	Description
22633	552234.0	696619.0	N/A	OW-12
22613	552343.0	696258.0	N/A	OW-48
22614	552325.0	696258.0	N/A	OW-48A
22617	552538.0	696318.0	N/A	OW-52A
22629	552226.0	696553.0	N/A	UID-14
22642	552360.0	696324.0	N/A	UID-48

NOTE:

1. BORINGS BY NH BORING, GOLDER, MICRO-WELL, AND ENVIROGEN WERE FILLED WITH GROUT.
2. SEE APPENDIX "E" FOR ADDITIONAL DECOMMISSIONED STRUCTURE DATA.

REV.	DATE	DESCRIPTION	DR	CK
I	4/24/08	FINAL SUBMISSION	TC	DBM
H	2/8/08	EPA & DEP COMMENTS OF 2/8/08	TC	DBM
G	9/28/07	EPA & DEP COMMENTS OF 8/29/07	JF	CAC
F	5/15/07	EPA & DEP COMMENTS OF 8/3/06	JF	CAC
E	9/21/05	EPA & DEP COMMENTS OF 7/12/04	KL	MDP
D	6/11/04	EPA & DEP COMMENTS OF 10/30/03	JF	MDP
C	10/16/03	DEP REVISIONS	JF	MDP
B	8/11/00	EPA REVISIONS	JF	MDP
A	8/8/00	ISSUE FOR REVIEW		MDP

FINAL

PROFESSIONAL LAND SURVEYOR

PROFESSIONAL ENGINEER

PROFESSIONAL ENGINEER

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

MERIDIAN Land Services, Inc.
ENGINEERS - LAND SURVEYORS - SCIENTISTS - LAND PLANNERS

Golder Associates
Manchester, New Hampshire
400 Commercial Street
Manchester, N.H. USA 03101
603-668-0880 • FAX 603-668-1199

PROJECT RECORD (TAX MAP LOT 10-1-6)

BOUNDARY LINES, LAND CLASSIFICATIONS, EASEMENTS AND ASBUILT DRAINAGE

INDUSTRI-PLEX SITE REMEDIAL TRUST
WOBURN, MASSACHUSETTS

SCALE: 1" = 50'

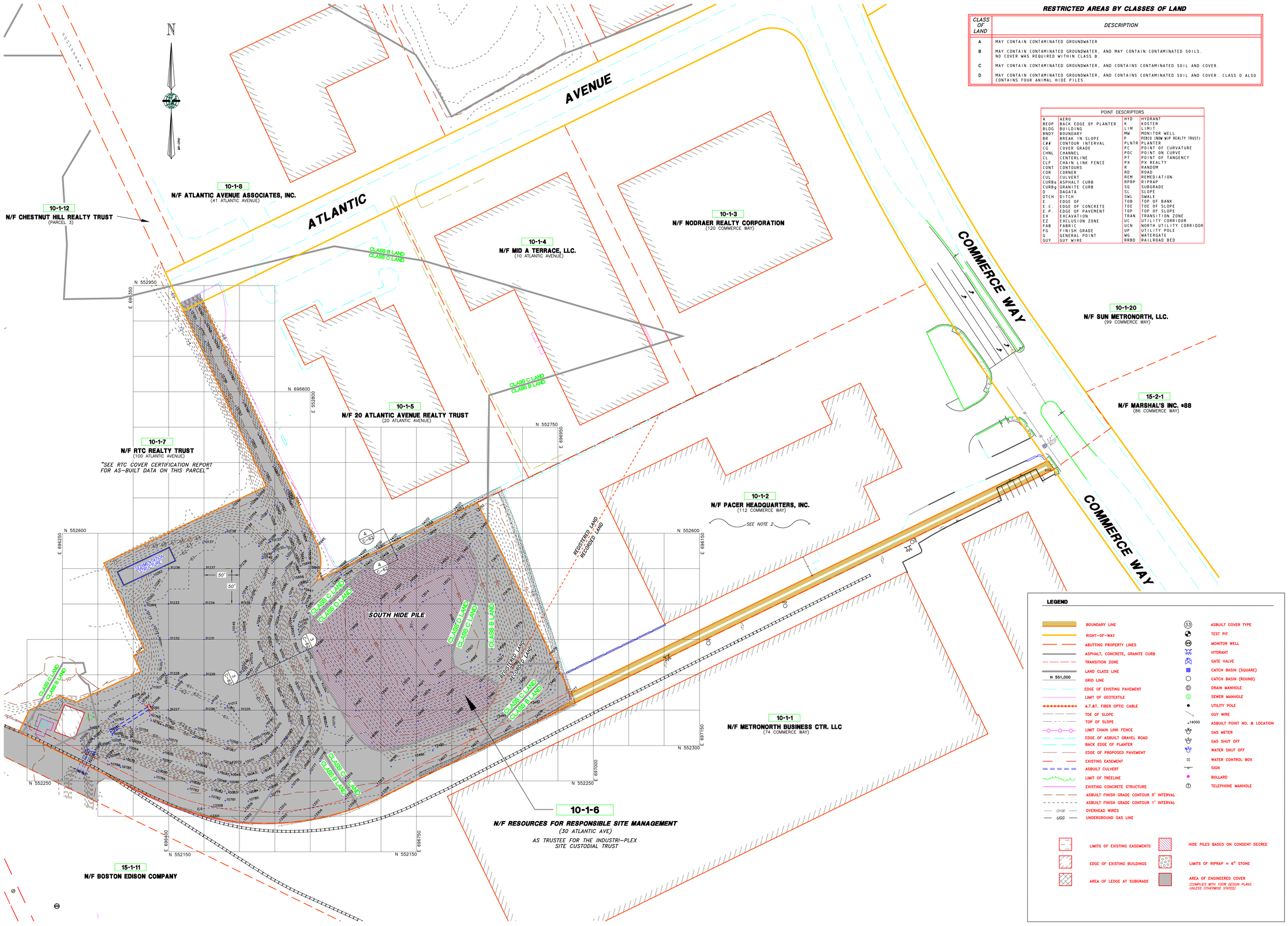
AUGUST 8, 2000

DESIGNED BY: MDP
DRAFTED BY: MDP
CHECKED BY: JGK
FILE: 29003811Z.dwg
DO NOT SCALE DRAWING

C-57
SHEET NO.
PROJECT: 2900.00
SHEET 2 OF 7

GRAPHIC SCALE
50' 25' 0 50' 100' 150'

Apr 24, 2008 - 1:29pm MDP Land Desktop 2004 - LDT4
H:\rma\U2900-0-AR\2900.38\AS-BUILTS\U-PARCEL-1\



RESTRICTED AREAS BY CLASSES OF LAND

CLASS OF LAND	DESCRIPTION
A	MAY CONTAIN CONTAMINATED GROUNDWATER
B	MAY CONTAIN CONTAMINATED GROUNDWATER, AND MAY CONTAIN CONTAMINATED SOILS. NO COVER WAS REQUIRED WITHIN CLASS B.
C	MAY CONTAIN CONTAMINATED GROUNDWATER, AND CONTAINS CONTAMINATED SOIL AND COVER.
D	MAY CONTAIN CONTAMINATED GROUNDWATER, AND CONTAINS CONTAMINATED SOIL AND COVER. CLASS D ALSO CONTAINS FOUR ANIMAL HIDE PILES.

POINT DESCRIPTORS

A	AERO	HYD	HYDRANT
BEOP	BACK EDGE OF PLANTER	K	KOSTER
BLDG	BUILDING	LIM	LIMIT
BNDY	BOUNDARY	MW	MONITOR WELL
BR	BREAK IN SLOPE	P	PEBCO (NOW WJP REALTY TRUST)
C##	CONTOUR INTERVAL	PLNTR	PLANTER
CG	COVER GRADE	PC	POINT OF CURVATURE
CHNL	CHANNEL	POC	POINT ON CURVE
CL	CENTERLINE	PT	POINT OF TANGENCY
CLF	CHAIN LINK FENCE	PX	PX REALTY
CONT	CONTOURS	R	RANDOM
COR	CORNER	RD	ROAD
CUL	CULVERT	REM	REMEDIATION
CURBa	ASPHALT CURB	RPRP	RIPRAP
CURBg	GRANITE CURB	SG	SUBGRADE
D	DAGATA	SL	SLOPE
DTCH	DITCH	SWL	SWALE
E.	EDGE OF	TOB	TOP OF BANK
E.C.	EDGE OF CONCRETE	TOE	TOE OF SLOPE
E.P.	EDGE OF PAVEMENT	TOP	TOP OF SLOPE
EX	EXCAVATION	TRAN	TRANSITION ZONE
EZ	EXCLUSION ZONE	UC	UTILITY CORRIDOR
FAB	FABRIC	UCN	NORTH UTILITY CORRIDOR
FG	FINISH GRADE	UP	UTILITY POLE
G	GENERAL POINT	WG	WATERGATE
GUY	GUY WIRE	RRBD	RAILROAD BED

NOTES:

1. SEE CHART ON SHEET C-59 FOR RECORD POINTS TABLE.
2. EXISTING IMPROVEMENTS SHOWN (OUTSIDE THE ENGINEERED COVER) FOR LOT 10-1-2 ARE PER REFERENCE PLAN #3b AND ARE NOT THE RESULT OF A FIELD SURVEY BY THIS OFFICE.

REV.	DATE	DESCRIPTION	DR	CK
I	4/24/08	FINAL SUBMISSION	TC	DBM
H	2/29/08	EPA COMMENTS OF 2/15/08	TC	DBM
G	9/20/07	EPA & DEP COMMENTS OF 8/29/07	JF	CAC
F	5/15/07	EPA & DEP COMMENTS OF 8/3/06	JF	CAC
E	9/21/05	EPA & DEP COMMENTS OF 7/12/04	KL	MDP
D	6/11/04	EPA & DEP COMMENTS OF 10/30/03	JF	MDP
C	10/16/03	DEP REVISIONS	JF	MDP
B	8/11/03	EPA REVISIONS	JF	MDP
A	8/8/00	ISSUE FOR REVIEW	MDP	JGK

FINAL

PROFESSIONAL LAND SURVEYOR

PROFESSIONAL ENGINEER

PREPARED FOR: ROUX ASSOCIATES, INC. Environmental Consulting & Management

PREPARED BY: MERIDIAN Land Services, Inc. 1 Technology Park Drive, Westford, MA 01886 Tel. 978-692-1313 Fax 978-692-1314 www.meridian-assoc.com ENGINEERS • LAND SURVEYORS • GCGENTISTS • LAND PLANNERS

DESIGNED BY: Golder Associates 400 Commercial Street Manchester, New Hampshire Manchester, N.H. USA 03101 603-668-0880 • FAX 603-668-1199

PROJECT RECORD (TAX MAP LOT 10-1-6)

RECORD POINTS, TOPOGRAPHY & LIMITS OF ENGINEERED COVER

INDUSTRI-PLEX SITE REMEDIAL TRUST WOBURN, MASSACHUSETTS

AUGUST 8, 2000

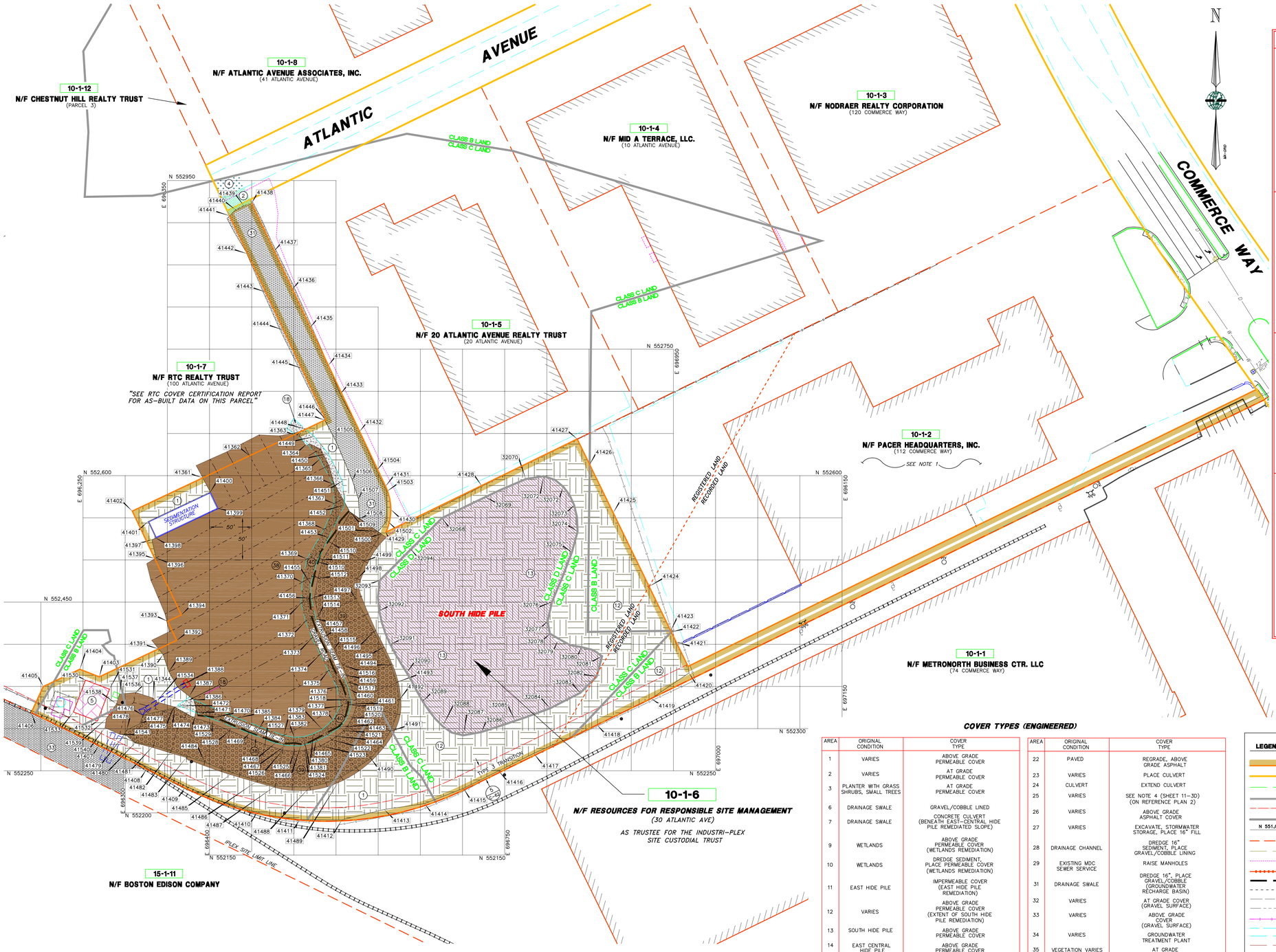
SCALE: 1" = 50'

DESIGNED BY: MDP	C-58
DRAFTED BY: MDP	SHEET NO.
CHECKED BY: JGK	
FILE: 29003813.dwg	PROJECT: 2900.00
DO NOT SCALE DRAWING	SHEET 3 OF 7

Apr 24, 2008 - 1:42pm MDP Land Desktop 2004 - LD14
H:\rma\2029\0-0-AEV\2900.38\AS-BUILTS\0-PARCEL-1\

MERIDIAN LAND SERVICES POINTS TABLE

Point Number	Northing	Easting	Subgrade Grade Feet	Cover Grade Feet	Cover Grade Inches	Finish Grade Feet	Finish Grade Inches	Total Depth Inches	Desc.
7528	552312.9	692326.9	51.17	A		58.17		43.28	BRDP
7521	552301.9	692326.9	54.35	A		56.59	2.52	26.88	TRANS
8052	552336.9	692417.8	54.95	2.72		57.67	2.28	26.64	TRANS
8053	552336.9	692417.8	54.95	2.72		57.67	2.28	26.64	TRANS
10922	552449.2	692542.5	55.56	1.72		57.28		21.12	BR
10923	552449.2	692542.5	55.56	1.72		57.28		21.12	BR
10925	552429.8	692542.9	55.53	A		57.43		23.44	TOE
10926	552429.8	692542.9	55.53	A		57.43		23.44	TOE
10927	552446.5	692559.0	55.82	A		57.89		21.12	TOE
10928	552446.5	692559.0	55.86	A		57.89		21.12	TOE
10931	552317.3	692317.4	55.44	A		57.67		26.76	TOE
10932	552317.3	692317.4	55.44	A		57.67		26.76	TOE
10933	552328.2	692308.5	55.87	A		57.52		24.00	TOE
10934	552328.2	692308.5	55.87	A		57.52		24.00	TOE
10935	552296.9	692081.8	55.47	A		57.42		21.60	TOE
10936	552296.9	692081.8	55.47	A		57.42		21.60	TOE
10938	552272.3	692072.5	55.48	A		57.29		21.48	TOE
10939	552272.3	692072.5	55.48	A		57.29		21.48	TOE
10940	552271.5	692031.6	55.56	A		57.24		17.24	TOE
10941	552271.5	692031.6	55.56	A		57.24		17.24	TOE
10942	552271.5	692031.6	55.55	A		57.24		17.24	TOE
10943	552271.5	692031.6	55.55	A		57.24		17.24	TOE
10944	552325.4	692510.0	55.320	A		57.33		15.56	TOE
10945	552325.4	692510.0	55.320	A		57.33		15.56	TOE
10946	552327.1	692488.5	55.36	A		57.31		15.24	TOE
10947	552327.1	692488.5	55.36	A		57.31		15.24	TOE
10948	552327.5	692469.8	55.27	A		57.19		14.92	TOE
10949	552327.5	692469.8	55.27	A		57.19		14.92	TOE
10950	552329.6	692452.5	55.19	A		57.14		14.68	TOE
10951	552329.6	692452.5	55.19	A		57.14		14.68	TOE
10952	552329.5	692432.2	55.00	A		57.09		14.56	TOE
10953	552329.5	692432.2	55.00	A		57.09		14.56	TOE
10954	552326.3	692416.4	54.78	A		56.98		14.40	TOE
10955	552326.3	692416.4	54.78	A		56.98		14.40	TOE
10956	552325.0	692327.4	55.19	A		57.22		16.36	TOE
10957	552325.0	692327.4	55.19	A		57.22		16.36	TOE
10958	552326.4	692317.4	55.51	A		57.42		17.88	TOE
10959	552326.4	692317.4	55.51	A		57.42		17.88	TOE
10960	552329.0	692226.9	55.88	A		57.77		20.76	TOE
10961	552329.0	692226.9	55.88	A		57.77		20.76	TOE
10962	552329.2	692202.2	55.90	A		57.79		20.88	TOE
10963	552329.2	692202.2	55.90	A		57.79		20.88	TOE
10964	552327.2	692192.4	55.95	A		57.84		21.48	TOE
10965	552327.2	692192.4	55.95	A		57.84		21.48	TOE
10966	552326.0	692176.6	55.95	A		57.87		22.32	TOE
10967	552326.0	692176.6	55.95	A		57.87		22.32	TOE
10968	552326.4	692152.4	55.96	A		57.92		23.52	TOE
10969	552326.4	692152.4	55.96	A		57.92		23.52	TOE
10970	552327.7	692126.9	55.95	A		57.95		24.00	TOE
10971	552327.7	692126.9	55.95	A		57.95		24.00	TOE
10972	552329.2	692098.6	55.95	A		57.95		24.00	TOE
10973	552329.2	692098.6	55.95	A		57.95		24.00	TOE
10974	552329.8	692076.9	55.95	A		57.95		24.00	TOE
10975	552329.8	692076.9	55.95	A		57.95		24.00	TOE
10979	552276.9	692315.2	63.83	A		65.25		17.04	TOB
10980	552276.9	692315.2	63.83	A		65.25		17.04	TOB
10981	552276.1	692336.6	63.21	A		64.83		19.44	TOB
10982	552276.1	692336.6	63.21	A		64.83		19.44	TOB
10983	552271.0	692361.6	63.47	A		64.95		17.88	TOB
10984	552271.0	692361.6	63.47	A		64.95		17.88	TOB
10985	552271.4	692411.8	62.71	A		64.46		21.12	TOB
10986	552271.4	692411.8	62.71	A		64.46		21.12	TOB
10987	552327.7	692526.9	63.05	A		65.57		27.12	TOB
10988	552327.7	692526.9	63.05	A		65.57		27.12	TOB
10989	552326.4	692542.4	63.07	A		65.64		27.48	TOB
10990	552326.4	692542.4	63.07	A		65.64		27.48	TOB
10996	552337.0	692609.6	63.29	A		65.79		27.48	TOB
10997	552337.0	692609.6	63.29	A		65.79		27.48	TOB
10994	552342.5	692571.1	64.22	A		66.48		27.48	TOB
10995	552342.5	692571.1	64.22	A		66.48		27.48	TOB
10997	552372.5	692587.3	63.81	A		66.24		28.44	TOB
10998	552372.5	692587.3	63.81	A		66.24		28.44	TOB
10999	552326.5	692315.6	63.74	A		65.48		20.88	TOB
11000	552326.5	692315.6	63.74	A		65.48		20.88	TOB
11010	552305.9	692325.8	63.51	A		65.17		19.56	TOB
11011	552305.9	692325.8	63.51	A		65.17		19.56	TOB
11033	552357.9	692552.5	63.21	A		65.54		27.00	TOB
11034	552357.9	692552.5	63.21	A		65.54		27.00	TOB
11035	552366.2	692569.2	63.02	A		65.47		27.60	TOB
11036	552366.2	692569.2	63.02	A		65.47		27.60	TOB
11042	552371.5	692603.8	62.87	A		65.29		28.44	TOB
11043	552371.5	692603.8	62.87	A		65.29		28.44	TOB
11044	552375.4	692620.8	62.71	A		65.12		28.44	TOB
11045	552375.4	692620.8	62.71	A		65.12		28.44	TOB
11046	552374.5	692639.1	62.55	A		64.95		28.44	TOB
11047	552374.5	692639.1	62.55	A		64.95		28.44	TOB
11048	552374.1	692657.4	62.39	A		64.78		28.44	TOB
11049	552374.1	692657.4	62.39	A		64.78		28.44	TOB
11050	552373.8	692675.7	62.23	A		64.62		28.44	TOB
11051	552373.8	692675.7	62.23	A		64.62		28.44	TOB
11052	552373.5	692694.0	62.07	A		64.45		28.44	TOB
11053	552373.5	692694.0	62.07	A		64.45		28.44	TOB
11054	552373.3	692712.3	61.91	A		64.29		28.44	TOB
11055	552373.3	692712.3	61.91	A		64.29		28.44	TOB
11056	552373.0	692730.6	61.75	A		64.12		28.44	TOB
11057	552373.0	692730.6	61.75	A		64.12		28.44	TOB
11058	552372.8	692748.9	61.59	A		63.96		28.44	TOB
11059	552372.8	692748.9	61.59	A		63.96		28.44	TOB
11060	552372.5	692767.2	61.43	A		63.79		28.44	TOB
11061	552372.5	692767.2	61.43	A		63.79		28.44	TOB
11062	552372.3	692785.5	61.27	A		63.62		28.44	TOB
11063	552372.3	692785.5	61.27	A		63.62		28.44	TOB
11064	552372.0	692803.8	61.11	A		63.46		28.44	TOB
11065	552372.0	692803.8	61.11	A		63.46		28.44	TOB
11066	552371.8	692822.1	60.95	A		63.29		28.44	TOB
11067	552371.8	692822.1	60.95	A		63.29		28.44	TOB
11068	552371.5	692840.4	60.79	A		63.12		28.44	TOB
11069	552371.5	692840.4	60.79	A		63.12		28.44	TOB
11070	552371.3	692858.7	60.63	A		62.96		28.44	TOB
11071	552371.3	692858.7	60.63	A		62.96		28.44	TOB
11072	552371.0	692877.0	60.47	A		62.79		28.44	TOB
11073	552371.0	692877.0	60.47	A		62.79		28.44	TOB
11074	552370.8	692895.3	60.31	A		62.62		28.44	TOB
11075	552370.8	692895.3	60.31	A		62.62		28.44	TOB
11076	552370.5	692913.6	60.15	A		62.46		28.44	TOB
11077	552370.5	692913.6	60.15	A		62.46		28.44	TOB
11078	552370.3	692931.9	59.99	A		62.29		28.44	TOB
11079	552370.3	692931.9	59.99	A		62.29		28.44	TOB
11080	552370.0	692950.2	59.83	A		62.12		28.44	TOB
11081	552370.0	692950.2	59.83	A		62.12		28.44	TOB
11082	552369.8	692968.5	59.67	A		61.96		28.44	TOB
11083	552369.8	692968.5	59.67	A		61.96		28.44	TOB
11084	552369.5	692986.8	59.51	A		61.79		28.44	TOB
11085	552369.5	692986.8	59.51	A		61.79		28.44	TOB
11086	552369.3	693005.1	59.35	A		61.62		28.44	TOB
11087	552369.3	693005.1	59.35	A		61.62		28.44	TOB
11088	552369.0	693023.4	59.19	A		61.46		28.44	TOB
11089	552369.0	693023.4	59.19	A		61.46		28.44	TOB
11090	552368.8	693041.7	59.03	A		61.29		28.44	TOB
11091	552368.8	693041.7	59.03	A		61.29		28.44	TOB
11092	552368.5	693060.0	58.87	A		61.12		28.44	TOB
11093	552368.5	693060.0	58.87	A		61.12		28.44	TOB
11094	552368.3	693078.3	58.71	A		60.96		28.44	TOB
11095	552368.3	693078.3	58.71	A		60.96		28.44	TOB
11096	552368.0	693096.6	58.55	A		60.79		28.44	TOB
11097	552368.0	693096.6	58.55	A		60.79		28.44	TOB
11098	552367.8	693114.9	58.39	A		60.62		28.44	TOB
11099	552367.8	693114.9	58.39	A		60.62		28.44	TOB
11100	552367.5	693133.2	58.23	A		60.46		28.44	TOB
11101	552367.5	693133.2	58.23	A		60.46		28.44	TOB
11102	552254.5	692254.5	59.71	A		61.05		17.04	TOE
11103	552254.5	692254.5	59.71	A		61.05		17.04	TOE
11104	552257.2	692277.2	59.57	A		61.23		17.88	TOE
11105	552257.2	692277.2	59.57	A		61.23		17.88	TOE
11106	552259.9	692299.9	59.42	A		61.40		18.72	TOE
11107	552259.9	692299.9	59.42	A		61.40		18.72	TOE
11108	552262.6	692322.6	59.27	A		61.57		19.56	TOE
11109	552262.6	692322.6	59.27	A		61.57		19.56	TOE
11110	552265.3	692345.3	59.12	A		61.74		20.40	TOE
11111	552265.3	692345.3	59.12	A		61.74		20.40	TOE
11112	552268.0	692368.0	58.97	A		61.92		21.24	TOE
11113	552268.0	692368.0	58.97	A		61.92		21.24	TOE
11114	552270.8	692390.7	58.82	A		62.09		22.08	TOE
11115	552270.8	692390.7	58.82	A		62.09		22.08	TOE
11116	552273.5	692413.4	58.67	A		62.26		22.92	TOE
11117	552273.5	692413.4	58.67	A		62.26		22.92	TOE
11118	552276.2	692436.1	58.52	A		62.43		23.76	TOE
11119	552276.2	692436.1	58.52	A		62.43		23.76	TOE
11120	552278.9	692458.8	58.37	A		62.60		24.60	TOE
11121	552278.9	692458.8	58.37	A		62.60		24.60	TOE
11122	552281.6	692481.5	58.22	A		62.77		25.44	TOE
11123	552281.6	692481.5	58.22	A		62.77		25.44	TOE
11124	552284.3	692504.2	58.07	A		62.94		26.28	TOE
11125	552284.3	692504.2	58.07	A		62.94		26.28	TOE
11126	552287.0	692526.9	57.92	A		63.11		27.12	TOE
11127	552287.0	692526.9	57.92	A		63.11		27.12	TOE
11128	552289.7	692549.6	57.77	A		63.28		27.96	TOE
11129	552289.7	692549.6	57.77	A		63.28		27.96	TOE
11130	552292.4	692572.3	57.62	A		63.45		28.80	TOE
11131	552292.4	692572.3	57.62	A		63.45		28.80	TOE
11132	552295.1	692595.0	57.47	A		63.62		29.64	TOE
11133	552295.1	692595.0	57.47	A		63.62		29.64	TOE
11134	552297.8	692617.7	57.32	A		63.79		30.48	TOE
11135	552297.8	692617.7	57.32	A		63.79		30.48	TOE
11136	552300.5	692640.4	57.17	A		63.96		31.32	TOE
11137	552300.5	692640.4	57.17	A		63.96		31.32	TOE
11138	552303.2	692663.1	57.02	A		64.13		32.16	TOE
11139	552303.2	692663.1	57.02	A		64.13		32.16	TOE
11140	552305.9	692685.8	56.87	A		64.30		33.00	TOE
11141	552305.9	692685.8	56.87	A		64.30		33.00	TOE
11142	552307.7	692704.1	56.75	A		64.47		33.72	TOE
11143	552307.7	692704.1	56.75	A		64.47		33.72	TOE
11144	552309.5	692722.4	56.63	A		64.64		34.44	TOE
11145	552309.5	692722.4	56.63	A		64.64		34.44	TOE
11146	552311.3	692740.7	56.51	A		64.81		35.16	TOE
11147	552311.3	692740.7	56.51	A		64.81		35.16	TOE
11148	552313.1	692759.0	56.39	A		64.98		35.88	TOE
11149	552313.1	692759.0	56.39	A		64.98		35.88	TOE
11150	552314.9	692777.3	56.27	A		65.15		36.60	TOE
11151	552314.9	692777.3	56.27	A		65.15		36.60	TOE
11152	552316.7	692795.6	56.15	A		65.32		37.32	TOE
11153	552316.7	692795.6	56.15	A		65.32		37.32	TOE
11154	552318.5	692813.9	56.03	A		65.49		38.04	TOE
11155	552318.5	692813.9	56.03	A		65.49		38.04	TOE
11156	552320.3	692832.2	55.91	A		65.66		38.76	TOE
11157	552320.3	692832.2	55.91	A		65.66		38.76	TOE
11158	552322.1	692850.5	55.79	A		65.83		39.48	TOE
11159	552322.1	692850.5	55.79	A		65.83		39.48	TOE
11160	552323.9	692868.8	55.67	A		66.00		40.20	TOE
11161	552323.9	692868.8	55.67	A		66.00		40.20	TOE
11162	552325.7	692887.1	55.55	A		66.17		40.92	TOE
11163	552325.7	692887.1	55.55	A		66.17		40.92	TOE
11164	552327.5	692905.4	55.43	A		66.34		41.64	TOE
11165	552327.5	692905.4	55.43	A		66.34		41.64	TOE
11166	552329.3	692923.7	55.31	A		66.51		42.36	TOE
11167	552329.3	692923.7	55.31	A		66.51		42.36	TOE
11168	552331.1	692942.0	55.19	A		66.68		43.08	TOE
11169	552331.1	692942.0	55.19	A		66.68		43.08	TOE
11170	552332.9	692960.3	55.07	A		66.85		43.80	TOE
11171	552332.9	692960.3	55.07	A		66.85		43.80	TOE
11172	552334.7	692978.6	54.95	A		67.02		44.52	TOE
11173	552334.7	692978.6	54.95	A		67.02		44.52	TOE
11174	552336.5	692996.9	54.83	A		67.19		45.24	TOE
11175	552336.5	692996.9	54.83	A		67.19		45.24	TOE
11176	552338.3	693015.2	54.71	A		67.36		45.96	TOE
11177	552338.3	693015.2	54.71	A		67.36		45.96	TOE
11178	552340.1	693033.5	54.59	A		67.53		46.68	TOE
11179	552340.1	693033.5	54.59	A		67.53		46.68	TOE
11180	552341.9	693051.8	54.47	A		67.70		47.40	TOE
11181	552341.9	693051.8	54.47	A		67.70		47.40	TOE
11182	552343.7	693070.1	54.35	A		67.87		48.12	TOE
11183	552343.7	693070.1	54.35	A		67.87		48.12	TOE
11184	552345.5	693088.4	54.23	A		68.04		48.84	TOE
11185	552345.5	693088.4	54.23	A		68.04		48.84	TOE
11186	552347.3	693106.7	54.11	A		68.21		49.56	TOE
11187	552347.3	693106.7	54.11	A		68.21		49.56	TOE
11188	552349.1	693125.0	53.99	A		68.38		50.28	TOE
11189	552349.1	693125.0	53.99	A		68.38		50.28	TOE
11190	552350.9	693143.3	53.87	A		68.55		51.00	TOE
11191	552350.9	693143.3	53.87	A		68.55		51.00	TOE
11192	552352.7	693161.6	53.75	A		68.72		51.72	TOE
11193	552352.7	693161.6	53.75	A		68.72		51.72	TOE
11194	552354.5	693179.9	53.63	A		68.89		52.44	TOE
11195	552354.5	693179.9	53.63	A		68.89		52.44	TOE
11196	552356.3	693198.2	53.51	A		69.06		53.16	TOE
11197	552356.3	693198.2	53.51	A		69.06		53.16	TOE
11198	552358.1	693216.5	53.39	A		69.23		53.88	TOE
11199	552358.1	693216.5	53.39	A		69.23		53.88	TOE
11200	552359.9	693234.8	53.27	A		69.40		54.60	TOE
11201	552359.9	693234.8	53.27	A		69.40		54.60	TOE
11202	552361.7	693253.1	53.15	A		69.57		55.32	TOE
11203	552361.7	693253.1	53.15	A		69.57		55.32	TOE
11204	552363.5	693271.4	53.03	A		69.74		56.04	TOE
11205	552363.5	693271.4	53.03	A		69.74		56.04	TOE
11206	552365.3	693289.7	52.91	A		69.91		56.76	TOE
11207	552365.3	693289.7	52.91	A		69.91		56.76	TOE
11208	552367.1	693308.0	52.79	A		70.08		57.48	TOE
11209	552367.1	693308.0	52.79	A		70.08		57.48	TOE
11210	552368.9	693326.3	52.67	A		70.25		58.20	TOE
11211	552368.9	693326.3	52.67	A		70.25		58.20	TOE
11212	552370.7	693344.6	52.55	A		70.42		58.92	TOE
11213	552370.7	693344.6	52.55	A		70.42		58.92	TOE
11214	552372.5	693362.9	52.43	A		70.59		59.64	TOE
11215	552372.5	693362.9	52.43	A		70.59		59.64	TOE
11216	552374.3	693381.2	52.31	A		70.76		60.36	TOE
11217	552374.3	693381.2	52.31	A		70.76		60.36	TOE
11218	552376.1	693399.5	52.19	A		70.93		61.08	TOE
11219	552376.1	693399.5	52.19	A		70.93		61.08	TOE
11220	552377.9	693417.8	52.07	A		71.10		61.80	TOE
11221	552377.9	693417.8	52.07	A		71.10		61.80	TOE
11222	552379.7	693436.1	51.95	A		71.27		62.52	TOE
11223	552379.7	693436.1	51.95	A		71.27		62.52	TOE
11224	552381.5	693454.4	51.83	A		71.44		63.24	TOE
11225	552381.5	693454.4	51.83	A		71.44		63.24	TOE
11226	552383.3	693472.7	51.71	A		71.61		63.96	TOE
11227	552383.3	693472.7	51.71	A		71.61		63.96	TOE
11228	552385.1	693491.0	51.59	A		71.78		64.68	TOE
11229	552385.1	693491.0	51.59	A		71.78		64.68	TOE
11230	552386.9	693509.3	51.47	A		71.95		65.40	TOE
11231	552386.9	693509.3	51.47	A		71.95		65.40	TOE
11232	552388.7	693527.6	51.35	A		72.12		66.12	TOE
11233	552388.7	693527.6	51.35	A		72.12		66.12	TOE
11234	552390.5	693545.9	51.23	A		72.29		66.84	TOE
11235	552390.5	693545.9	51.23	A		72.29		66.84	TOE
11236	552392.3	693564.2	51.11	A		72.46		67.56	TOE
11237	552392.3	693564.2	51.11	A		72.46		67.56	TOE
11238	552394.1	693582.5	50.99	A		72.63		68.28	TOE
11239	552394.1	693582.5	50.99	A		72.63		68.28	TOE
11240	552395.9	693600.8	50.87	A		72.80		69.00	TOE
11241	552395.9	693600.8	50.87	A		72.80		69.00	TOE
11242	552397.7	693619.1	50.75	A		72.97		69.72	TOE
11243	552397.7	693619.1	50.75	A		72.97		69.72	TOE
11244	552399.5	693637.4	50.63	A		73.14		70.44	TOE
11245	552399.5	693637.4	50.63	A		73.14		70.44	TOE
11246	552401.3	693655.7	50.51	A		73.31		71.16	TOE
11247	552401.3	693655.7	50.51	A		73.31		71.16	TOE
11248	552403.1	693674.0	50.39	A		73.48		71.88	TOE
11249	552403.1	693674.0	50.39	A		73.48		71.88	TOE
11250	552404.9	693692.3	50.27	A		73.65		72.60	TOE
11251	552404.9	693692.3	50.27	A		73.65		72.60	TOE
11252	552406.7	693710.6	50.15	A		73.82		73.32	TOE
11253	552406.7	693710.6	50.15	A		73.82		73.32	TOE
11254	552408.5	693728.9	50.03	A		73.99		74.04	TOE
11255	552408.5	693728.9	50.03	A		73.99		74.04	TOE
11256	552410.3	693747.2	49.91	A		74.16		74.76	TOE
11257	552410.3	693747.2	49.91	A		74.16		74.76	TOE
11258	552412.1	693765.5	49.79	A		74.33		75.48	TOE
11259	552412.1	693765.5	49.79	A		74.33		75.48	TOE
11260	552413.9	693783.8	49.67	A		74.50		76.20	TOE
11261	552413.9	693783.8	49.67	A		74.50		76.20	TOE
11262	552415.7	693802.1	49.55	A		74.67		76.92	TOE
11263	552415.7	693802.1	49.55	A		74.67		76.92	TOE
11264	552417.5	693820.4	49.43	A		74.84		77.64	TOE
11265	552417.5	693820.4	49.43	A		74.84		77.64	TOE
11266	552419.3	693838.7	49.31	A		75.01		78.36	TOE
11267	552419.3	693838.7	49.31	A		75.01		78.36	TOE
11268	552421.1	693857.0	49.19	A		75.18		79.08	TOE
11269	552421.1	693857.0	49.19	A		75.18		79.08	TOE
11270	552422.9	693875.3	49.07	A		75.35		79.80	TOE
11271	552422.9	693875.3	49.07	A		75.35		79.80	TOE
11272	552424.7	693893.6	48.95	A		75.52		80.52	TOE
11273	552424.7	693893.6	48.95	A		75.52		80.52	TOE
11274	552426.5	693911.9	48.83	A		75.69		81.24	TOE
11275	552426.5	693911.9	48.83	A		75.69		81.24	TOE
11276	552428.3	693930.2	48.71	A		75.86		81.96	TOE
11277	552428.3	693930.2	48.71	A		75.86		81.96	TOE
11278	552430.1	693948.5	48.59	A		76.03		82.68	TOE
11279	552430.1	693948.5	48.59	A		76.03		82.68	TOE
11280	552431.9	693966.8	48.47	A		76.20		83.40	TOE
11281	552431.9	693966.8	48.47	A		76.20		83.40	TOE
11282	552433.7	693985.1	48.35	A		76.37		84.12	TOE
11283	552433.7	693985.1	48.35	A		76.37		84.12	TOE
11284	552435.5	694003.4	48.23	A		76.54		84.84	TOE
11285	552435.5	694003.4	48.23	A		76.54		84.84	TOE
11286	552437.3	694021.7	48.11	A		76.71		85.56	TOE
11287	552437.3	694021.7	48.11	A		76.71		85.56	TOE
11288	552439.1	694040.0	47.99	A		76.88		86.28	TOE
11289	552439.1	694040.0	47.99	A		76.88		86.28	TOE
11290	552440.9	694058.3	47.87	A		77.05		87.00	TOE
11291	552440.9	694058.3	47.87	A		77.05		87.00	TOE
11292	552442.7	694076.6	47.75	A		77.22		87.72	TOE
11293	552442.7	694076.6	47.75	A		77.22		87.72	TOE
11294	552444.5	694094.9	47.63	A		77.39		88.44	TOE
11295	552444.5	694094.9	47.63	A		77.39		88.44	TOE
11296	552446.3	694113.2	47.51	A		77.56		89.16	T



COVER TYPE POINT CHART

NUMBER	NORTHING*	EASTING*	NUMBER	NORTHING*	EASTING*
32068	552549.7	696675.7	41438	552923.2	696449.9
32069	552571.6	696727.2	41439	552920.3	696440.6
32070	552595.9	696775.0	41440	552915.3	696430.8
32071	552599.4	696796.1	41441	552908.2	696423.8
32072	552587.1	696819.2	41442	552883.0	696445.2
32073	552564.9	696832.6	41443	552817.8	696466.5
32074	552533.6	696836.5	41444	552772.6	696487.9
32075	552509.2	696829.7	41445	552727.4	696509.3
32076	552450.2	696806.0	41446	552666.6	696538.1
32077	552427.3	696800.8	41447	552665.8	696536.7
32078	552412.6	696803.6	41448	552655.1	696514.2
32079	552403.9	696812.7	41449	552646.6	696524.2
32080	552396.6	696840.9	41450	552626.2	696540.8
32081	552385.8	696865.6	41451	552593.7	696557.6
32082	552361.7	696858.9	41452	552565.1	696560.1
32083	552342.6	696839.7	41453	552526.6	696541.4
32084	552324.0	696803.6	41454	552498.0	696527.5
32085	552309.2	696762.2	41455	552471.9	696519.7
32086	552296.0	696722.6	41456	552454.7	696528.7
32087	552292.0	696700.9	41457	552430.0	696526.3
32088	552302.9	696676.6	41458	552408.6	696535.9
32089	552332.3	696652.8	41459	552363.9	696557.8
32090	552366.3	696633.8	41460	552367.5	696564.8
32091	552399.9	696614.3	41461	552329.9	696568.7
32092	552439.8	696601.1	41462	552311.9	696562.6
32093	552475.8	696601.8	41463	552302.2	696545.1
32094	552512.8	696638.8	41464	552292.0	696540.7
41361	552597.4	696392.0	41465	552284.9	696526.3
41362	552623.6	696447.5	41466	552279.4	696508.0
41363	552648.9	696500.9	41467	552280.1	696490.1
41364	552638.0	696515.6	41468	552282.8	696478.1
41365	552619.5	696530.7	41469	552294.5	696447.6
41366	552590.2	696545.9	41470	552312.3	696400.8
41367	552564.9	696547.9	41471	552319.1	696383.4
41368	552536.7	696535.9	41472	552327.5	696362.1
41369	552501.2	696515.3	41473	552312.6	696382.3
41370	552473.7	696509.8	41474	552325.4	696359.0
41371	552448.6	696508.4	41475	552324.1	696357.0
41372	552427.1	696513.8	41476	552316.0	696320.4
41373	552407.3	696521.3	41477	552305.7	696317.5
41374	552388.1	696531.3	41478	552298.4	696301.9
41375	552368.4	696540.6	41479	552289.9	696296.7
41376	552349.2	696551.0	41480	552283.6	696312.2
41377	552326.5	696554.7	41481	552280.0	696333.7
41378	552310.1	696546.1	41482	552273.5	696354.6
41379	552299.0	696533.7	41483	552266.9	696373.4
41380	552294.0	696523.2	41484	552260.2	696394.2
41381	552293.3	696511.8	41485	552247.6	696427.4
41382	552289.7	696500.5	41486	552238.1	696456.9
41383	552292.0	696488.1	41487	552231.9	696478.1
41384	552302.2	696459.9	41488	552230.8	696519.1
41385	552312.6	696433.3	41489	552242.6	696556.3
41386	552334.2	696381.3	41490	552264.8	696591.2
41387	552338.3	696376.0	41491	552297.1	696614.7
41388	552349.4	696362.0	41492	552334.1	696624.9
41389	552367.6	696351.7	41493	552354.9	696621.9
41390	552387.8	696344.9	41494	552375.8	696614.9
41391	552394.5	696339.6	41495	552395.3	696604.4
41392	552404.6	696361.0	41496	552415.2	696595.0
41393	552427.2	696350.3	41497	552454.0	696573.5
41394	552434.9	696366.6	41498	552477.9	696575.0
41395	552501.5	696335.2	41499	552498.6	696583.3
41396	552502.4	696336.6	41500	552530.9	696603.8
41397	552524.0	696331.6	41501	552536.1	696601.9
41398	552526.0	696336.6	41502	552546.7	696610.5
41399	552560.9	696410.2	41503	552581.3	696610.3
41400	552580.5	696401.0	41504	552605.9	696598.3
41401	552545.6	696327.1	41505	552640.2	696550.2
41402	552557.9	696308.4	41506	552594.4	696569.5
41403	552361.3	696269.4	41507	552572.2	696578.7
41404	552370.3	696246.2	41508	552557.3	696577.6
41405	552349.8	696202.9	41509	552556.7	696566.9
41406	552319.0	696188.7	41510	552519.7	696545.2
41407	552279.8	696268.7	41511	552500.4	696534.0
41408	552315.6	696325.1	41512	552478.6	696528.6
41409	552229.3	696370.1	41513	552455.5	696524.3
41410	552199.3	696455.7	41514	552439.7	696529.1
41411	552192.1	696506.9	41515	552395.1	696547.8
41412	552191.6	696556.9	41516	552375.4	696557.7
41413	552204.1	696607.3	41517	552354.9	696566.1
41414	552211.0	696655.0	41518	552334.3	696573.8
41415	552229.2	696701.2	41519	552327.1	696574.0
41416	552249.9	696742.8	41520	552313.2	696569.7
41417	552270.6	696784.4	41521	552297.6	696559.2
41418	552304.5	696859.1	41522	552286.8	696545.0
41419	552335.7	696923.6	41523	552279.6	696531.6
41420	552365.9	696968.6	41524	552271.1	696513.4
41421	552402.8	696952.2	41525	552273.0	696500.6
41422	552414.6	696947.5	41526	552275.4	696486.7
41423	552416.0	696946.8	41527	552281.2	696465.7
41424	552468.5	696921.2	41528	552297.6	696424.0
41425	552555.9	696878.6	41529	552306.2	696403.3
41426	552613.1	696850.7	41530	552357.5	696252.9
41427	552643.4	696836.0	41531	552366.0	696281.4
41428	552588.1	696722.5	41532	552309.0	696267.1
41429	552532.8	696609.1	41533	552319.7	696238.6
41430	552560.1	696614.9	41534	552331.9	696337.0
41431	552587.4	696608.6	41535	552336.3	696333.2
41432	552652.3	696577.9	41536	552342.9	696312.6
41433	552696.7	696555.1	41537	552341.0	696293.4
41434	552730.8	696540.8	41538	552329.4	696289.6
41435	552776.0	696519.5	41539	552311.7	696277.6
41436	552821.2	696498.1	41540	552301.0	696276.0
41437	552866.4	696476.7	41541	552293.3	696293.5

* HORIZONTAL POSITION REPRESENTED BY DATA LISTED ABOVE WAS DEVELOPED FROM VARIOUS SOURCES. (SEE NOTES 3 & 4 ON SHEET 1)

COVER TYPES (ENGINEERED)

AREA	ORIGINAL CONDITION	COVER TYPE
1	VARIES	ABOVE GRADE PERMEABLE COVER
2	VARIES	AT GRADE PERMEABLE COVER
3	PLANTER WITH GRASS SHRUBS, SMALL TREES	AT GRADE PERMEABLE COVER
6	DRAINAGE SWALE	GRAVEL/COBBLE LINED
7	DRAINAGE SWALE	CONCRETE CULVERT (BENEATH EAST-CENTRAL HIDE PILE REMEDIATED SLOPE)
9	WETLANDS	ABOVE GRADE PERMEABLE COVER (WETLANDS REMEDIATION)
10	WETLANDS	DREDGE SEDIMENT, PLACE PERMEABLE COVER (WETLANDS REMEDIATION)
11	EAST HIDE PILE	IMPERMEABLE COVER (EAST HIDE PILE REMEDIATION)
12	VARIES	ABOVE GRADE PERMEABLE COVER (EXTENT OF SOUTH HIDE PILE REMEDIATION)
13	SOUTH HIDE PILE	ABOVE GRADE PERMEABLE COVER
14	EAST CENTRAL HIDE PILE	ABOVE GRADE PERMEABLE COVER
15	DEPRESSION VEGETATION VARIES	AT GRADE PERMEABLE COVER
16	RAILROAD LINES	RAILROAD COVER
17	VARIES	PLACE TRENCH DRAIN
18	VARIES	GRAVEL ACCESS ROAD
19	CHROMIUM LAGOONS	FILL, ABOVE GRADE PERMEABLE COVER
20	CONCRETE FOUNDATION	CLEAR, CLEAN & PATCH
22	PAVED	REGRADE, ABOVE GRADE ASPHALT
23	VARIES	PLACE CULVERT
24	CULVERT	EXTEND CULVERT
25	VARIES	SEE NOTE 4 (SHEET 11-3D) (ON REFERENCE PLAN 2)
26	VARIES	ABOVE GRADE ASPHALT COVER
27	VARIES	EXCAVATE, STORMWATER STORAGE, PLACE 16" FILL
28	DRAINAGE CHANNEL	DREDGE 16" SEDIMENT, PLACE GRAVEL/COBBLE LINING
29	EXISTING MDC SEWER SERVICE	RAISE MANHOLES
31	DRAINAGE SWALE	DREDGE 16", PLACE GRAVEL/COBBLE (GROUNDWATER RECHARGE BASIN)
32	VARIES	AT GRADE COVER (GRAVEL SURFACE)
33	VARIES	ABOVE GRADE COVER (GRAVEL SURFACE)
34	VARIES	GROUNDWATER TREATMENT PLANT
35	VEGETATION VARIES	AT GRADE ASPHALT COVER
36	WEST HIDE PILE	ABOVE GRADE PERMEABLE COVER
37	VARIES	GRAVEL/COBBLE LINED CREATED WETLAND STREAM
38	VARIES	DETENTION BASIN REMEDIATION IMPERMEABLE COVER
39	VARIES	LIMITS OF RIP RAP = 6" STONE (DRAINAGE SWALE / COBBLE LINED)
40	VARIES	GRAVEL ACCESS ROAD IMPERMEABLE COVER

1 & 12 & 13 ABOVE GRADE PERMEABLE COVER
2 AT GRADE ENGINEERED PERMEABLE COVER
18 GRAVEL ACCESS ROAD PERMEABLE COVER
31 LIMITS OF RIP RAP = 3" STONE (DRAINAGE SWALE / COBBLE LINED) PERMEABLE COVER
33 ABOVE GRADE ENGINEERED GRAVEL COVER
38 IMPERMEABLE COVER
39 LIMITS OF RIP RAP = 6" STONE (DRAINAGE SWALE / COBBLE LINED) IMPERMEABLE COVER
40 GRAVEL ACCESS ROAD IMPERMEABLE COVER

COVER TYPES (EQUIVALENT)

AREA	ORIGINAL CONDITION	EQUIVALENT COVER TYPE
4	PAVED	EQUIVALENT COVER
5	BUILDING	EQUIVALENT COVER
8	BEDROCK DRAINAGE SWALE	BLAST/EXCAVATE CHANNEL EQUIVALENT COVER
21	BEDROCK OUTCROP	ORUR & CLEAN EQUIVALENT COVER
30	STACK	EQUIVALENT COVER

4 PAVED EQUIVALENT COVER
5 BUILDING EQUIVALENT COVER

RESTRICTED AREAS BY CLASSES OF LAND

CLASS OF LAND	DESCRIPTION
A	MAY CONTAIN CONTAMINATED GROUNDWATER
B	MAY CONTAIN CONTAMINATED GROUNDWATER, AND MAY CONTAIN CONTAMINATED SOILS. NO COVER WAS REQUIRED WITHIN CLASS B.
C	MAY CONTAIN CONTAMINATED GROUNDWATER, AND CONTAINS CONTAMINATED SOIL AND COVER.
D	MAY CONTAIN CONTAMINATED GROUNDWATER, AND CONTAINS CONTAMINATED SOIL AND COVER. CLASS D ALSO CONTAINS FOUR ANIMAL HIDE PILES.

NOTE:

1. EXISTING IMPROVEMENTS SHOWN (OUTSIDE THE ENGINEERED COVER) FOR LOT 10-1-2 ARE PER REFERENCE PLAN #3b AND ARE NOT THE RESULT OF A FIELD SURVEY BY THIS OFFICE.

LEGEND

BOUNDARY LINE
RIGHT-OF-WAY
ABUTTING PROPERTY LINES
ASPHALT, CONCRETE, GRANITE CURB
TRANSITION ZONE
N 551,000 LAND CLASS LINE
GRID LINE
IPLEX SITE LIMIT
EDGE OF EXISTING PAVEMENT
LIMIT OF GEOTEXTILE
A.T.&T. FIBER OPTIC CABLE
EXTRUSION SEAM TIE-IN
HIDE PILE SEAM LINE
TOE OF SLOPE
TOP OF SLOPE
LIMIT CHAIN LINK FENCE
EDGE OF ASBUILT GRAVEL ROAD
BACK EDGE OF PLANTER
EDGE OF PROPOSED PAVEMENT
EXISTING EASEMENT
ASBUILT CULVERT
LIMIT OF TREE LINE
EXISTING CONCRETE STRUCTURE
ASBUILT FINISH GRADE CONTOUR 5' INTERVAL
ASBUILT FINISH GRADE CONTOUR 1' INTERVAL
OHW OVERHEAD WIRES
UGG UNDERGROUND GAS LINE
LIMITS OF EXISTING EASEMENTS
EDGE OF EXISTING BUILDINGS
33 ASBUILT COVER TYPE
TEST PIT
MW MONITOR WELL
HYDRANT
GATE VALVE
CATCH BASIN (SQUARE)
CATCH BASIN (ROUND)
DRAIN MANHOLE
SEWER MANHOLE
UTILITY POLE
GUY WIRE
ASBUILT POINT NO. & LOCATION
GAS METER
GAS SHUT OFF
WATER SHUT OFF
WATER CONTROL BOX
SIGN
BOLLARD
TELEPHONE MANHOLE
99999 POINT MARKER (SEE POINTS CHART)
AREA OF LEDGE AT SUBGRADE
CLASS D LAND – HILE PILES

X / C-XX — DETAIL/CROSS SECTION DESIGNATION / SHEET No. WHERE DETAIL/CROSS SECTION IS PRESENTED

GRAPHIC SCALE
50' 25' 0 50' 100' 150'

REV.	DATE	DESCRIPTION	DR	CK
I	4/24/08	FINAL SUBMISSION	TC DBM	MDP
H	2/8/08	EPA & DEP COMMENTS OF 2/4/08	TC DBM	MDP
G	9/29/07	EPA & DEP COMMENTS OF 8/29/07	JF CAC	MDP
F	5/15/07	EPA & DEP COMMENTS OF 8/3/06	JF CAC	MDP
E	9/21/05	EPA & DEP COMMENTS OF 7/12/04	KL MDP	JGK
D	6/11/04	EPA & DEP COMMENTS OF 10/30/03	JF MDP	JGK
C	10/16/03	DEP REVISIONS	JF MDP	JGK
B	5/30/01	ISSUE FOR REVIEW	MDP	JGK
A	8/8/00	ISSUE FOR REVIEW	MDP	JGK

FINAL

PROFESSIONAL LAND SURVEYOR

PROFESSIONAL ENGINEER

PREPARED FOR: ROUX ASSOCIATES, INC. Environmental Consulting & Management

PREPARED BY: MERIDIAN Land Services, Inc. ENGINEERS - LAND SURVEYORS - SCIENTISTS - LAND PLANNERS

DESIGNED BY: Golder Associates, Manchester, New Hampshire, 400 Commercial Street, Manchester, N.H. USA 03101, 603-668-0880 • FAX 603-668-1199

PROJECT RECORD (TAX MAP LOT 10-1-6)

COVER TYPES AND TRANSITIONS

INDUSTRI-PLEX SITE REMEDIAL TRUST
WOBURN, MASSACHUSETTS

AUGUST 8, 2000

SCALE: 1" = 50'

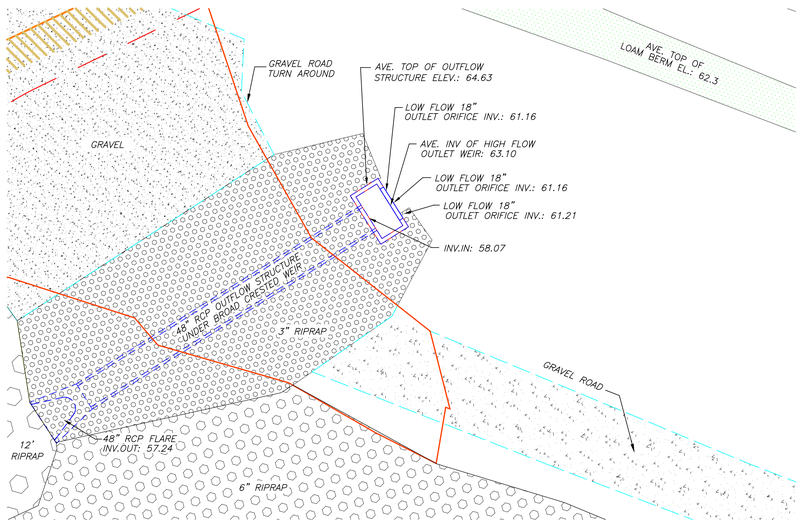
DESIGNED BY: MDP	C-60
DRAFTED BY: MDP	SHEET NO.
CHECKED BY: JGK	
FILE: 29003815.dwg	PROJECT: 2900.00
DO NOT SCALE DRAWING	SHEET 5 OF 7

Apr 24, 2008 – 2:02pm MDP Land Desktop 2004 – LDT4
H:\rmw\U2900-10-AR\2900.38\AS-BUILTS\0-PARCEL-1\

Apr 24, 2008 - 2:07pm MDP Land Desktop 2004 - LDT4
H:\mls\02900-0-AB\2900.38\AS-BUILTS\0-PARCEL-1\

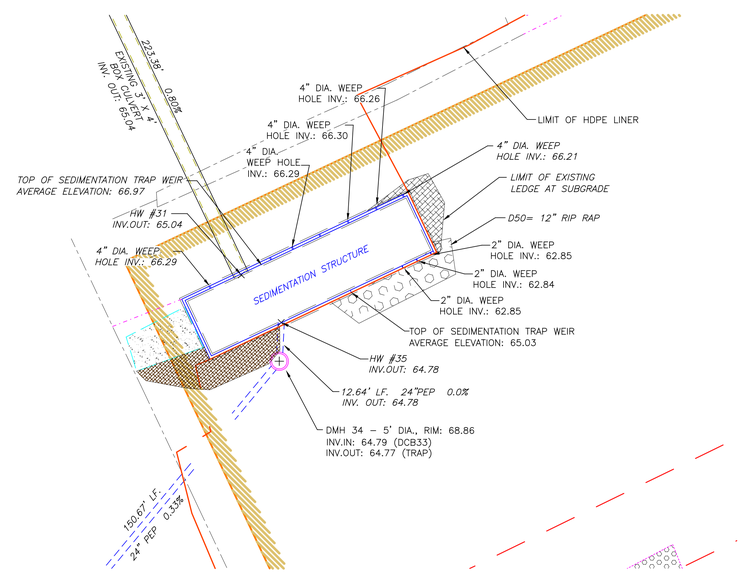
POINT NUMBER	NORTHING	EASTING	ELEVATION	DESCRIPTION
4003	552278.1	694558.1	58.85	REPAIRAY
4004	552278.4	694557.8	58.85	REPAIRAY
4005	552278.5	694557.8	58.85	REPAIRAY
4006	552278.5	694557.8	59.36	REPAIRQ
4007	552278.5	694557.8	59.36	REPAIRQ
4008	552278.5	694557.8	59.36	REPAIRQ
4009	552278.5	694557.8	59.36	REPAIRQ
4010	552278.5	694557.8	59.36	REPAIRQ
4011	552278.5	694557.8	59.36	REPAIRQ
4012	552278.5	694557.8	59.36	REPAIRQ
4013	552278.5	694557.8	59.36	REPAIRQ
4014	552278.5	694557.8	59.36	REPAIRQ
4015	552278.5	694557.8	59.36	REPAIRQ
4016	552278.5	694557.8	59.36	REPAIRQ
4017	552278.5	694557.8	59.36	REPAIRQ
4018	552278.5	694557.8	59.36	REPAIRQ
4019	552278.5	694557.8	59.36	REPAIRQ
4020	552278.5	694557.8	59.36	REPAIRQ
4021	552278.5	694557.8	59.36	REPAIRQ
4022	552278.5	694557.8	59.36	REPAIRQ
4023	552278.5	694557.8	59.36	REPAIRQ
4024	552278.5	694557.8	59.36	REPAIRQ
4025	552278.5	694557.8	59.36	REPAIRQ
4026	552278.5	694557.8	59.36	REPAIRQ
4027	552278.5	694557.8	59.36	REPAIRQ
4028	552278.5	694557.8	59.36	REPAIRQ
4029	552278.5	694557.8	59.36	REPAIRQ
4030	552278.5	694557.8	59.36	REPAIRQ
4031	552278.5	694557.8	59.36	REPAIRQ
4032	552278.5	694557.8	59.36	REPAIRQ
4033	552278.5	694557.8	59.36	REPAIRQ
4034	552278.5	694557.8	59.36	REPAIRQ
4035	552278.5	694557.8	59.36	REPAIRQ
4036	552278.5	694557.8	59.36	REPAIRQ
4037	552278.5	694557.8	59.36	REPAIRQ
4038	552278.5	694557.8	59.36	REPAIRQ
4039	552278.5	694557.8	59.36	REPAIRQ
4040	552278.5	694557.8	59.36	REPAIRQ
4041	552278.5	694557.8	59.36	REPAIRQ
4042	552278.5	694557.8	59.36	REPAIRQ
4043	552278.5	694557.8	59.36	REPAIRQ
4044	552278.5	694557.8	59.36	REPAIRQ
4045	552278.5	694557.8	59.36	REPAIRQ
4046	552278.5	694557.8	59.36	REPAIRQ
4047	552278.5	694557.8	59.36	REPAIRQ
4048	552278.5	694557.8	59.36	REPAIRQ
4049	552278.5	694557.8	59.36	REPAIRQ
4050	552278.5	694557.8	59.36	REPAIRQ
4051	552278.5	694557.8	59.36	REPAIRQ
4052	552278.5	694557.8	59.36	REPAIRQ
4053	552278.5	694557.8	59.36	REPAIRQ
4054	552278.5	694557.8	59.36	REPAIRQ
4055	552278.5	694557.8	59.36	REPAIRQ
4056	552278.5	694557.8	59.36	REPAIRQ
4057	552278.5	694557.8	59.36	REPAIRQ
4058	552278.5	694557.8	59.36	REPAIRQ
4059	552278.5	694557.8	59.36	REPAIRQ
4060	552278.5	694557.8	59.36	REPAIRQ
4061	552278.5	694557.8	59.36	REPAIRQ
4062	552278.5	694557.8	59.36	REPAIRQ
4063	552278.5	694557.8	59.36	REPAIRQ
4064	552278.5	694557.8	59.36	REPAIRQ
4065	552278.5	694557.8	59.36	REPAIRQ
4066	552278.5	694557.8	59.36	REPAIRQ
4067	552278.5	694557.8	59.36	REPAIRQ
4068	552278.5	694557.8	59.36	REPAIRQ
4069	552278.5	694557.8	59.36	REPAIRQ
4070	552278.5	694557.8	59.36	REPAIRQ
4071	552278.5	694557.8	59.36	REPAIRQ
4072	552278.5	694557.8	59.36	REPAIRQ
4073	552278.5	694557.8	59.36	REPAIRQ
4074	552278.5	694557.8	59.36	REPAIRQ
4075	552278.5	694557.8	59.36	REPAIRQ
4076	552278.5	694557.8	59.36	REPAIRQ
4077	552278.5	694557.8	59.36	REPAIRQ
4078	552278.5	694557.8	59.36	REPAIRQ
4079	552278.5	694557.8	59.36	REPAIRQ
4080	552278.5	694557.8	59.36	REPAIRQ
4081	552278.5	694557.8	59.36	REPAIRQ
4082	552278.5	694557.8	59.36	REPAIRQ
4083	552278.5	694557.8	59.36	REPAIRQ
4084	552278.5	694557.8	59.36	REPAIRQ
4085	552278.5	694557.8	59.36	REPAIRQ
4086	552278.5	694557.8	59.36	REPAIRQ
4087	552278.5	694557.8	59.36	REPAIRQ
4088	552278.5	694557.8	59.36	REPAIRQ
4089	552278.5	694557.8	59.36	REPAIRQ
4090	552278.5	694557.8	59.36	REPAIRQ
4091	552278.5	694557.8	59.36	REPAIRQ
4092	552278.5	694557.8	59.36	REPAIRQ
4093	552278.5	694557.8	59.36	REPAIRQ
4094	552278.5	694557.8	59.36	REPAIRQ
4095	552278.5	694557.8	59.36	REPAIRQ
4096	552278.5	694557.8	59.36	REPAIRQ
4097	552278.5	694557.8	59.36	REPAIRQ
4098	552278.5	694557.8	59.36	REPAIRQ
4099	552278.5	694557.8	59.36	REPAIRQ
4100	552278.5	694557.8	59.36	REPAIRQ
4101	552278.5	694557.8	59.36	REPAIRQ
4102	552278.5	694557.8	59.36	REPAIRQ
4103	552278.5	694557.8	59.36	REPAIRQ
4104	552278.5	694557.8	59.36	REPAIRQ
4105	552278.5	694557.8	59.36	REPAIRQ
4106	552278.5	694557.8	59.36	REPAIRQ
4107	552278.5	694557.8	59.36	REPAIRQ
4108	552278.5	694557.8	59.36	REPAIRQ
4109	552278.5	694557.8	59.36	REPAIRQ
4110	552278.5	694557.8	59.36	REPAIRQ
4111	552278.5	694557.8	59.36	REPAIRQ
4112	552278.5	694557.8	59.36	REPAIRQ
4113	552278.5	694557.8	59.36	REPAIRQ
4114	552278.5	694557.8	59.36	REPAIRQ
4115	552278.5	694557.8	59.36	REPAIRQ
4116	552278.5	694557.8	59.36	REPAIRQ
4117	552278.5	694557.8	59.36	REPAIRQ
4118	552278.5	694557.8	59.36	REPAIRQ
4119	552278.5	694557.8	59.36	REPAIRQ
4120	552278.5	694557.8	59.36	REPAIRQ
4121	552278.5	694557.8	59.36	REPAIRQ
4122	552278.5	694557.8	59.36	REPAIRQ
4123	552278.5	694557.8	59.36	REPAIRQ
4124	552278.5	694557.8	59.36	REPAIRQ
4125	552278.5	694557.8	59.36	REPAIRQ
4126	552278.5	694557.8	59.36	REPAIRQ
4127	552278.5	694557.8	59.36	REPAIRQ
4128	552278.5	694557.8	59.36	REPAIRQ
4129	552278.5	694557.8	59.36	REPAIRQ
4130	552278.5	694557.8	59.36	REPAIRQ
4131	552278.5	694557.8	59.36	REPAIRQ
4132	552278.5	694557.8	59.36	REPAIRQ
4133	552278.5	694557.8	59.36	REPAIRQ
4134	552278.5	694557.8	59.36	REPAIRQ
4135	552278.5	694557.8	59.36	REPAIRQ
4136	552278.5	694557.8	59.36	REPAIRQ
4137	552278.5	694557.8	59.36	REPAIRQ
4138	552278.5	694557.8	59.36	REPAIRQ
4139	552278.5	694557.8	59.36	REPAIRQ
4140	552278.5	694557.8	59.36	REPAIRQ
4141	552278.5	694557.8	59.36	REPAIRQ
4142	552278.5	694557.8	59.36	REPAIRQ
4143	552278.5	694557.8	59.36	REPAIRQ
4144	552278.5	694557.8	59.36	REPAIRQ
4145	552278.5	694557.8	59.36	REPAIRQ
4146	552278.5	694557.8	59.36	REPAIRQ
4147	552278.5	694557.8	59.36	REPAIRQ
4148	552278.5	694557.8	59.36	REPAIRQ
4149	552278.5	694557.8	59.36	REPAIRQ
4150	552278.5	694557.8	59.36	REPAIRQ
4151	552278.5	694557.8	59.36	REPAIRQ
4152	552278.5	694557.8	59.36	REPAIRQ
4153	552278.5	694557.8	59.36	REPAIRQ
4154	552278.5	694557.8	59.36	REPAIRQ
4155	552278.5	694557.8	59.36	REPAIRQ
4156	552278.5	694557.8	59.36	REPAIRQ
4157	552278.5	694557.8	59.36	REPAIRQ
4158	552278.5	694557.8	59.36	REPAIRQ
4159	552278.5	694557.8	59.36	REPAIRQ
4160	552278.5	694557.8	59.36	REPAIRQ
4161	552278.5	694557.8	59.36	REPAIRQ
4162	552278.5	694557.8	59.36	REPAIRQ
4163	552278.5	694557.8	59.36	REPAIRQ
4164	552278.5	694557.8	59.36	REPAIRQ
4165	552278.5	694557.8	59.36	REPAIRQ
4166	552278.5	694557.8	59.36	REPAIRQ
4167	552278.5	694557.8	59.36	REPAIRQ
4168	552278.5	694557.8	59.36	REPAIRQ
4169	552278.5	694557.8	59.36	REPAIRQ
4170	552278.5	694557.8	59.36	REPAIRQ
4171	552278.5	694557.8	59.36	REPAIRQ
4172	552278.5	694557.8	59.36	REPAIRQ
4173	552278.5	694557.8	59.36	REPAIRQ
4174	552278.5	694557.8	59.36	REPAIRQ
4175	552278.5	694557.8	59.36	REPAIRQ
4176	552278.5	694557.8	59.36	REPAIRQ
4177	552278.5	694557.8	59.36	REPAIRQ
4178	552278.5	694557.8	59.36	REPAIRQ
4179	552278.5	694557.8	59.36	REPAIRQ
4180	552278.5	694557.8	59.36	REPAIRQ
4181	552278.5	694557.8	59.36	REPAIRQ
4182	552278.5	694557.8	59.36	REPAIRQ
4183	552278.5	694557.8	59.36	REPAIRQ
4184	552278.5	694557.8	59.36	REPAIRQ
4185	552278.5	694557.8	59.36	REPAIRQ
4186	552278.5	694557.8	59.36	REPAIRQ
4187	552278.5	694557.8	59.36	REPAIRQ
4188	552278.5	694557.8	59.36	REPAIRQ
4189	552278.5	694557.8	59.36	REPAIRQ
4190	552278.5	694557.8	59.36	REPAIRQ
4191	552278.5	694557.8	59.36	REPAIRQ
4192	552278.5	694557.8	59.36	REPAIRQ
4193	552278.5	694557.8	59.36	REPAIRQ
4194	552278.5	694557.8	59.36	REPAIRQ
4195	552278.5	694557.8	59.36	REPAIRQ
4196	552278.5	694557.8	59.36	REPAIRQ
4197	552278.5	694557.8	59.36	REPAIRQ
4198	552278.5	694557.8	59.36	REPAIRQ
4199	552278.5	694557.8	59.36	REPAIRQ
4200	552278.5	694557.8	59.36	REPAIRQ
4201	552278.5	694557.8	59.36	REPAIRQ
4202	552278.5	694557.8	59.36	REPAIRQ
4203	552278.5	694557.8	59.36	REPAIRQ
4204	552278.5	694557.8	59.36	REPAIRQ
4205	552278.5	694557.8	59.36	REPAIRQ
4206	552278.5	694557.8	59.36	REPAIRQ
4207	552278.5	694557.8	59.36	REPAIRQ
4208	552278.5	694557.8	59.36	REPAIRQ
4209	552278.5	694557.8	59.36	REPAIRQ
4210	552278.5	694557.8	59.36	REPAIRQ
4211	552278.5	694557.8	59.36	REPAIRQ
4212	552278.5	694557.8	59.36	REPAIRQ
4213	552278.5	694557.8	59.36	REPAIRQ
4214	552278.5	694557.8	59.36	REPAIRQ
4215	552278.5	694557.8	59.36	REPAIRQ
4216	552278.5	694557.8	59.36	REPAIRQ
4217	552278.5	694557.8	59.36	REPAIRQ
4218	552278.5	694557.8	59.36	REPAIRQ
4219	552278.5	694557.8	59.36	REPAIRQ
4220	552278.5	694557.8	59.36	REPAIRQ
4221	552278.5	694557.8	59.36	REPAIRQ
4222	552278.5	694557.8	59.36	REPAIRQ
4223	552278.5	694557.8	59.36	REPAIRQ
4224	552278.5	694557.8	59.36	REPAIRQ
4225	552278.5	694557.8	59.36	REPAIRQ
4226	552278.5	694557.8	59.36	REPAIRQ
4227	552278.5	694557.8	59.36	REPAIRQ
4228	552278.5	694557.8	59.36	REPAIRQ
4229	552278.5	694557.8	59.36	REPAIRQ
4230	552278.5	694557.8	59.36	REPAIRQ
4231	552278.5	694557.8	59.36	REPAIRQ
4232	552278.5	694557.8	59.36	REPAIRQ
4233	552278.5	694557.8	59.36	REPAIRQ
4234	552278.5	694557.8	59.36	REPAIRQ
4235	552278.5	694557.8	59.36	REPAIRQ
4236	552278.5	694557.8	59.36	REPAIRQ
4237	552278.5	694557.8	59.36	REPAIRQ
4238	552278.5	694557.8	59.36	REPAIRQ
4239	552278.5	694557.8	59.36	REPAIRQ
4240	552278.5	694557.8	59.36	REPAIRQ
4241	552278.5	694557.8	59.36	REPAIRQ
4242	552278.5	694557.8	59.36	REPAIRQ
4243	552278.5	694557.8	59.36	REPAIRQ
4244	552278.5	694557.8	59.36	REPAIRQ
4245	552278.5	694557.8	59.36	REPAIRQ
4246	552278.5	694557.8	59.36	REPAIRQ
4247	552278.5	694557.8	59.36	REPAIRQ
4248	552278.5	694557.8	59.36	REPAIRQ
4249	552278.5	694557.8	59.36	REPAIRQ
4250	552278.5	694557.8	59.36	REPAIRQ
4251	552278.5	694557.8	59.36	REPAIRQ
4252	552278.5	694557.8	59.36	REPAIRQ
4253	552278.5	694557.8	59.36	REPAIRQ
4254	552278.5	694557.8	59.36	REPAIRQ
4255	552278.5	694557.8	59.36	REPAIRQ
4256	552278.5	694557.8	59.36	REPAIRQ
4257	552278.5	694557.8	59.36	REPAIRQ
4258	552278.5	694557.8	59.36	REPAIRQ
4259	552278.5	694557.8	59.36	REPAIRQ
4260	552278.5	694557.8	59.36	REPAIRQ
4261	552278.5	694557.8	59.36	REPAIRQ
4262	552278.5	694557.8	59.36	REPAIRQ

POINT NUMBER	NORTHING	EASTING	ELEVATION	DESCRIPTION
4263	552278.5	694557.8	59.36	REPAIRQ
4264	552278.5	694557.8	59.36	REPAIRQ
4265	552278.5	694557.8	59.36	REPAIRQ
4266	552278.5	694557.8	59.36	REPAIRQ
4267	552278.5	694557.8	59.36	REPAIRQ
4268	552278.5	694557.8	59.36	REPAIRQ
4269	552278.5	694557.8	59.36	REPAIRQ
4270	552278.5	694557.8	59.36	REPAIRQ
4271	552278.5	694557.8	59.36	REPAIRQ
4272	552278.5	694557.8	59.36	REPAIRQ
4273	552278.5	694557.8	59.36	REPAIRQ
4274	552278.5	694557.8	59.36	REPAIRQ
4275	552278.5	694557.8	59.36	REPAIRQ
4276	552278.5	694557.8	59.36	REPAIRQ
4277	552278.5	694557.8	59.36	REPAIRQ
4278	552278.5	694557.8	59.36	REPAIRQ
4279	552278.5	694557.8	59.36	REPAIRQ
4280	552278.5	694557.8	59.36	REPAIRQ
4281	552278.5	694557.8	59.36	REPAIRQ
4282	552278.5	694557.8	59.36	REPAIRQ
4283	552278.5	694557.8	59.36	REPAIRQ
4284	552278.5	694557.8	59.36	REPAIRQ
4285	552278.5	694557.8	59.36	REPAIRQ
4286	552278.5	694557.8	59.36	REPAIRQ
4287	552278.5	694557.8	59.36	REPAIRQ
4288	552278.5	694557.8	59.36	REPAIRQ
4289	552278.5	694557.8	59.36	REPAIRQ
4290	552278.5	694557.8	59.36	REPAIRQ
4291	552278.5	694557.8	59.36	REPAIRQ
4292	552278.5	694557.8	59.36	REPAIRQ
4293	552278.5	694557.8	59.36	REPAIRQ
4294	552278.5	694557.8	59.36	REPAIRQ
4295	552278.5	694557.8	59.36	REPAIRQ
4296	552278.5	694557.8	59.36	REPAIRQ
4297	552278.5	694557.8	59.36	REPAIRQ
4298	552278.5	694557.8	59.36	REPAIRQ
4299	552278.5	694557.8	59.36	REPAIRQ
4300	552278.5	694557.8	59.36	REPAIRQ
4301	552278.5	694557.8	59.36	REPAIRQ
4302	552278.5	694557.8	59.36	REPAIRQ
4303	552278.5	694557.8	59.36	REPAIRQ
4304	552278.5	694557.8	59.36	REPAIRQ
4305	552278.5	694557.8	59.36	REPAIRQ
4306	552278.5	694557.8	59.36	REPAIRQ
4307	552278.5	694557.8	59.36	REPAIRQ
4308	552278.5	694557.8	59.36	REPAIRQ
4309	552278.5	694557.8	59.36	REPAIRQ
4310	552278.5	694557.8	59.36	REPAIRQ
4311	552278.5	694557.8	59.36	REPAIRQ
4312	552278.5	694557.8	59.36	REPAIRQ
4313	552278.5	694557.8	59.36	REPAIRQ
4314	552278.5	694557.8	59.36	REPAIRQ
4315	552278.5	694557.8	59.36	REPAIRQ
4316	552278.5	694557.8	59.36	REPAIRQ
4317	552278.5	694557.8	59.36	REPAIRQ
4318	552278.5	694557.8	59.36	REPAIRQ
4319	552278.5	694557.8	59.36	REPAIRQ
4320	552278.5	694557.8	59.36	REPAIRQ
4321	552278.5	694557.8	59.36	REPAIRQ
4322	552278.5	694557.8	59.36	REPAIRQ
4323	552278.5	694557.8	59.36	REPAIRQ
4324	552278.5	694557.8	59.36	REPAIRQ
4325	552278.5	694557.8	59.36	REPAIRQ
4326	552278.5	694557.8	59.36	REPAIRQ
4327	552278.5	694557.8	59.36	REPAIRQ
4328	552278.5	694557.8	59.36	REPAIRQ
4329	552278.5	694557.8	59.36	REPAIRQ
4330	552278.5	694557.8	59.36	REPAIRQ
4331	552278.5	694557.8	59.36	REPAIRQ
4332	552278.5	694557.8	59.36	REPAIRQ
4333	552278.5	694557.8	59.36	REPAIRQ
4334	552278.5	694557.8	59.36	REPAIRQ
4335	552278.5	694557.8	59.36	REPAIRQ
4336	552278.5	694557.8	59.36	REPAIRQ
4337	552278.5	694557.8	59.36	REPAIRQ
4338	552278.5	694557.8	59.36	REPAIRQ
4339	552278.5	694557.8	59.36	REPAIRQ
4340	552278.5	694557.8	59.36	REPAIRQ
4341	552278.5	694557.8	59.36	REPAIRQ
4342	552278.5	694557.8	59.36	REPAIRQ
4343	552278.5	694557.8	59.36	REPAIRQ
4344	552278.5	694557.8	59.36	REPAIRQ
4345	552278.5	694557.8	59.36	REPAIRQ
4346	552278.5	694557.8	59.36	REPAIRQ
4347	552278.5	694557.8	59.36	REPAIRQ
4348	552278.5	694557.8	59.36	REPAIRQ
4349	552278.5	694557.8	59.36	REPAIRQ
4350	552278.5	694557.8	59.36	REPAIRQ
4351	552278.5	694557.8	59.36	REPAIRQ
4352	552278.5	694557.8	59.36	REPAIRQ
4353	552278.5	694557.8	59.36	REPAIRQ
4354	552278.5	694557.8	59.36	REPAIRQ
4355	552278.5	694557.8	59.36	REPAIRQ
4356	552278.5	694557.8	59.36	REPAIRQ
4357	552278.5	694557.8	59.36	REPAIRQ
4358	552278.5	694557.8	59.36	REPAIRQ
4359	552278.5	694557.8	59.36	REPAIRQ
4360	552278.5	694557.8	59.36	REPAIRQ
4361	552278.5	694557.8	59.36	REPAIRQ
4362	552278.5	694557.8	59.36	REPAIRQ
4363	552278.5	694557.8	59.36	REPAIRQ
4364	552278.5	694557.8	59.36	REPAIRQ
4365	552278.5	694557.8	59.36	REPAIRQ
4366	552278.5	694557.8	59.36	REPAIRQ
4367	552278.5	694557.8	59.36	REPAIRQ
4368	552278.5	694557.8	59.36	REPAIRQ
4369	552278.5	694557.8	59.36	REPAIRQ
4370	552278.5	694557.8	59.36	REPAIRQ
4371	552278.5	694557.8	59.36	REPAIRQ
4372	552278.5	694557.8	59.36	REPAIRQ
4373	552278.5	694557.8	59.36	REPAIRQ
4374	552278.5	694557.8	59.36	REPAIRQ
4375	552278.5	694557.8	59.36	REPAIRQ
4376	552278.5	694557.8	59.36	REPAIRQ
4377	552278.5	694557.8	59.36	REPAIRQ
4378	552278.5	694557.8	59.36	REPAIRQ
4379	552278.5	694557.8	59.36	REPAIRQ
4380	552278.5	694557.8	59.36	REPAIRQ
4381	552278.5	694557.8	59.36	REPAIRQ
4382	552278.5	694557.8	59.36	REPAIRQ
4383	552278.5	694557.8	59.36	REPAIRQ
4384	552278.5	694557.8	59.36	REPAIRQ
4385	552278.5	694557.8	59.36	REPAIRQ
4386	552278.5	694557.8	59.36	REPAIRQ
4387	552278.5	694557.8	59.36	REPAIRQ
4388	552278.5	694557.8	59.36	REPAIRQ
4389	552278.5	694557.8	59.36	REPAIRQ
4390	552278.5	694557.8	59.36	REPAIRQ
4391	552278.5	694557.8	59.36	REPAIRQ
4392	552278.5	694557.8	59.36	REPAIRQ
4393	552278.5	694557.8	59.36	REPAIRQ
4394	552278.5	694557.8	59.36	REPAIRQ
4395	552278.5	694557.8	59.36	REPAIRQ
4396	552278.5	694557.8	59.36	REPAIRQ
4397	552278.5	694557.8	59.36	REPAIRQ
4398	552278.5	694557.8	59.36	REPAIRQ
4399	552278.5	694557.8	59.36	REPAIRQ
4400	552278.5	694557.8	59.36	REPAIRQ
4401	552278.5	694557.8	59.36	REPAIRQ
4402	552278.5	694557.8	59.36	REPAIRQ
4403	552278.5	694557.8	59.36	REPAIRQ
4404	552278.5	694557.8	59.36	REPAIRQ
4405	552278.5	694557.8	59.36	REPAIRQ
4406	552278.5	694557.8	59.36	REPAIRQ
4407	552278.5	694557.8	59.36	REPAIRQ
4408	552278.5	694557.8	59.36	REPAIRQ
4409	552278.5	694557.8	59.36	REPAIRQ
4410	552278.5	694557.8	59.36	REPAIRQ
4411	552278.5	694557.8	59.36	REPAIRQ
4412	552278.5	694557.8	59.36	REPAIRQ
4413	552278.5	694557.8	59.36	REPAIRQ
4414	552278.5	694557.8	59.36	REPAIRQ
4415	552278.5	694557.8	59.36	REPAIRQ
4416	552278.5	694557.8	59.36	REPAIRQ
4417	552278.5	694557.8	59.36	REPAIRQ
4418	552278.5	694557.8	59.36	REPAIRQ
4419	552278.5	694557.8	59.36	REPAIRQ
4420	552278.5	694557.8	59.36	REPAIRQ
4421	552278.5	694557.8	59.36	REPAIRQ
4422	552278.5	694557.8	59.36	REPAIRQ
4423	552278.5	694557.8	59.36	REPAIRQ
4424	552278.5	694557.8	59.36	REPAIRQ
4425	552278.5	694557.8	59.36	REPAIRQ
4426	552278.5	694557.8	59.36	REPAIRQ
4427	552278.5	694557.8	59.36	REPAIRQ
4428	552278.5	694557.8	59.36	REPAIRQ
4429	552278.5	694557.8	59.36	REPAIRQ
4430	552278.5	694557.8	59.36	REPAIRQ
4431	552278.5	694557.8	59.36	REPAIRQ
4432	552278.5	694557.8	59.36	REPAIRQ
4433	552278.5	694557.8	59.36	REPAIRQ
4434	552278.5	694557.8	59.36	REPAIRQ
4435	552278.5	694557.8	59.36	REPAIRQ
4436	552278.5	694557.8	59.36	REPAIRQ
4437	552278.5	694557.8	59.36	REPAIRQ
4438	552278.5	694557.8	59.36	REPAIRQ
4439	552278.5	694557.8	59.36	REPAIRQ
4440	552278.5	694557.8	59.36	REPAIRQ
4441	552278.5	694557.8	59.36	REPAIRQ
4442	552278.5	694557.8	59.36	REPAIRQ
4443	552278.5	694557.8	59.36	REPAIRQ
4444	552278.5	694557.8	59.36	REPAIRQ
4445	552278.5	694557.8	59.36	REPAIRQ
4446	552278.5	694557.8	59.36	REPAIRQ
4447	552278.5	694557.8	59.36	REPAIRQ
4448	552278.5	694557.8	59.36	REPAIRQ
4449	552278.5	694557.8	59.36	REPAIRQ
4450	552278.5	694557.8	59.36	REPAIRQ
4451	552278.5	694557.8	59.36	REPAIRQ
4452	552278.5	694557.8	59.36	REPAIRQ
4453	552278.5	694557.8	59.36	REPAIRQ
4454	552278.5	694557.8	59.36	REPAIRQ
4455



1 / C-62 **OUTFLOW STRUCTURE**

SCALE: 1 = 10'



2 / C-62 **SEDIMENTATION STRUCTURE**

SCALE: 1 = 20'

LEGEND

X / C-62 — DETAIL/CROSS SECTION DESIGNATION
SHEET No. WHERE DETAIL/CROSS SECTION IS PRESENTED

NOTES

1.) SEE SPECIFICATIONS FOR DETAILS AND MATERIALS USED.

2.) FOR SLOPES FLATTER THAN 25% A 16oz. NONWOVEN GEOTEXTILE WAS INSTALLED ON HIDE PILES AND A 6oz. NONWOVEN GEOTEXTILE WAS INSTALLED ELSEWHERE.

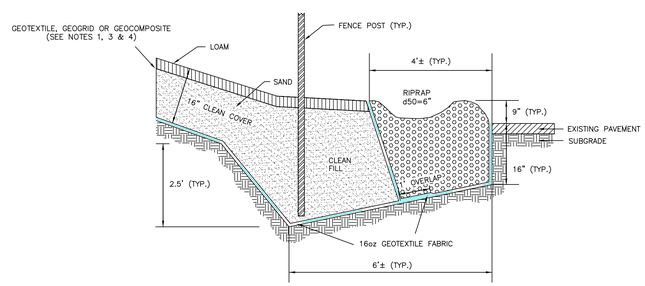
3.) FOR SLOPES 25% OR STEEPER, A GEOSYNTHETIC DRAIN WAS USED AS FOLLOWS:

a. ON HIDE PILES, A GEOCOMPOSITE DRAIN WAS EXTENDED FROM THE TOE OF SLOPE A DISTANCE EQUAL TO A 10 FOOT CHANGE IN ELEVATION. A 16oz. NONWOVEN GEOTEXTILE WAS USED ELSEWHERE AND FIELD SEWN WITH THE GEOCOMPOSITE.

b. IN AREAS OTHER THAN HIDE PILES, A 16oz. NONWOVEN GEOTEXTILE WAS USED THROUGHOUT.

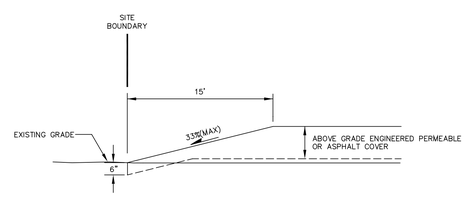
4.) FOR SLOPES STEEPER THAN 33%, A GEOGRID WAS PLACED DIRECTLY ABOVE THE GEOSYNTHETIC AND EXTENDED A DISTANCE OF 10 FEET BEYOND THE CREST OF THE SLOPE. FOR SLOPES 50% OR STEEPER A RIPRAP FACING WAS PLACED WITHOUT GEOGRID.

5.) PLEASE REFER TO THE REGIONAL TRANSPORTATION CENTER COVER CERTIFICATION REPORT AND AS-BUILT RECORDS FOR ADDITIONAL DETAILS RELATED TO THE REGIONAL TRANSPORTATION CENTER.



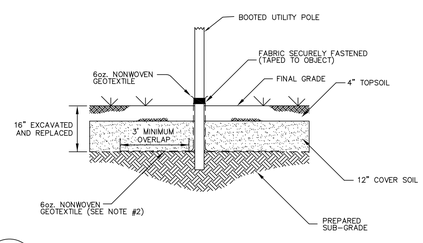
4 / C-62 **ENGINEERED FENCE TRENCH ADJACENT TO PAVEMENT**

NOT TO SCALE



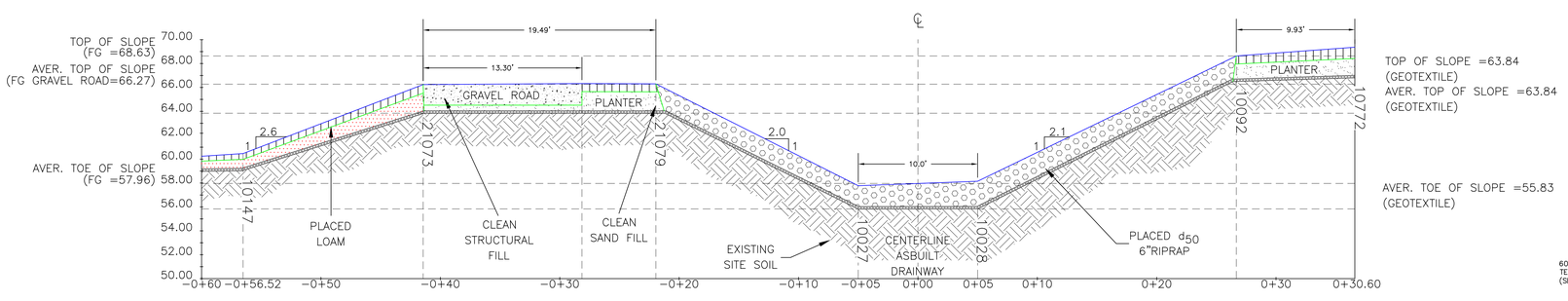
5 / C-62 **TYPICAL TYPE 3 TRANSITION**

NOT TO SCALE



6 / C-62 **TYPICAL 'BOOT' DETAIL FOR UTILITY POLE**

NOT TO SCALE



3 / C-62 **CROSS-SECTION STA. 5+50 AAD (SOUTH)**

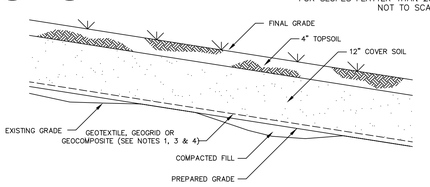
SCALE: 1 = 10'

NOTE: ELEVATIONS FOR SAND FILL BELOW GRAVEL ROAD WERE NOT MEASURED, THEREFORE CROSS-SECTION DEPICTS DESIGN DATA.

COVER TYPES

1 & 12 & 13 **ABOVE GRADE ENGINEERED PERMEABLE COVER**

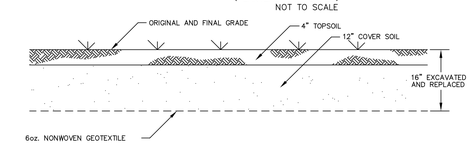
FOR SLOPES FLATTER THAN 25%
NOT TO SCALE



COVER TYPES

2 **AT GRADE ENGINEERED PERMEABLE COVER**

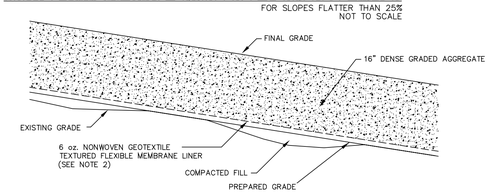
(PLANTERS WITH GRASS)
NOT TO SCALE



COVER TYPE

18 **GRAVEL ACCESS ROAD ENGINEERED PERMEABLE COVER**

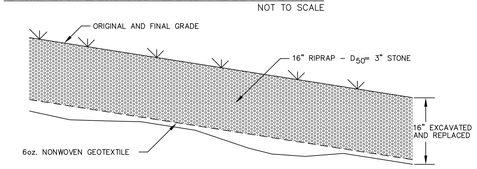
FOR SLOPES FLATTER THAN 25%
NOT TO SCALE



COVER TYPE

31 **LIMITS OF RIPRAP ▪ 3" STONE PERMEABLE DRAINAGE SWALE/COBBLE LINES**

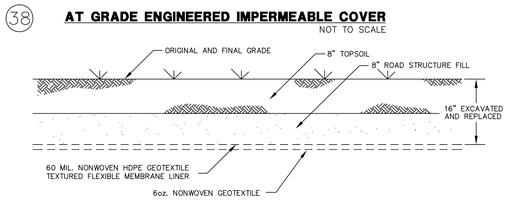
NOT TO SCALE



COVER TYPE

38 **AT GRADE ENGINEERED IMPERMEABLE COVER**

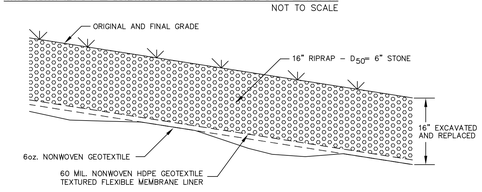
NOT TO SCALE



COVER TYPE

39 **LIMITS OF RIPRAP ▪ 6" STONE IMPERMEABLE DRAINAGE SWALE/COBBLE LINES**

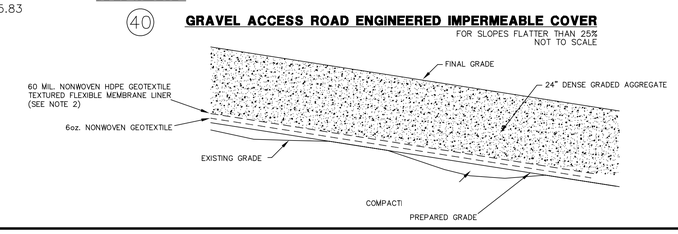
NOT TO SCALE



COVER TYPE

40 **GRAVEL ACCESS ROAD ENGINEERED IMPERMEABLE COVER**

FOR SLOPES FLATTER THAN 25%
NOT TO SCALE



REV.	DATE	DESCRIPTION	DR	CK
I	4/24/08	FINAL SUBMISSION	TC DBM	MDP MDP
H	3/28/08	EPA & DEP COMMENTS OF 3/26/08	TC DBM	MDP MDP
G	9/20/07	EPA & DEP COMMENTS OF 8/29/07	JF CAC	MDP MDP
F	5/15/07	EPA & DEP COMMENTS OF 8/3/06	JF CAC	MDP MDP
E	9/21/05	EPA & DEP COMMENTS OF 7/12/04	KL MDP	JCK JCK
D	6/11/04	EPA & DEP COMMENTS OF 10/30/03	JF MDP	JCK JCK
C	10/16/03	DEP REVISIONS	JF MDP	JCK JCK
B	8/11/03	EPA REVISIONS	JF MDP	JCK JCK
A	8/8/00	ISSUE FOR REVIEW	MDP	JCK

FINAL

PROFESSIONAL LAND SURVEYOR

PROFESSIONAL ENGINEER

PREPARED FOR: ROUX — ROUX ASSOCIATES, INC. Environmental Consulting & Management

PREPARED BY: MERIDIAN Land Services, Inc. — 2 Technology Park Drive, Westford, MA 01886 · Tel. 978-692-1313 · www.meridianlandservices.com — ENGINEERS · LAND SURVEYORS · SCIENTISTS · LAND PLANNERS

DESIGNED BY: Golder Associates — Manchester, New Hampshire — 400 Commercial Street, Manchester, N.H. USA 03101 — 603-668-0880 • FAX 603-668-1199

PROJECT RECORD (TAX MAP LOT 10-1-6)

DETAILS AND TRANSITIONS

INDUSTRI-PLEX SITE REMEDIAL TRUST
WOBURN, MASSACHUSETTS

AUGUST 8, 2000

SCALE: 1" = AS SHOWN

DESIGNED BY: MDP	C-62
DRAFTED BY: MDP	SHEET NO.
CHECKED BY: JCK	
FILE: 29003817.dwg	PROJECT: 2900.00
DO NOT SCALE DRAWING	SHEET 7 OF 7

Apr 28, 2008 – 11:03am MDP Land Desktop 2004 – LDT4
H:\mis\02900-0-AB\2900.38\AS-BUILTS\0-PARCEL-1\

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
ONE CONGRESS STREET SUITE 1100
BOSTON, MASSACHUSETTS 02114-2023

April 25, 2008

Cynthia Brooks
Resources for Responsible Site Management, Inc.
44 Shattuck Road
Watertown, MA 02472

Re: Industri-plex Superfund Site, Operable Unit 1: Final Property-Specific Cover Certification Report for 30 Atlantic Avenue, Woburn, MA, (Tax Map 10-1-6).

Please find attached the property-specific final Cover Certification Report (CCR) for your property located at 30 Atlantic Avenue, Woburn, MA, (Tax Map 10-1-6), containing the South Hide Pile and Detention Basin. This CCR documents the completion of a portion of the Remedial Action for soil, sediments, and air at the Industri-Plex Superfund Site, Operable Unit 1, Woburn, MA, in accordance with approved 100% Design Report, dated April 1992. The Remedial Action implemented on your property was required by the Consent Decree entered on April 24, 1989 by the United States District Court for the District of Massachusetts in the matter styled United States v. Stauffer Chemical Company et al., Civil Action No. 89-0195-MC, and Commonwealth of Massachusetts v. Stauffer Chemical Company et al., Civil Action No. 89-0196-MC.

The CCR contains detailed full-size Record Drawings illustrating the Remedial Action implemented on your property, such as the location of Engineered and/or Equivalent Covers which serve as barriers preventing contact to the underlying Contaminated Soils. The Record Drawings also illustrate the location of various land classifications designated on your property (i.e. Land Class A, B, C and/or D), which represent various conditions and restrictions. The details contained in the CCR, particularly the Record Drawings, will be useful towards ensuring the long protectiveness of the remedy and compliance with institutional controls (i.e. Grant of Environmental Restriction).

In addition to the CCR, your are also being provided:

1) a set of half-size Record Drawings; and

2) a compact disc containing electronic versions of the CCR, as well as electronic CAD files of the Record Drawings.

The half-size drawings will be useful towards your periodic inspection of the remedial action implemented on your property, as well as any consideration you may have towards implementing

future intrusive work on the property that may affect the remedial action. If you elect to alter the remedial action on your property (e.g. Engineered or Equivalent Covers), then you will be required to prepare As Built Records. The As Built Records are engineering drawings and other records depicting the location and details of remedial action alterations, and Clean Corridors, as constructed on the property. EPA expects the As Built Records to include engineering drawings which are similar in detail and quality as the Record Drawings. The electronic CAD files provided in the attached compact disc can be utilized by the owner and/or their designated surveyor to effectively and efficiently alter the Record Drawings and prepare adequate As Built Records.

The next steps in the superfund process for this property will be the inauguration and recording of the Grant of Environmental Restrictions (Grant). A package will be sent to you regarding the inauguration requirements for your property. Because your property is one of two properties expediting Grant recordation at the site, you may already be well underway with the inauguration process.

If you should have any questions regarding this letter, please contact me at (617) 918-1323.

Sincerely,

Joseph F. LeMay, P.E.
Remedial Project Manager
Office Site Remediation and Restoration

cc: Bob Cianciarulo, EPA (letter)
David Peterson, EPA (letter)
Jennifer McWeeney, MassDEP
Andy Cohen, MassDEP (letter)
Tim Cosgrave, ISRT Coordinator (letter)
Carol Dickerson, SMC (letter)
Randy Cooper, Monsanto (letter)
Marc Weinreich, RRSM (letter)