CDM
One Cambridge Place, 50 Hampshire Street
Cambridge, Massachusetts 02139
tel +1 617 452-6000
fax +1 617 452-8000

May 25, 2011

Ms. Janet S. Waldron
Project Manager
Bureau of Waste Site Cleanup
Massachusetts Department of Environmental Protection
One Winter Street
7th Floor
Boston, MA 02108

Mr. Derrick S. Golden
Remedial Project Manager
Office of Remediation and Restoration
U.S. EPA – Region 1
5 Post Office Square, Suite 100
Mail Code OSRR07-4
Boston, MA 02109-3912

Subject: Executed Construction Contract Documents – Specifications and Plans
Southern Mound Closure – Haverhill landfill
Construction Contract No. 1 - Project No. CWSRF – 3403
October 2010, Revised February 2011

Dear Ms. Waldron and Mr. Golden:

For your records, please find enclosed one copy of the executed contract documents for the above referenced project and an accompanying set of final plans. Also enclosed is a CD containing the same set of documents.

Please call me at (617) 452-6532 if you have any questions or require additional information.

Very truly yours,

Andrew B. Miller, P.E.
Associate
Camp Dresser & McKee Inc.

Enclosures

cc: Robert Ward, City of Haverhill (w/out enclosure)
Scott Colby, Aggregate Industries (w/out enclosure)
Dennis Lydon, Aggregate Industries (w/out enclosure)
Michael Leon, Esq., Nutter McClennen & Fish (w/out enclosure)
Craig Campbell, Esq., outside counsel to Aggregate (w/out enclosure)
Andrew Culbert, Esq., Masterman, Culbert & Tully (w/out enclosure)
Bruce Haskell, CDM (w/out enclosure)
File· CSA/4.13.6

Copy No. 11

IFB02011

CITY OF HAVERHILL, MASSACHUSETTS
AND
AGGREGATE INDUSTRIES – NORTHEAST REGION, INC.

PROJECT MANUAL

FOR

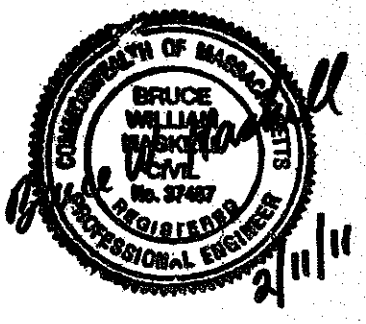
SOUTHERN MOUND CLOSURE – HAVERHILL LANDFILL
OLD GROVELAND ROAD
HAVERHILL, MASSACHUSETTS

CONTRACT NO. 1

PROJECT NO. CWSRF - 3403

OCTOBER 2010
REVISED FEBRUARY 2011

CITY OF HAVERHILL, MASSACHUSETTS	and	AGGREGATE INDUSTRIES – NORTHEAST REGION, INC.
JAMES J. FIORENTINI, MAYOR		GRAHAM HARDWICK, PRESIDENT



CAMP DRESSER & McKEE INC.
ONE CAMBRIDGE PLACE
50 HAMPSHIRE STREET
CAMBRIDGE, MASSACHUSETTS 02139

SPECIFICATIONS

Section 00100 – Instructions to Bidders

1. ADD under Paragraph 4.1:

   4.1.1 Alternatively questions may be submitted in writing via email to jonesne@cdm.com or faxed to 617-452-6563.

2. REPLACE Paragraph 11.6 with:

   11.6 If the Contract is to be awarded, OWNER will give the Successful Bidder a Notice of Award within ten days, excluding Saturdays, Sundays, and legal holidays after the actual date of the opening of the Bids. All bids shall remain open for sixty days, excluding Saturdays, Sundays, and legal holidays after the actual date of the opening of the Bids but OWNER may, at OWNER's sole discretion, release any Bid and return the Bid Security prior to that date.

Section 00300 – Bid Form

1. REPLACE second paragraph of the Bid Form with:

   The time period for holding bids, where Federal approval is not required is 60 days, Saturdays, Sundays and legal holidays excluded, after the opening of General Bids and where Federal approval is required, the time period for holding bids is 60 days, Saturdays, Sundays and holidays excluded after Federal approval.

Section 00800 – Supplementary Conditions

1. ADD under Article 14 – Payments to Contractor and Completion

   SC-14.02.A.1

   Delete the words "20 days" and replace with the following:

   45 days

   SC-14.02.B.1

   Delete the words "10 days" and replace with the following:

   15 days

   SC-14.02.C.1

   Delete the words "10 days" and replace with the following:

   30 days

2. ADD after page 00800-20 attached Federal Wage Rates.

Section 01010 – Summary of Work

1. ADD under Paragraph 1.05:

   B. Construct Permanent Gas Monitoring Wells shown on Sheet C-11 of the Drawings by August 1, 2011.

Section 01025 – Measurement and Payment

1. ADD under Paragraph 1.05.B:

   2. Actual quantity may be substantially different than estimated quantity shown on Bid Form. Payment for Item 4 will be made at the unit price bid regardless of quantity. Unit price bid should not include Contractor overhead and profit.

2. ADD under Paragraph 1.29.B:

   2. Actual quantity may be substantially different than estimated quantity shown on Bid Form. Payment for Item 4 will be made at the unit price bid regardless of quantity. Unit price bid should not include Contractor overhead and profit.

Section 02230 – Granular Fill Material

1. ADD under Paragraph 1.04:

   C. U.S. Environmental Protection Agency (EPA)

      1. EPA SW-486 - Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.

   D. Massachusetts Department of Environmental Protection Agency (MassDEP)

      1. 310 CMR 40.0000 – The Massachusetts Contingency Plan (MCP)

2. ADD under Paragraph 2.02:

   B. Chemical Analysis: For sand, backfill/fill, structural fill, select fill, and common fill to be placed above or outside limit of liner, obtain and analyze one composite soil sample from each borrow source prior to bringing such soil on-site.

      1. Analysis shall be performed by an independent environmental analysis laboratory with current MassDEP Certification for the following:

         a. Volatile organic compounds (VOCs) by EPA SW-846 Method 8260.

b. Semi-volatile organic compounds (SVOCs) by EPA SW-846 Method 8270.

c. Total EPA priority pollutant Metals by EPA SW-846 6000/7000 series.

d. Polychlorinated biphenols (PCBs) by EPA SW-846 Method 8080.

e. Pesticides by EPA SW-846 Method 8081.

f. Chlorinated Herbicides by EPA SW-846 Method 8151.

2. Submit a copy of all analytical results to the Engineer within 2 days of receipt of the laboratory report. Engineer's review of data will be 5 days.

3. Contractor shall not deliver material to site until Engineer issues written acceptance of the chemical analysis results.

4. Fill materials shall be deemed unsuitable for use if any parameter is greater than the MCP Reportable Concentration for Category S-1 Soil (RCS-1) and Contractor shall identify a different source for fill materials.

5. Fill materials placed upgradient of wetland resource areas shall be deemed unsuitable if any parameter is greater than MassDEP Stage I Freshwater Sediment Screening Criteria.

6. Fill materials placed on the private property located at 158 Old Groveland Road shall be deemed unsuitable if VOCs, SVOCs, or PCBs are detected above laboratory reporting limits.

Section 02612 – Reinforced Concrete Drain Pipe

1. REPLACE paragraph 1.02.A with the following:

A. Excavation and backfilling are included in Section 02200.

Section 02930 – Topsoil and Hydroseeding

1. ADD under Paragraph 1.04:

D. U.S. Environmental Protection Agency (EPA)

1. EPA SW-486 - Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.

E. Massachusetts Department of Environmental Protection Agency (MassDEP)

1. 310 CMR 40.0000 – The Massachusetts Contingency Plan (MCP)

2. ADD under Paragraph 2.01:

B. Chemical Analysis: Obtain and analyze one composite soil sample from each borrow source prior to bringing such soil on-site.

1. Analysis shall be performed by an independent environmental analysis laboratory with current MassDEP Certification for the following:

a. Volatile organic compounds (VOCs) by EPA SW-846 Method 8260.

b. Semi-volatile organic compounds (SVOCs) by EPA SW-846 Method 8270.

c. Total EPA priority pollutant Metals by EPA SW-846 6000/7000 series.

d. Polychlorinated biphenols (PCBs) by EPA SW-846 Method 8080.

e. Pesticides by EPA SW-846 Method 8081.

f. Chlorinated Herbicides by EPA SW-846 Method 8151.

2. Submit a copy of all analytical results to the Engineer within 2 days of receipt of the laboratory report. Engineer's review of data will be 5 days.

3. Contractor shall not deliver material to site until Engineer issues written acceptance of the chemical analysis results.

4. Topsoil shall be deemed unsuitable for use if any parameter is greater than the MCP Reportable Concentration for Category S-1 Soil (RCS-1) and Contractor shall identify a different source for fill materials.

5. Topsoil placed upgradient of wetland resource areas shall be deemed unsuitable if any parameter is greater than MassDEP Stage I Freshwater Sediment Screening Criteria.

6. Topsoil placed on the private property located at 158 Old Groveland Road shall be deemed unsuitable if VOCs, SVOCs, or PCBs are detected above laboratory reporting limits.

3. DELETE Paragraph 2.01.A.6.

<u>Section 02955 – Wetlands Restoration</u>

1. ADD under Paragraph 1.06:

C. U.S. Environmental Protection Agency (EPA)

1. EPA SW-486 - Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.

D. Massachusetts Department of Environmental Protection Agency (MassDEP)

1. 310 CMR 40.0000 – The Massachusetts Contingency Plan (MCP)

2. ADD under Paragraph 2.01:

L. Chemical Analysis: Obtain and analyze one composite soil sample from each borrow source prior to bringing such soil on-site.

1. Analysis shall be performed by an independent environmental analysis laboratory with current MassDEP Certification for the following:

a. Volatile organic compounds (VOCs) by EPA SW-846 Method 8260.

b. Semi-volatile organic compounds (SVOCs) by EPA SW-846 Method 8270.

c. Total EPA priority pollutant Metals by EPA SW-846 6000/7000 series.

d. Polychlorinated biphenols (PCBs) by EPA SW-846 Method 8080.

e. Pesticides by EPA SW-846 Method 8081.

f. Chlorinated Herbicides by EPA SW-846 Method 8151.

2. Submit a copy of all analytical results to the Engineer within 2 days of receipt of the laboratory report. Engineer's review of data will be 5 days.

3. Contractor shall not deliver material to site until Engineer issues written acceptance of the chemical analysis results.

4. Organic rich loam shall be deemed unsuitable for use if any parameter is greater than the MCP Reportable Concentration for Category S-1 Soil (RCS-1) or MassDEP Stage I Freshwater Screening Criteria and Contractor shall identify a different source for fill materials.

Section 11170 – Solar Ignited Vent Flares

1. REPLACE paragraph 1.01.A with the following:

A. Furnish all labor, materials, equipment and incidentals required for solar ignited vent flares to be mounted directly on all passive landfill gas vents as shown on the Drawings.

2. ADD under Paragraph 2.02.G:

1. Grounding rod shall not penetrate flexible membrane liner.

2. No later than 60 days prior to installation of flares, contractor shall submit detail showing how the electrical ground for each flare will be installed.

APPENDICES

The Water Quality Certificate included in Appendix A of the Project Manual is missing page 6. A complete Water Quality Certificate is attached to this Addendum No. 1.

Attachments
Figure Add 1-1
Figure Add 1-2
Figure Add 1-3
Federal Wage Rates
Water Quality Certificate

6-FT HIGH CHAIN LINK FENCE

18-IN RCP

11 D-2 FLARED END SECTION AND RIPRAP APRON
INV. 66.70
(D50 12-IN)
25' MIN. FROM EDGE OF WETLANDS

10 D-2 OUTLET RISER SECTION
STANDPIPE INV. 69.35
OVERFLOW GRATE INV. 71.35
OUTLET PIPE INV. 68.00

12 D-2 FOREBAY

13 D-2 DOUBLE LEAF SWING GATE

65.1 66.9 65.4 70.8 67.1 67.3 76.9 72.7 69.5 71.8 76.5 71.6 73.0 71.9 72.8 71.8 81.3 72.2 72.8 71.0

Z1 Z2 Z3 Z4 Z5

68 70 72 74 74 72

1" = 30'
15 0 30

Plot Stamp - ProjectWise Project: 0522\78856\04 Design Services NM_100%\15 Bidding Services\04 Addendo File: C:\CDMXM\JONESNE\D0507547\CSTPL101.DWG Saved by: JONESNE On: 22-Feb-11 Plotted on: 22-Feb-11 11:32 AM

REV. NO.	DATE	DRWN	CHK'D	REMARKS

DESIGNED BY: J. CORDA/N. JONES
DRAWN BY: J. CORDA
SHEET CHK'D BY: B. HASKELL
CROSS CHK'D BY: N. JONES
APPROVED BY: B. HASKELL
DATE: FEBRUARY 2011

CDM
Camp Dresser & McKee
One Cambridge Place, 50 Hampshire Street
Cambridge, MA 02139
Tel: (617) 452-6000
consulting • engineering • construction • operations

CITY OF HAVERHILL / AGGREGATE INDUSTRIES, INC. - NORTHEAST REGION
HAVERHILL, MASSACHUSETTS
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
CONTRACT NO. 1 - ADDENDUM NO. 1

NEW STORMWATER BASIN NO. 3

PROJECT NO. 0522-78856
FILE NAME: CSTPL101
FIGURE NO.
ADD. 1-1

DOUBLE LEAF SWING GATE (13 / D-2)

APPROX. LOCATION OF EXISTING 18-IN RCP CULVERT

EXISTING CULVERT

LIMIT OF 6-FT HIGH CHAIN LINK FENCE

REPLACE EXISTING DOUBLE LEAF SWING GATE (13 / D-2)

OUTLET PIPE TO CONNECT TO EXISTING 18-INCH RCP BENEATH EXISTING ACCESS ROAD

OUTLET RISER SECTION (12 / D-2)
STANDPIPE INV. 66.00
OVERFLOW GRATE INV. 68.00
OUTLET PIPE INV. 65.60

6-FT HIGH CHAIN LINK FENCE (14 / D-2)

RIPRAP APPRON (D50 12-IN) (11 / D-2)

FOREBAY (12 / D-2)

NOTE: CLEAN AND CONDUCT PHYSICAL INSPECTION OF THE EXISTING 18-INCH RCP CULVERT BENEATH THE INACTIVE LANDFILL ACCESS ROAD AND THE EXISTING CULVERT ACROSS OLD GROVELAND ROAD. AT LEAST 45 DAYS PRIOR TO CONSTRUCTION OF BASIN NO. 4, SUBMIT TO ENGINEER THE RESULTS OF THE PHYSICAL INSPECTIONS AND PROPOSED MEANS OF TYING IN THE BASIN NO. 4 OUTLET PIPE TO THE EXISTING CULVERT, INCLUDING ANY NECESSARY REPAIRS TO THE EXISTING RCP, AND ANY NECESSARY REPAIRS TO THE EXISTING CULVERT ACROSS OLD GROVELAND ROAD.

1" = 30'
15 0 30

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: J. COROA/N. JONES
DRAWN BY: J. COROA
SHEET CHK'D BY: L. RUGAY
CROSS CHK'D BY: N. JONES
APPROVED BY: B. HASKELL
DATE: FEBRUARY 2011

CDM
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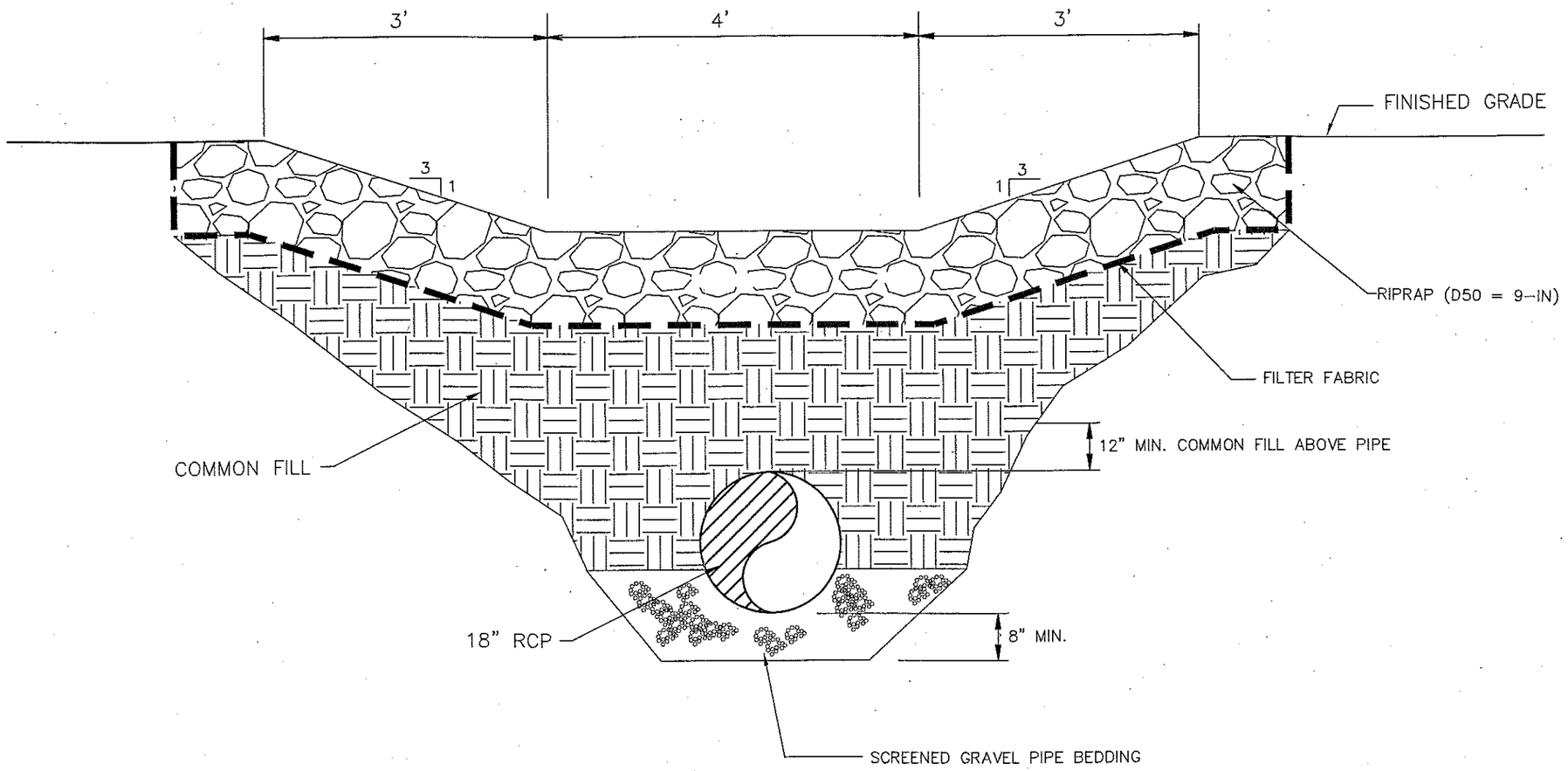
CITY OF HAVERHILL / AGGREGATE INDUSTRIES, INC. - NORTHEAST REGION
HAVERHILL, MASSACHUSETTS
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
CONTRACT NO. 1 - ADDENDUM NO. 1

NEW STORMWATER BASIN NO. 4

PROJECT NO. 0522-78856
FILE NAME: CSTPL102
FIGURE NO.
ADD. 1-2



OUTLET PIPE/EMERGENCY SPILLWAY

DETAIL 22

N.T.S.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: N. JONES
DRAWN BY: N. JONES
SHEET CHK'D BY: B. HASKELL
CROSS CHK'D BY: N. JONES
APPROVED BY: B. HASKELL
DATE: FEBRUARY 2011

CDM
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CITY OF HAVERHILL / AGGREGATE INDUSTRIES, INC. - NORTHEAST REGION
HAVERHILL, MASSACHUSETTS
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
CONTRACT NO. 1 - ADDENDUM NO. 1

OUTLET PIPE AND SPILLWAY DETAIL

PROJECT NO. 0522-78856
FILE NAME: CSTPL103
FIGURE NO.
ADD. 1-3

GENERAL DECISION: MA20100013 11/26/2010 MA13

Date: November 26, 2010
General Decision Number: MA20100013 11/26/2010

Superseded General Decision Number: MA20080013

State: Massachusetts

Construction Types: Heavy (Heavy and Marine)

Counties: Barnstable, Bristol, Dukes, Essex, Middlesex, Nantucket, Norfolk, Plymouth and Suffolk Counties in Massachusetts.

HEAVY AND MARINE CONTRUCTION PROJECTS

Modification Number	Publication Date
0	03/12/2010
1	03/19/2010
2	03/26/2010
3	04/02/2010
4	04/09/2010
5	04/16/2010
6	04/23/2010
7	05/14/2010
8	06/04/2010
9	07/16/2010
10	07/23/2010
11	08/06/2010
12	08/20/2010
13	09/03/2010
14	10/08/2010
15	10/22/2010
16	11/26/2010

BOIL0029-001 10/01/2009

	Rates	Fringes
BOILERMAKER	$ 38.25	17.04

BRMA0001-011 03/01/2010

FOXBORO CHAPTER

BRISTOL (Attleboro, Berkley, Dighton, Mansfield, North Attleboro, Norton, Raynham, Rehoboth, Seekonk, Taunton); NORFOLK, (Bellingham, Canton, Dedham, Foxboro, Franklin, Norfolk, Norwood, Plainville, Sharon, Walpole, Westrwood, Wrentham); and PLYMOUTH (Lakeville)

	Rates	Fringes
Bricklayer/Cement Mason	$ 43.86	24.15

BRMA0001-012 03/01/2010

LOWELL CHAPTER

MIDDLESEX (Acton, Ashby, Ayer, Bedford, Billerica, Boxboro, Carlisle, Chemsford, Dracut, Dunstabale, Ft Devens, Groton, Littleton, Lowell, North Acton, Pepperell, Shirley, South Acton, Tewksbury, Townsend, Tyngsboro, West Acton, Westford, Wilmington)

	Rates	Fringes
BRICKLAYER	$ 43.86	24.15

BRMA0001-013 03/01/2010

LOWELL CHAPTER
MIDDLESEX (Ashland, Framingham, Holliston, Hopkinton, Hudson, Maynard, Natick, Sherbvorn, Stow); and NORFOLK (Medfield, Medway, Millis)

	Rates	Fringes
BRICKLAYER	$ 43.86	24.15

BRMA0003-001 02/01/2010

	Rates	Fringes
Marble & Tile Finisher	$ 34.59	22.40
Marble, Tile & Terrazzo Workers	$ 44.65	23.62
TERRAZZO FINISHER	$ 43.55	23.45

BRMA0003-003 02/01/2010

BOSTON CHAPTER
MIDDLESEX (Arlington, Cambridge, Everett, Malden, Medford, Melrose, Somerville); NORFOLK (Brookline, Milton); and SUFFOLK

	Rates	Fringes
BRICKLAYER	$ 44.61	23.84

BRMA0003-011 02/01/2010

LYNN CHAPTER

ESSEX (Amesbury, Andover, Beverly, Boxford, Danvers, Essex, Georgetown, Gloucester, Groveland, Hamilton, Haverhill, Ipswich, Lawrence, Lynn, Lynnfield, Manchester, Marblehead, Merrimac, Methuen, Middleton, Nahant, Newbury, Newburyport, North Andover, Peabody, Rockport, Rowley, Salisbury, Salem, Saugus, Swampscott, Topsfield, Wakefield, Wenham, West Newbury); and MIDDLESEX (North Reading, Reading, Wakefield)

	Rates	Fringes
Bricklayer/Cement Mason	$ 44.61	23.84

BRMA0003-012 02/01/2010

	Rates	Fringes

BRICKLAYER
WALTHAM CHAPTER -
MIDDLESEX (Belmont,
Burlington, Concord,
Lexington, Lincoln,
Stoneham, Sudbury,
Waltham, Watertown,
Wayland, Weston,
Winchester, Woburn).....$ 44.61 23.84

BRMA0003-014 02/01/2010

QUINCY CHAPTER

PLYMOUTH COUNTY (Abington, Bridgewater, Brockton, Carver, Duxbury, East Bridgewater, Halifax, Hanover, Hanson, Hingham, Hull, Kingston, Marshfield, Middleboro, Norwell, Pembroke, Plymouth, Rockland, Scituate, West Bridgewater, Whitman)

	Rates	Fringes
Bricklayer/Cement Mason.....	$ 44.61	23.84

BRMA0003-025 02/01/2010

NEW BEDFORD CHAPTER

BARNSTABLE; BRISTOL (Acushnet, Darmouth, Fairhaven, Fall River, Freetown, New Bedford, Somerset, Swansea, Westport); DUKES; NANTUCKET; PLYMOUTH (Marion, Mattapoisett, Rochester, Wareham)

	Rates	Fringes
Bricklayer/Cement Mason.....	$ 44.61	23.84

BRMA0003-033 02/01/2010

NEWTON CHAPTER
MIDDLESEX (Newton); NORFOLK (Dover, Needham, Wellesley)

	Rates	Fringes
Bricklayer, Plasterer.....	$ 44.61	23.84

CARP0026-003 03/01/2010

BRISTOL (Attleborough, North Attleborough); ESSEX; MIDDLESEX (Except Belmont, Cambridge, Everett, Malden, Medford, Somerville); AND NORFOLK (Bellingham, Braintree, Canton, Cohassett, Foxboro, Franklin, Medfield, Medway, Millis, Needham, Norfolk, Norwood, Plainville, Quincy, Sharon, Walpole, Wellesley, Westwood, Weymouth, Wrentham) COUNTIES

	Rates	Fringes
CARPENTER.....	$ 31.73	23.56

CARP0033-003 03/01/2010

MIDDLESEX (Belmont, Cambridge, Everett, Malden, Medford, Somerville); NORFOLK (Brookline, Dedham, Milton); AND SUFFOLK COUNTIES

	Rates	Fringes
CARPENTER	$ 37.03	24.94

CARP0056-001 08/01/2010

All of SUFFOLK COUNTY; and those areas of BARNSTABLE, BRISTOL, ESSEX, MIDDLESEX, NORFOLK, and PLYMOUTH COUNTIES situated INSIDE Boston Beltway (I-495) and North of Cape Cod Canal. ALL of DUKES and NANTUCKET COUNTIES

	Rates	Fringes
PILEDRIVERMAN	$ 37.37	25.80

CARP0056-002 08/01/2010

The areas of BARNSTABLE, BRISTOL, PLYMOUTH, and NORFOLK COUNTIES situated OUTSIDE Boston Beltway (I-495) and South of Cape Cod Canal

	Rates	Fringes
PILEDRIVERMAN	$ 37.37	25.80

CARP0056-003 08/01/2010

Those areas of ESSEX and MIDDLESEX COUNTIES situated OUTSIDE Boston Beltway (I-495)

	Rates	Fringes
PILEDRIVERMAN	$ 37.37	25.80

CARP0056-004 08/01/2010

	Rates	Fringes
DIVER TENDER	$ 37.37	25.80
DIVER	$ 52.32	25.80

CARP0424-001 03/01/2010

NORFOLK (Braintree, Quincy, Cohasset, Weymouth, etc.) PLYMOUTH (Duxbury, Hanover, Hull, Hingham, Marshfield, Norwell, Pembroke Rockland, Scituate)

	Rates	Fringes
CARPENTER	$ 31.73	23.56

CARP0624-002 03/01/2010

BARNSTABLE; BRISTOL (Except Attleboro & North Attleboro); DUKES; NANTUCKET; NORFOLK (Avon, Holbrook, Randolph, Stoughton); PLYMOUTH (Bridgewater, Kingston, Lakeville,

Middleboro, Plymouth, S. Hanover, Whitman)

	Rates	Fringes
CARPENTER	$ 31.73	23.56

CARP1121-001 05/02/2010

	Rates	Fringes
MILLWRIGHT	$ 29.78	18.61

ELEC0096-001 06/01/2010

MIDDLESEX (Ashby, Ashland, Ayer, Ft. Devens, Groton, Hopkinton, Hudson, Marlboro, Pepperell, Shirley, Stow, Townsend)

	Rates	Fringes
ELECTRICIAN	$ 35.91	17.58
Teledata System Installer	$ 26.91	14.31

ELEC0099-001 06/01/2010

BRISTOL (Attleboro, North Attleboro, Seekonk)

	Rates	Fringes
ELECTRICIAN	$ 34.08	56.26%
Teledata System Installer	$ 25.56	12.87

ELEC0103-002 09/01/2010

ESSEX (Amesbury, Andover, Boxford, Georgetown, Groveland, Haverhill, Lawrence, Merrimac, Methuen, Newbury, Newburyport, North Andover, Rowley, Salisbury, West Newbury); MIDDLESEX (Bedford, Billerica, Boxboro, Burlington, Carlisle, Chelmsford, Dracut, Dunstable littleton, Lowell, North Reading, Tewksbury, Tyngsboro, Westford, Wilmington)

	Rates	Fringes
ELECTRICIAN	$ 41.45	26.05

ELEC0103-004 09/01/2010

ESSEX (Beverly, Danvers, Essex, Gloucester, Hamilton, Ipswich, Manchester, Marblehead, Middleton, Peabody, Rockport, Salem, Topsfield, Wenham)

	Rates	Fringes
ELECTRICIAN	$ 41.45	26.05

ELEC0103-005 09/01/2010

ESSEX (Lynn, Lynnfield, Nahant, Saugus, Swampscott); MIDDLESEX (Acton, Arlington, Belmont, Cambridge, Concord, Everett, Framingham, Holliston, Lexington, Lincoln, Malden, Maynard, Medford, Melrose, Natick, Newton, Reading, Sherborn,

Somerville, Stoneham, Sudbury, Wakefield, Waltham, Watertown, Wayland, Weston, Winchester, Woburn); NORFOLK (Bellingham, Braintree, Brookline, Canton, Cohasset, Dedham, Dover, Foxboro, Frankloin, Medfield, Medway, Millis, Milton, Needham, Norfolk, Norwood, Quincy, Sharon, Walpole, Wellesley, Westwood, Weymouth, Wrentham); PLYMOUTH (Hingham and Hull);SUFFOLK

	Rates	Fringes
ELECTRICIAN	$ 41.45	26.05

ELEC0104-001 08/31/2009

	Rates	Fringes
Line Construction:		
Cableman	$ 34.89	7.50+A
Equipment Operator	$ 34.89	11.50+A
Groundman	$ 22.58	7.50+A
Lineman	$ 41.05	14.43+A

A. PAID HOLIDAYS: New Year's Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day; Christmas Day and Columbus Day, provided the employee has been employed 5 working days prior to any one of the listed holidays.

ELEC0223-002 09/01/2010

BARNSTABLE, BRISTOL (Except Attleboro, North Attleboro, Seekonk); DUKES; NANTUCKET; PLYMOUTH (Except Hingham and Hull Twps); NORFOLK (Avon, Halbrook, Randolph, Sloughton)

	Rates	Fringes
ELECTRICIAN	$ 34.74	18.31

ENGI0004-009 12/01/2009

	Rates	Fringes
Power equipment operators:		
Group 1	$ 38.48	20.84+A
Group 2	$ 38.14	20.84+A
Group 3	$ 27.84	20.84+A
Group 4	$ 32.69	20.84+A
Group 5	$ 21.70	20.84+A
Group 6	$ 24.67	20.84+A

HOURLY PREMIUM FOR BOOM LENGTHS (Including Jib):
Over 150 ft. +1.99
Over 185 ft. +3.48
Over 210 ft. +4.90
Over 250 ft. +7.42
Over 295 ft. +10.29
Over 350 ft. +11.96

FOOTNOTE FOR POWER EQUIPMENT OPERATORS:
A. PAID HOLIDAYS: New Year's Day, Washington,s Birthday, Labor Day, Memorial Day, Independence Day, Patriot's Day,

Columbus Day, Veteran's Day, Thanksgiving Day, Christmas Day

POWER EQUIPMENT OPERATORS CLASSIFICATIONS [HEAVY CONSTRUCTION]

GROUP 1: Power shovel; crane; truck crane; derrick; pile driver; trenching machine; mechanical hoist pavement breaker; cement concrete paver; dragline; hoisting engine; three drum machine; pumpcrete machine; loaders; shovel dozer; front end loader; mucking machine; shaft hoist; steam engine; backhoe; gradall; cable way; fork lift; cherry picker; boring machine; rotary drill; post hole hammer; post hole digger; asphalt plant on job site; concrete batching and/or mixing plant on job site; crusher plant on job site; paving concrete mixer; timber jack

GROUP 2: Sonic or vibratory hammer; grader; scraper; tandem scraper; bulldozer; tractor; mechanic - maintenance; York rake; mulching machine; paving screed machine;stationary steam boiler; paving concrete finishing machine; grout pump; portable steam boiler; portable steam generator; roller; spreader; asphalt paver; locomotives or machines used in place thereof; tamper (self propelled or tractor-draw); cal tracks; ballast regulator;rail anchor machine; switch tamper; tire truck

GROUP 3: Pumps (1-3 grouped); compressor; welding machines (1-3 grouped); generator; sighting plant; heaters (power driven, 1- 5); syphon-pulsometer; concrete mixer; valves controlling permanent plant air steam, conveyor, wellpoint system (operating)

GROUP 4: Assitant engineer (fireman)

GROUP 5: Oiler (other than truck cranes and gradalls)

GROUP 6: Oiler (on truck cranes and gradalls)

POWER EQUIPMENT OPERATORS CASSIFICATIONS [MARINE CONSTRUCTION]

Group 1: Shovel; crane; truck crane; cherry picker; derrick; pile driver; two or more drum machines; lighters; derrick boats; trenching machines; mechanic hoist pavement breakers; cement concrete pavers; draglines; hoisting engines; pumpcrete machines; elevating graders; shovel dozer; front end loader; backhoe; gradall; cable ways; boring machine; rotary drill; post hole hammer; post hole digger; fork lift; timber jack; asphalt plant (on site); concrete batching and/or mixing plant (on site); crusher plant (on site); paving concrete mixer

Group 2: Portable steam boiler; portable steam generator; sonic or vibratory hammer; grader; scraper; tandem scraper; concrete pump; bulldozer; tractor; York rake; mulching machine; roller; spreader; tamper (self-propelled or tractor-drawn); asphalt paver; concrete mixer with side loader; mechanic - maintenance; cal tracks; ballast regulator; switch tamper; rail anchor machine; tire truck

Group 3: Pumps (1-3 grouped); comressor; welding machines (1-3 grouped); generator; lighting plant; heaters (power driven 1-5); syphon-pulsometer; concrete mixer; valves controlling permanent plant air or steam; conveyor; well point systems; auger (powered by independent engines and attached to pile drivers); hydraulic saws

Group 4: Fireman

Group 5: Assistant engineer (other than truck crane and gradall)

Group 6: Assistant engineer (on truck crane and gradall)

IRON0007-001 09/16/2010

AREA 1: BRISTOL (Easton); ESSEX (Beverly,Gloucester,Lynn, Lynnfield, Manchester,Marblehead, Nahant, Salem, Saugus, Swampscott); MIDDLESEX (Arlington, Bedford, Belmont, Burlington, Cambridge, Concord,Everett, Framingham, Lexington, Lincoln, Malden, Maynard, Medford, Melrose, Natick, Newton, Reading, Sherborn, Somerville, Stoneham, Sudbury, Wakefield, Waltham, Watertown, Wayland, Weston, Winchester, Woburn); NORFOLK (Except Medway); PLYMOUTH (Abington, Bridgewater, Brocton, Duxbury, East Bridgewater, Halifax, Hanover, Hanson, Hingham, Hull, Kingston, Marshfield, Norwell, Pembroke, Plymouth, Plympton, Rockland, Scituate, West Bridgewater, Whitman); SUFFOLK

AREA 2: ESSEX (Amesbury, Andover, Boxford, Danvers, Essex, Georgetown, Hamilton, Haverhill, Ipswich, Lawrence, Merrimac, Methuen, Newbury, Newburyport, North Andover, Rockport, Rowley, Salisbury, Topsfield, Wenham, West Newbury); MIDDLESEX (Action,Billerica, Carlisle, Chelmsford, Dracut, Dunstable, Groton, Groveland, Littleton, Lowell, Middleton, North Reading, Pepperell, Tewksbury, Tyngsboro, Westford, Wilminton)

	Rates	Fringes
IRONWORKER		
AREA 1	$ 36.28	26.41
AREA 2	$ 31.87	26.41

IRON0007-010 09/16/2010

MIDDLESEX (Ashby, Ashland, Ayer, Boxboro, Holliston, Hopkinton, Hudson, Marlboro, Shirley, Stow, Townsend); NORFOLK (Medway)

	Rates	Fringes
IRONWORKER	$ 36.28	26.41

IRON0037-002 06/01/2009

BARNSTABLE; BRISTOL (Acushnet, Attleboro, Berkley, Dartmouth, Dighton, Fairhaven, Fall River, Freetown, Mansfield, New Bedford, North Attleboro, Norton, Raynham, Rehoboth, Seekonk, Somerset, Swansea, Taunton, Westport); DUKES; NANTUCKET; NORFOLK (Billingham, Franklin, Plainville, Wrentham); PLYMOUTH (Lakeville, Marion, Mattapoisett, Middleboro, Rochester,

Wareham)

	Rates	Fringes
IRONWORKER	$ 30.45	19.47

LAB00022-006 06/01/2010

SUFFOLK COUNTY (Boston, Chelsea, Revere, Winthrop, Deer & Nut Islands); MIDDLESEX COUNTY (Arlington, Belmont, Burlington, Cambridge, Everett, Malden, Medford, Melrose, Reading, Somerville, Stoneham, Wakefield, Winchester, Winthrop and Woburn only); NORFOLK COUNTY (Brookline, Dedham, and Milton only)

	Rates	Fringes
Laborers:		
GROUP 1	$ 29.80	18.75
GROUP 2	$ 30.05	18.75
GROUP 3	$ 30.55	18.75
GROUP 4	$ 30.80	18.75
GROUP 5	$ 30.05	18.75
GROUP 6	$ 31.80	18.75

LABORERS CLASSIFICATIONS

GROUP 1: Laborers; carpenter tenders; cement finisher tenders

GROUP 2: Asphalt raker; fence and guard rail erector; laser beam operator; mason tender; pipelayer; pneumatic drill operator; pneumatic tool operator; wagon drill operator

GROUP 3: Air track operator; block paver; rammer; curb setter

GROUP 4: Blaster; powderman

GROUP 5: Flagger

GROUP 6: Asbestos Abatement; Toxic and Hazardous Waste Laborers

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LAB00022-012 06/01/2010

Counties of BARNSTABLE; BRISTOL; DUKES; ESSEX; NANTUCKET; PLYMOUTH; MIDDLESEX (With the exception of Arlington, Belmont, Burlington, Cambridge, Everett, Malden, Melrose, Reading, Somerville, Stoneham, Wakefield, Winchester, Winthrop and Woburn); NORFOLK (With the exception of Brookline, Dedham, and Milton)

	Rates	Fringes
Laborers:		
GROUP 1	$ 27.85	17.35
GROUP 2	$ 28.10	17.35
GROUP 3	$ 28.60	17.35
GROUP 4	$ 28.85	17.35

GROUP 5.....$ 21.70 17.35
GROUP 6.....$ 29.85 17.35

LABORERS CLASSIFICATIONS

GROUP 1: Laborers; carpenter tenders; cement finisher tenders

GROUP 2: Asphalt raker; fence and guard rail erector; laser beam operator; mason tender; pipelayer; pneumatic drill operator; pneumatic tool operator; wagon drillperator

GROUP 3: Air track operator; block paver; rammer; curb setter; hydraulic & similar self powere drills

GROUP 4: Blaster; powderman

GROUP 5: Flagger

GROUP 6: Asbestos Abatement; Toxic and Hazardous Waste Laborers

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LABO0022-013 06/01/2010

	Rates	Fringes
Laborers:		
(FREE AIR OPERATION): SHIELD DRIVEN AND LINER PLATE IN FREE AIR)		
GROUP 1	$ 32.90	20.30+A
GROUP 2	$ 32.90	20.30+A
(OPEN AIR CASSONS, UNDERPINNING AND TEST BORING INDUSTRIES):		
TEST BORING & WELL DRILLING		
Driller	$ 31.05	18.90+A
Laborer	$ 29.65	18.90+A
(OPEN AIR CASSONS, UNDERPINNING AND TEST BORING INDUSTRIES):		
OPEN AIR CASSON, UNDERPINNING WORK & BORING CREW		
Bottom man	$ 30.80	18.90+A
Laborers; Top man	$ 29.65	18.90+A
(TUNNELS, CAISSON & CYLINDER WORK IN COMPRESSED AIR)		
GROUP 1	$ 30.35	20.30+A
GROUP 2	$ 40.83	20.30+A
GROUP 3	$ 40.83	20.30+A
GROUP 4	$ 40.83	20.30+A
GROUP 5	$ 40.83	20.30+A

GROUP 6	$ 42.83	20.30+A
CLEANING CONCRETE AND CAULKING TUNNEL (Both New & Existing)		
GROUP 1	$ 32.90	20.30+A
GROUP 2	$ 32.90	20.30+A
ROCK SHAFT, CONCRETE LINING OF SAME AND TUNNEL IN FREE AIR		
GROUP 1	$ 30.35	20.30+A
GROUP 2	$ 32.90	20.30+A
GROUP 3	$ 32.90	20.30+A
GROUP 4	$ 32.90	20.30+A
GROUP 5	$ 34.90	20.30+A

LABORERS CLASSIFICATIONS for TUNNELS, CAISSON & CYLINDER WORK IN COMPRESSED AIR

GROUP 1: Powder watchman; Top man on iron bolt; change house attendant

GROUP 2: Brakeman; trackman; groutman; tunnel laborer; outside lock tender; lock tender; guage tender

GROUP 3: Motorman, miner

GROUP 4: Blaster

GROUP 5: Mucking machine operator

GROUP 6: Hazardous Waste work within the "HOT" zone. (A premium of two dollars $2.00 per hour over the basic wage rate.

LABORERS CLASSIFICATIONS for (FREE AIR OPERATION): SHIELD DRIVEN AND LINER PLATE IN FREE AIR

GROUP 1: Miner; miner welder; conveyor operator; motorman; mucking machine operator; nozzle man; grout man-; pumps, shaft and tunnel steel and rodman; shield and erector arm operators, mole nipper, outside motorman, burner, TBM operator, safety miner; laborer topside; heading motormen; erecting operators; top signal men

GROUP 2: Brakeman; trackman

LABORERS CLASSIFICATIONS FOR CLEANING CONCRETE AND CAULKING TUNNEL (Both New & Existing)

GROUP 1: Concrete workers; strippers and form movers (wood & steel); cement finisher

GROUP 2: Form erector (wood & steel and all accessories)

LABORERS CLASSIFICATIONS for ROCK SHAFT, CONCRETE LINING OF SAME AND TUNNE IN FREE AIR

GROUP 1: Change house attendants

GROUP 2: Laborers, topside, bottom men (when heading is 50 ft. from shaft) and all other laborers

GROUP 3: Brakeman; trackman; tunnel laborers; shaft laborers

GROUP 4: Miner; cage tender; bellman

GROUP 5: Hazardous Waste work within the "HOT" zone. (A premium of two dollars $2.00 per hour over the basic wage rate)

FOOTNOTE FOR LABORERS:

A. PAID HOLIDAYS: New Year's Day, Washington's Birthday, Patriot's Day, Memorial Day, Independence Day, Labor Day, Columbus Day, Veteran's Day, Thanksgiving Day, and Christmas Day

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LABO1421-001 06/01/2010

WRECKING LABORERS:

	Rates	Fringes
Laborers: (Wrecking)		
Group 1	$ 29.80	18.75
Group 2	$ 30.55	18.75
Group 3	$ 30.80	18.75
Group 4	$ 25.80	18.75
Group 5	$ 28.90	18.75
Group 6	$ 29.80	18.75

Group 1: Adzeman, Wrecking Laborer.
Group 2: Burners, Jackhammers.
Group 3: Small Backhoes, Loaders on tracks, Bobcat Type Loaders, Hydraulic "Brock" Type Hammer Operators, Concrete Cutting Saws.
Group 4: Yardman (Salvage Yard Only).
Group 5: Yardman, Burners, Sawyers.
Group 6: Asbestos, Lead Paint, Toxic and Hazardous Waste.

PAIN0035-001 01/01/2010

BARNSTABLE BRISTOL; DUKES; ESSEX; NANTUCKET; PLYMOUTH (Remainder of NORFOLK; MIDDLESEX AND SUFFOLK COUNTIES)

	Rates	Fringes
Painters:		
NEW CONSTRUCTION:		
Bridge	$ 43.01	21.40
Brush, Taper	$ 32.51	21.40
Spray, Sandblast	$ 33.91	21.40
REPAINT:		
Bridge	$ 43.01	21.40
Brush, Taper	$ 30.57	21.40
Spray, Sandblast	$ 31.97	21.40

PAIN0035-015 01/01/2010

MIDDLESEX (Cambridge, Everett, Malden, Medford, Sommerville)
SUFFOLK COUNTY (Boston, Chelsea) NORFOLK COUNTY (Brookline)

	Rates	Fringes
Painters:		
NEW CONSTRUCTION:		
Brush, Taper	$ 38.30	21.40
Spray, Sandblast	$ 39.70	21.40
REPAINT:		
Bridge	$ 43.01	21.40
Brush, Taper	$ 36.36	21.40
Spray, Sandblast	$ 37.76	21.40

PLAS0534-001 07/01/2010

ESSEX; MIDDLESEX; NORFOLK AND SUFFOLK COUNTY

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER	$ 35.00	27.91

PLUM0004-001 09/01/2010

MIDDLESEX (Ashby, Ayer-West of Greenville branch of Boston and Maine Railroad, Ft. Devens, Groton, Shirley, Townsend)

	Rates	Fringes
Plumbers and Pipefitters	$ 38.54	22.83

PLUM0012-001 09/01/2010

ESSEX (Lynn, Lynnfield, Nahant, Saugus, Swampscott); MIDDLESEX (Acton, Arlington, Ashland, Ayer - except W. of Greenville Branch of Boston & Maine RR, Bedford, Belmont, Billerica, Boxboro, Burlington, Cambridge, Carlisle, Chelmsford, Concord, Dracut, Dunstable, Everett, Framingham, Hudson, Holliston, Hopkinton, Lexington, Lincoln, Littleton, Lowell, Malden, Marlboro, Maynard, Medford, Melrose, Natick, Newton, North Reading, Pepperell, Reading, Sherborn, Somerville, Stoneham, Stow, Sudbury, Tewksbury, Tyngsboro, Wakefield, Waltham, Watertown, Wayland, Westford, Wilmington, Winchester, Woburn); NORFOLK (Bellingham, Braintree, Brokline, Canton, Cohasset, Dedham, Dover, Foxboro, Franklin, Medfield, Medway, Millis, Milton, Needham, Norfolk, Norwood, Plainville, Quincy, Sharon, Walpole, Wellesley, Westwood, Weymouth, Wrentham); PLYMOUTH (Hingham, Hull, Scituate); SUFFOLK

	Rates	Fringes
PLUMBER	$ 45.22	22.98

PLUM0051-005 03/01/2010

BARNSTABLE; BRISTOL; DUKES; NANTUCKET; NORFOLK (Avon, Holbrook, Randolph, Stoughton) PLYMOUTH(Remainder of County)

	Rates	Fringes

Plumbers and Pipefitters.....$ 34.36 24.47

PLUM0138-001 04/01/2010

ESSEX (Ames, Andover, Beverly, Boxford, Byfield, Danvers, Essex, Georgetown, Gloucester, Groveland, Hamilton, Haverhill, Ipswich, Lawrence, Manchester, Marblehead, Merrimac, Methuen, Middleton, Newbury, Newburyport, North Andover, Peabody, Rockport, Rowley, Salem, Salisbury, Topsfield, Wenham, West Newbury)

	Rates	Fringes
Plumber, Pipefitter, Steamfitter	$ 41.14	22.98

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* PLUM0537-001 09/01/2010

MIDDLESEX (Arlington, Cambridge, Everett, Malden, Medford, Melrose, Reading, Wakefield, Winchester and Woburn); NORFOLK (Bellingham, Braintree, Brookline, Canton Cashasset, Dedham, Foxboro, Franklin, Millis, Milton, Sharon, Walpole, Westwood, and Wrenthan); PLYMOUTH (Hingham, Hull, Scituate); ESSEX (Lynn, Lynnfield, Nahant, Saugus, Swanpscott); SUFFOLK (Boston and Chelsea)

	Rates	Fringes
PIPEFITTER	$ 46.09	23.31

TEAM0379-001 06/01/2010

	Rates	Fringes
Truck drivers:		
Group 1	$ 29.28	14.98+A+B
Group 2	$ 29.45	14.98+A+B
Group 3	$ 29.52	14.98+A+B
Group 4	$ 29.64	14.98+A+B
Group 5	$ 29.74	14.98+A+B
Group 6	$ 30.03	14.98+A+B
Group 7	$ 30.32	14.98+A+B

POWER TRUCKS $.25 DIFFERENTIAL BY AXLE
TUNNEL WORK (UNDERGROUND ONLY) $.40 DIFFERENTIAL BY AXLE
HAZARDOUS MATERIALS (IN HOT ZONE ONLY) $2.00 PREMIUM

TRUCK DRIVERS CLASSIFICATIONS

Group 1: Station wagons; panel trucks; and pickup trucks

Group 2: Two axle equipment; & forklift operator

Group 3: Three axle equipment and tireman

Group 4: Four and Five Axle equipment

Group 5: Specialized earth moving equipment under 35 tons

other than conventional type trucks; low bed; vachual; mechanics, paving restoration equipment

Group 6: Specialized earth moving equipment over 35 tons

Group 7: Trailers for earth moving equipment (double hookup)

FOOTNOTES:

A. PAID HOLIDAYS: New Year's Day, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Patriot's Day, Columbus Day, Veteran's Day, Thanksgiving Day and Christmas Day

B. PAID VACATION: Employees with 4 months to 1 year of service receive 1/2 day's pay per month; 1 week vacation for 1 - 5 years of service; 2 weeks vacation for 5 - 10 years of service; and 3 weeks vacation for more than 10 years of service

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

In the listing above, the "SU" designation means that rates listed under the identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

GENERAL DECISION: MA20100006 10/22/2010 MA6

Date: October 22, 2010
General Decision Number: MA20100006 10/22/2010

Superseded General Decision Number: MA20080006

State: Massachusetts

Construction Type: Highway

Counties: Bristol, Essex, Middlesex, Norfolk, Plymouth and Suffolk Counties in Massachusetts.

HIGHWAY CONSTRUCTION PROJECTS

Modification Number	Publication Date
0	03/12/2010
1	03/19/2010
2	04/09/2010
3	04/16/2010
4	04/23/2010
5	05/07/2010
6	05/14/2010
7	07/23/2010
8	08/06/2010
9	08/20/2010
10	09/03/2010
11	10/08/2010
12	10/22/2010

BRMA0001-016 03/01/2010

FOXBORO CHAPTER
BRISTOL (Attleboro, Berkley, Dighton, Mansfield, North Attleboro, Norton, Raynham, Rehoboth, Seekonk, Taunton); NORFOLK (Bellingham, Canton, Dedham, Foxboro, Franklin, Norfolk, Norwood, Planville, Sharon, Walpole, Westwood, Wrentham); and PLYMOUTH (Lakeville)

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER	$ 43.86	24.15

BRMA0001-017 03/01/2010

LOWELL CHAPTER
MIDDLESEX (Ashland, Framingham, Holliston, Hopkinton, Hudson, Maynard, Natick, Sherbvorn, Stow); and NORFOLK (Medfield, Medway, Millis)

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER	$ 43.86	24.15

BRMA0003-018 02/01/2010

NEWTON CHAPTER
MIDDLESEX (Newton) and NORFOLK (Dover, Needham, Wellesley)

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER	$ 44.61	23.84

BRMA0003-019 02/01/2010

NEW BEDFORD CHAPTER

BRISTOL (Acushnet, Darmouth, Fairhaven, Fall River, Freetown, New Bedford, Somerset, Swansea, Westport); PLYMOUTH (Marion, Mattapoisett, Rochester, Wareham)

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER	$ 44.61	23.84

BRMA0003-020 02/01/2010

QUINCY CHAPTER

NORFOLK (Avon, Braintree, Cohasset, Holbrook, Quincy, Randolph, Soughton, Weymouth); PLYMOUTH (Abington, Bridgewater, Brockton, Carver, Duxbury, East Bridgewater, Halifax, Hanover, Hanson, Hingham, Hull, Kinston, Marshfield, Middleboro, Norwell, Pembroke, Plymouth, Rockland, Scituate West Bridgewater, Whitman)

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER	$ 44.61	23.84

CARP0026-002 03/01/2010

BRISTOL (Attleborough, North Attleborough); ESSEX; MIDDLESEX (Except Belmont, Cambridge, Everett, Malden, Medford, Somerville); NORFOLK (Bellingham, Canton, Foxboro, Franklin, Medfield, Medway, Millis, Needham, Norfolk, Norwood, Plainville, Quincy, Sharon, Walpole, Wellesley, Westwood, Wrentham); AND PLYMOUTH (Duxbury, Hanover, Hingham, Hull, Marshfield, Norwell, Pembroke, Rockland and Scituate) COUNTIES

	Rates	Fringes
CARPENTER	$ 31.73	23.56

CARP0033-002 03/01/2010

MIDDLESEX (Belmont, Cambridge, Everett, Malden, Medford, Somerville); NORFOLK (Brookline, Dedham, Milton); and SUFFOLK

	Rates	Fringes
CARPENTER	$ 37.03	24.94

CARP0056-005 08/01/2010

All of SUFFOLK COUNTY; and those areas of BRISTOL, ESSEX, MIDDLESEX, NORFOLK, and PLYMOUTH COUNTIES situated INSIDE Boston Beltway (I-495) and North of Cape Cod Canal

	Rates	Fringes
PILEDRIVERMAN	$ 37.37	25.80

CARP0056-006 08/01/2010

Those areas of BRISTOL, PLYMOUTH, and NORFOLK COUNTIES situated OUTSIDE Boston Beltway (I-495) and South of Cape Cod Canal

	Rates	Fringes
PILEDRIVERMAN	$ 37.37	25.80

CARP0056-007 08/01/2010

Those areas of ESSEX and MIDDLESEX COUNTIES situated OUTSIDE Boston Beltway (I-495)

	Rates	Fringes
PILEDRIVERMAN	$ 37.37	25.80

CARP0424-003 03/01/2010

NORFOLK COUNTY (Braintree, Cohassett, Scituate, Weymouth, Quincy)

	Rates	Fringes
CARPENTER	$ 31.73	23.56

CARP0624-003 03/01/2010

BRISTOL (except Attleboro & North Attleboro); DUKES; NANTUCKET; NORFOLK(Avon, Holbrook, Randolph, Stoughton); AND PLYMOUTH (REMAINDER OF COUNTY

	Rates	Fringes
CARPENTER	$ 31.73	23.56

ELEC0099-003 06/01/2010

BRISTOL (Attleboro, North Attleboro, Seekonk)

	Rates	Fringes
ELECTRICIAN	$ 34.08	56.26%

ELEC0103-006 09/01/2010

ESSEX (Amesbury, Andover, Boxford, Georgetown, Groveland, Haverhill, Lawrence, Merrimac, Methuen, Newbury, Newburyport, North Andover, Rowley, Salisbury, West Newbury); MIDDLESEX (Bedford, Billerica, Boxboro, Burlington, Carlisle, Chelmsford, Dracut, Dunstable littleton, Lowell, North Reading, Tewksbury, Tyngsboro, Westford, Wilmington)

	Rates	Fringes

ELECTRICIAN.....$ 41.45 26.05

ELEC0103-007 09/01/2010

ESSEX (Beverly, Danvers, Essex, Gloucester, Hamilton, Ipswich, Manchester, Marblehead, Middleton, Peabody, Rockport, Salem, Topsfield, Wenham)

	Rates	Fringes
ELECTRICIAN	$ 41.45	26.05

ELEC0103-008 09/01/2010

ESSEX (Lynn, Lynnfield, Nahant, Saugus, Swampscott); MIDDLESEX (Acton, Arlington, Belmont, Cambridge, Concord, Everett, Framingham, Holliston, Lexington, Lincoln, Malden, Maynard, Medford, Melrose, Natick, Newton, Reading, Sherborn, Somerville, Stoneham, Sudbury, Wakefield, Waltham, Watertown, Wayland, Weston, Winchester, Woburn); NORFOLK (Bellingham, Braintree, Brookline, Canton, Cohasset, Dedham, Dover, Foxboro, Frankloin, Medfield, Medway, Millis, Milton, Needham, Norfolk, Norwood, Quincy, Sharon, Walpole, Wellesley, Westwood, Weymouth, Wrentham); PLYMOUTH (Hingham, Hull); SUFFOLK

	Rates	Fringes
ELECTRICIAN	$ 41.45	26.05

ELEC0104-002 08/31/2009

	Rates	Fringes
Line Construction:		
Cableman	$ 34.89	7.50+A
Equipment Operator	$ 34.89	11.50+A
Groundman	$ 22.58	7.50+A
Lineman	$ 41.05	14.43+A

FOOTNOTE:

a. PAID HOLIDAYS: New Year's Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day; Christmas Day and Columbus Day, provided the employee has been employed 5 working days prior to any one of the listed holidays.

ELEC0223-003 09/01/2010

BRISTOL (except Attleboro, North Attleboro, Seekonk); PLYMOUTH (except Hingham and Hull) NORFOLK (Avon, Randolph, Holbrook, Stoughton, and Plainview Twps)

	Rates	Fringes
ELECTRICIAN	$ 34.74	18.31

ENGI0004-004 12/01/2009

	Rates	Fringes

Power equipment operators:
Backhoes; Cranes; Loaders;
Front-end Loaders;
Concrete Pavers; Post Hole
Diggers.....$ 38.48 20.84+A
Graders; Mechanics; Rollers.$ 38.14 20.84+A
Oilers (other than truck
cranes and gradalls).....$ 21.70 20.84+A
Oilers (truck cranes &
gradalls).....$ 24.67 20.84+A
Pumps.....$ 27.84 20.84+a

HOURLY PREMIUM FOR BOOM LENGTHS (Including Jib):
Over 150 ft +1.99
Over 185 ft +3.48
Over 210 ft +4.90
Over 250 ft +7.42
Over 295 ft +10.29
Over 350 ft +11.96

FOOTNOTE:
A. PAID HOLIDAYS: New Year's Day, Washington's Birthday, Labor Day, Memorial Day, Independence Day, Patriot's Day, Veteran's Day, Thanksgiving Day, and Christmas Day.

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* IRON0007-004 09/16/2010

AREA 1: BRISTOL (Easton); ESSEX (Beverly,Gloucester, Lynn, Lynnfield, Manchester,Marblehead, Nahant, Salem, Saugus, Swampscott); MIDDLESEX (Arlington, Bedford, Belmont, Burlington, Cambridge, Concord, Everett, Framingham, Lexington, Lincoln, Malden, Maynard, Medford, Melrose, Natick, Newton, Reading, Sherborn, Somerville, Stoneham, Sudbury, Wakefield, Waltham, Watertown, Wayland, Weston, Winchester, Woburn); NORFOLK (Except Medway); PLYMOUTH (Abington, Bridgewater, Brocton, Duxbury, East Bridgewater, Halifax, Hanover, Hanson, Hingham, Hull, Kingston, Marshfield, Norwell, Pembroke, Plymouth, Plympton, Rockland, Scituate, West Bridgewater, Whitman); SUFFOLK

AREA 1: ESSEX (Amesbury, Andover, Boxford, Danvers, Essex, Georgetown, Hamilton, Haverhill, Ipswich; Lawrence, Merrimac, Methuen, Newbury, Newburyport, North Andover, Rockport, Rowley, Salisbury, Topsfield, Wenham, West Newbury); MIDDLESEX (Action, bellerica, Carlisle, Chelmsford, Dracut, Dunstable, Groton, Groveland, Littleton, Lowell, Middleton, North Reading, Pepperell, Tewksbury, Tynsboro, Westford, Wilmington)

	Rates	Fringes
IRONWORKER		
AREA 1	$ 36.28	26.41
AREA 2	$ 31.87	26.41

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* IRON0007-013 09/16/2010

MIDDLESEX (Ashby, Ashland, Ayer, Boxboro, Holliston, Hopkinton, Hudson, Marlboro, Shirley, Stow, Townsend); NORFOLK (Medway)

	Rates	Fringes
IRONWORKER	$ 36.28	26.41

IRON0037-003 06/01/2009

BRISTOL (Acushnet, Attleboro, Berkley, Dartmouth, Dighton, Fairhaven, Fall River, Freetown, Mansfield, New Bedford, North Attleboro, Norton, Raynham, Rehoboth, Seekonk, Somerset, Swansea, Taunton, Westport); NORFOLK (Billingham, Franklin, Plainville, Wrentham); PLYMOUTH (Lakeville, Marion, Mattapoisett, Middleboro, Rochester, Wareham)

	Rates	Fringes
IRONWORKER	$ 30.45	19.47

LABO0022-003 06/01/2010

SUFFOLK COUNTY (Boston, Chelsea, Revere, Withrop, Deer & Nut Island); MIDDLESEX COUNTY (Arlington, Belmont, Burlington, Cambridge, Everett, Malden, Medford, Melrose, Reading, Somerville, Stoneham, Wakefield, Winchester, Winthrop, and Woburn only); NORFOLK COUNTY (Brookline, Dedham, and Milton only)

	Rates	Fringes
Laborers:		
Airtrack operator, Curb Setter, Block pavers, rammer, hydraulic and similar self-powered drills	$ 30.55	18.75
Asphalt Raker; Drill Operator; Fence and Guardrail Erector; Mason Tender; Pipelayer, laser beam operator	$ 30.05	18.75
Flagger	$ 23.40	18.75
Haz-mat Laborer	$ 31.80	18.75
Powdermen, Blaster	$ 30.80	18.75
Unskilled Laborer; Cement Finisher Tender	$ 29.80	18.75

LABO0022-004 06/01/2010

Counties of BRISTOL; ESSEX; PLYMOUTH; MIDDLESEX (with the exception of Arlington, Belmont, Burlington, Cambridge, Everett, Malden, Medford, Melrose, Reading, Somerville, Stoneham, Wakefield, Winchester, Winthrop and Woburn); NORFOLK (with the exception of Brookline, Dedham, and Milton)

	Rates	Fringes
Laborers:		
Air-track operator, Curb Setter, Block Pavers, rammer, Hydraulic, and similar self-powered drills	$ 28.60	17.35
Asphalt Raker; Drill		

Operator; Fence and Guardrail Erector; Mason Tender; Pipelayer, Laser beam operator	$ 28.10	17.35
Flagger	$ 21.70	17.35
Haz-mat Laborer	$ 29.85	17.35
Powdermen Blaster	$ 28.85	17.35
Unskilled Laborer; Cement Finisher Tender	$ 27.85	17.35

PAIN0035-002 01/01/2010

BRISTOL ,ESSEX AND PLYMOUTH COUNTIES; AND THE REMAINDER OF MIDDLESEX NORFOLK AND SUFFOLK COUNTIES

	Rates	Fringes
Painters:		
NEW CONSTRUCTION:		
Bridge	$ 43.01	21.40
Brush, Taper	$ 32.51	21.40
Spray, Sandblast	$ 33.91	21.40
REPAINT:		
Bridge	$ 43.01	21.40
Brush, Taper	$ 30.57	21.40
Spray, Sandblast	$ 31.97	21.40

PAIN0035-014 01/01/2010

MIDDLESEX (Cambridge, Everett, Malden, Medford, Somerville) SUFFOLK COUNTY (Boston, Chelsea) NORFOLK COUNTY (Brookline)

	Rates	Fringes
Painters:		
NEW CONSTRUCTION:		
Bridge	$ 43.01	21.40
Brush, Taper	$ 38.30	21.40
Spray, Sandblast	$ 39.70	21.40
REPAINT:		
Bridge	$ 43.01	21.40
Brush, Taper	$ 36.36	21.40
Spray, Sandblast	$ 37.76	21.40

PLAS0534-002 07/01/2010

ESSEX; MIDDLESEX; NORFOLK AND SUFFOLK COUNTY

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER	$ 35.00	27.91

SUMA1990-005 04/01/1990

	Rates	Fringes
BRICKLAYER	$ 20.61	4.87
Line Construction:		
Groundman	$ 12.09	3.90

PAINTER		
Spray (Linestriping)	$ 19.40	6.42
Power equipment operators:		
Cold Planer	$ 20.84	5.98
Gradall	$ 21.53	5.39
Spreader	$ 21.67	5.08
TRUCK DRIVER		
Truck Drivers 2 - axle	$ 16.74	4.12
Truck Drivers 5 - axle	$ 18.00	3.66

TEAM0379-002 06/01/2010

	Rates	Fringes
Truck drivers:		
Three-Axle	$ 29.52	14.98+A+B

FOOTNOTES FOR TRUCK DRIVERS:

A. PAID HOLIDAYS:
New Year's Day, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Patriot's Day, Columbus Day, Veteran's Day, Thanksgiving Day and Christmas Day

B. PAID VACATION:
Employees with 4 months to 1 year of service receive 1/2 day's pay per month; 1 week vacation for 1 - 5 years of service; 2 weeks vacation for 5 - 10 years of service; and 3 weeks vacation for more than 10 years of service

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

In the listing above, the "SU" designation means that rates listed under the identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NORTHEAST REGIONAL OFFICE
205B Lowell Street, Wilmington, MA 01887 • (978) 694-3200

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lieutenant Governor

RICHARD K. SULLIVAN JR.
Secretary

KENNETH L. KIMMELL
Commissioner

MassDEP NERO FAX TRANSMITTAL FORM

TO:

Date: 2/9/11

Attention: Magdalena Lofstedt

Company Name: CDM

Company Fax Number: 617 452-6597

Company Phone Number: _____

RE: 401 WQC - HAVERHILL LANDFILL

FROM:

MassDEP Contact Person: Nancy White

MassDEP Bureau: BRP - Wetlands

MassDEP Contact Telephone: 978 694 3359

Comments:

Transmittal Form plus 9 pages.

To report transmission problems, please contact the MassDEP employee this fax is directed to.
FAX Number for MassDEP NERO is 978-694-3499

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Northeast Regional Office • 205B Lowell Street, Wilmington MA 01887 • 978-694-3200

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lieutenant Governor

RICHARD K. SULLIVAN JR.
Secretary

KENNETH L. KIMMELL
Commissioner

February 9, 2011

City of Haverhill,
40 South Porter Street
Haverhill, MA 01835

Attn: Mr. Robert E. Ward

RE: **Water Quality Certification**
BRP WW10
Major Project
AT: off Groveland Road, Haverhill, MA
DEP File #'s 033-1302
Transmittal Number: X235384

Dear Mr. Ward:

MassDEP has reviewed your application for a Water Quality Certification, as referenced above. In accordance with the provisions of MGL c.21, §§ 26-53 and Section 401 of the Federal Clean Water Act as amended (33 U.S.C. §1251 et seq.) it has been determined there is reasonable assurance the project or activity will be conducted in a manner which will not violate applicable water quality standards. A site visit for the project [see: 314 CMR 9.05 (4)] was conducted by MassDEP staff on January 20, 2011, as part of a regulatory agency field inspection of the site.

The purpose of the project is to cap the 35-acre Southern Mound of the Haverhill Landfill in accordance with the MassDEP Solid Waste Management Regulations (310 CMR 19.00). The purpose of the capping is to isolate landfill contents, thus reducing leachate production, preventing run-off contact with waste, and volatilization of landfill gases and subsequent contaminant migration. Closure of the Haverhill Municipal Landfill is proceeding in accordance with an Administrative Consent Order (ACO) dated January 22, 1999 between the Site's owners (the City and Aggregate Industries) and MassDEP. Since the Haverhill Landfill is also a Superfund Site, closure must also meet the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) administrated by the U.S. Environmental Protection Agency (EPA).

Capping of the Haverhill Landfill Northern Mound and further assessment of arsenic impacted groundwater (to be required by the MassDEP Solid Waste Program) in the vicinity of Johnson

Creek will be conducted separate from the Southern Mound closure project. Regarding the assessment of project-wide impacts, MassDEP finds that the Southern Mound Closure can be conducted independently of the Northern Mound Closure and the Johnson Creek assessment projects. The existing site contains 62,000 square feet of BVW and 1,100 linear feet of Bank associated with the intermittent stream. Specific Southern Mound project activities approved by this Certification include the temporary alteration of 11,000 square feet of Bordering Vegetated Wetlands (BVW) and 1,050 linear feet of Bank associated with the intermittent stream located on the western side of the site. The alteration is proposed in order to remove waste material within the BVW, remediate soils, and install the landfill cap. The altered wetlands will be restored in place with no net loss. An Invasive Species Control Plan will also be implemented to remove and properly dispose of invasive species currently established in the western BVW. Six isolated depressions on or near the Southern Mound were determined to be non-jurisdictional wetland resource areas by the Haverhill Conservation Commission and therefore not subject to the Massachusetts Wetlands Protection Act. MassDEP concurs with this opinion and has also confirmed the findings of the United States Army Corps of Engineers (USACE) that these six areas are not subject to Federal Jurisdiction as Waters of the United States because they are not associated with, or lack significant nexus to, "navigable waters."

An Environmental Notification Form (ENF) was filed with the Massachusetts Environmental Policy Act (MEPA) for the project and the Certificate on the ENF was issued on November 30, 2001. More recently, a Notice of Project Change (NPC) was submitted to MEPA in July 2009 requesting separation of the Northern and Southern Mounds into two separate and distinct closure projects. The Certificate on the NPC was issued on September 18, 2009 approving the project change and stating that no further MEPA review was required for the Southern Mound.

The proposed project is being permitted under the Wetlands Protect Act through an Order of Conditions, DEP File # 33-1302, issued by the Haverhill Conservation Commission on December 22, 2010.

The Criteria for Evaluating Proposed Discharge to Wetlands of the March 1995, Regulations for the Water Quality Certification Program (the Regulations) requires the submittal of certain information that is necessary for MassDEP to determine that the project complies with the Wetland Protection Act, minimizes individual and cumulative impacts, and, complies with the Massachusetts Surface Water Quality Standards.

In accordance with the provisions of M.G.L. c.21, §§ 26-53 and Section 401 of the Federal Clean Water Act as amended (33 U.S.C. §1251 et seq.), and the Regulations 314 CMR 9.00, and as a result of the proposed mitigation measures, as supplemented by the following Conditions, there is reasonable assurance the project will be conducted in a manner which will not violate applicable water quality standards at 314 CMR 4.00 as implemented by 314 CMR 9.00. Therefore, based on information currently in the record, MassDEP grants a Water Quality Certification for this project subject to the following conditions to maintain water quality, to minimize impact on waters and wetlands, and to ensure compliance with appropriate state law:

1. This project could result in a violation of MassDEP's Water Quality Standards, 314 CMR 4.00. Therefore, reasonable care and diligence shall be taken to assure that the proposed activity will not violate Class B standards.

2. All activity shall conform to the following plans and documents:

   a. Application for Water Quality Certificate dated November 4, 2010, which includes Transmittal Form #X235384.

   b. Plan entitled:
   "City of Haverhill, Massachusetts & Aggregate Industries – Northeast Region, Inc., Southern Mound Closure – Haverhill Landfill Corrective Action Design, Project No. CWSRF-3403," Sheets G-1, C-1 through C-13, and D-1 through D-3, Various Scales. Dated October 2010. Plans Prepared by: CDM and stamped by Bruce William Haskell, P.E. No. 37487.

3. All activity shall conform to the requirements set forth in the Order of Conditions issued by the Haverhill Conservation Commission on December 22, 2010, for DEP File #033-1302, unless specified herein.

4. All activity shall conform to the requirements set forth in the Army Corps of Engineers, Individual 404 Permit, Category 2 Activity, Application Number NAE-2010-2369.

5. MassDEP shall be notified of all changes in plans affecting waters or wetlands. MassDEP will determine whether the changes require a revision to this certification.

6. Prior to the commencement of any activity on this site, there shall be a pre-construction meeting between the project supervisor, the contractor responsible for the work, the Environmental Monitor, a member of the Haverhill Conservation Commission or its Administrator, and a representative of MassDEP to ensure that the requirements of the Water Quality Certification are understood. Arrangements shall be made two weeks prior to any activity to arrange for the pre-construction meeting.

7. The project proponent shall notify MassDEP and the Haverhill Conservation Commission in writing, 48 hours before any activity commences on site.

8. Members and agents of MassDEP and the Haverhill Conservation Commission shall have the right to enter and inspect the premises to evaluate compliance with conditions stated in this Water Quality Certification. The project proponent shall submit any data MassDEP deems necessary for that evaluation.

9. Prior to construction, erosion controls shall be placed on site between areas of proposed work and resource areas. Haybales and/or silt fence must be staked. Silt fencing must be entrenched.

10. An adequate stockpile of erosion control materials shall be on site at all times for emergency or routine replacement and shall include materials to repair or replace silt

fences, haybales, stone riprap filter berms, or any other devices planned for use during construction.

11. The applicant shall be responsible for anticipating the need for and the installation of additional erosion controls during construction. Such controls may include, but are not limited to, temporary sedimentation basins, berms, additional silt fencing and haybales. If field conditions or professional judgment dictate, the applicant's contractor shall install additional erosion controls to protect wetland resource areas beyond what is shown on the plan.

12. Erosion controls shall be deployed as shown on the reference plans and described in the Notice of Intent and application for 401 Certification. The site-specific Stormwater Pollution Prevention Plan (SWPPP) developed for construction of this project shall be supplied to the MassDEP and Haverhill Conservation Commission prior to construction activities. Noncompliance with the erosion control plan and /or SWPPP shall constitute non-compliance with the requirements of this Certification.

13. The applicant shall employ a qualified professional to oversee emergency placement of controls and regular inspection or replacement of sedimentation and turbidity control devices for this project. The name and contact information for this staff person shall be provided to the Haverhill Conservation Commission and MassDEP prior to the start of work. This staff person shall be responsible for inspection of erosion controls on a weekly basis during construction and after any storm event measuring more than ½-inch of precipitation in each 24-hour period and shall have the authority to modify existing controls or require additional controls if he or she deems it necessary. This staff person shall have the authority to require that any erosion problems are addressed immediately and shall immediately notify MassDEP and the Haverhill Conservation Commission if any discharges to streams or any other wetlands resource areas occur.

14. The amount of Wetlands that will be temporarily filled is a total of 11,000 square feet with 11,000 square feet restored. The applicant shall conduct monitoring. A qualified environmental monitor (wetland specialist) shall conduct periodic inspections of work to remove existing waste, remediate soils and install the landfill cap, located within and immediately adjacent to wetland resource areas to ensure revegetation takes place, including:

    a. Inspection of final elevation of the replication areas including: i) comparison to the preexisting topography, ii) comparison to the elevation of adjacent undisturbed area, and iii) examination of the top strata of backfilled soils and confirmation of the correct depth of organics;
    b. A biannual evaluation of the extent and type of revegetation of the revegetated areas. Reports shall be sent to this Office until the area becomes revegetated with 75% indigenous species over five growing seasons after completion of construction. The evaluation shall be done in the late spring and at the end of the growing season. The format and minimum monitoring data shall be as shown in Appendix 4 in DEP's Massachusetts Inland Wetland Replication Guidelines;

c. Selection of photographic stations to provide "control" sites in unaltered areas adjacent to the replication areas, where photographs shall be taken as representative baseline conditions. Additionally, photographic stations shall be selected within the replication area where photographs shall be taken to monitor replication success. Such photographs shall be taken during each monitoring inspection and submitted with reports and also during the following phases of construction: 1) completion of subgrades; 2) completion of final grades; and 3) completion of planting;
d. Inspection and oversight to ensure that if removal of existing soils within BVW requires excavation below 12 inches, fill consistent with adjacent wetland (i.e. organic or mineral soil) shall be used to backfill to within 8-12 inches below finished grades.

15. During the construction of wetland restoration areas, the applicant shall provide the following documentation to the MassDEP:
    a. Certification by a registered engineer or land surveyor that the sub-grades and final grades have been completed in accordance with the approved plans;
    b. Certification by a wetland professional or registered landscape architect that the planting has been completed in accordance with the approved plans.

16. All wetland restoration areas shall be restored to pre-existing grades prior to planting. Natural or manufactured topsoil shall be used. Natural topsoil to be used for the creation/restoration of wetlands consists of a least twelve percent organic carbon content (by weight). The percent organic content may be adjusted based on individual site conditions. Manufactured topsoil consists of a mixture of equal volumes of organic and mineral materials. A statement from a qualified individual shall be submitted to the MassDEP prior to construction of wetland restoration areas certifying that the soils to be used comply with the terms of this Special Condition.

17. Invasive species located in the BVW proposed for soil remediation and along the bank of the intermittent stream located on the western portion of the site shall be removed, properly disposed of, monitored and controlled according with the recommendations contained in the "Invasive and Noxious Species Control Plan" referenced in Condition #20a above and the conditions contained in this Permit.

18. The Contractor shall prevent any debris from entering the resource areas during all phases of construction.

19. Stormwater discharged to all water courses and vegetated wetlands shall be treated prior to discharge at least to a level to ensure that there is no exceedance of the effluent limitations, including thermal criteria, corresponding to the class of each receiving water, established pursuant to 314 CMR 4.00, the Massachusetts Surface Water Discharge Standards.

20. At no time during or after construction shall fill or other materials be placed, slump into or fall beyond the limit of grading as shown on the plan. The applicant shall be responsible for inspecting and maintaining all slopes and shall immediately notify

MassDEP and the Haverhill Conservation Commission if slumping, erosion, or encroachment occurs.

21. Materials and equipment shall be stored in a manner and location that will minimize the compaction of soils and the concentration of runoff in or near jurisdictional areas. Refueling of vehicles shall not occur in jurisdictional areas with the exception of pumps necessary for dewatering or by-pass pumping that will be placed within secondary containment with capacity to hold the volume of the fuel tank. In the case of stationary equipment, such as cranes, drill rigs, etc., all service vehicles must be equipped with a spill kit that is designed to hold the full volume of the vehicle's fuel tank. If a spill occurs, contaminated soils shall be removed according to the MassDEP guidance and applicable requirements of the MCP.

22. Construction-period dewatering discharge will occur on the upland side of the construction area and use a splash board and hay bale sediment barrier or equivalent as specified in the SWPPP or other approved erosion control plan. Dewatering discharges from the work area shall be effectively filtered or settled to remove silt prior to being discharged into any jurisdictional areas. Discharges from any dewatering or by-pass pumping shall not cause scouring of jurisdictional areas or erosion of adjacent upland areas.

23. The construction site shall be completely cleaned, cleared of construction equipment and debris and permanently stabilized after the completion of the work and prior to the Contractor leaving the site.

24. In the event of hazardous materials (including gasoline, fuel oils, lubricants, and hydraulic fluids), please call the appropriate agency, the Haverhill Fire Department (978-373-8460), MassDEP (888-304-1133), the Haverhill Board of Health (978-374-2325), and the Haverhill Conservation Commission (978-374-2334).

25. Upon stabilization of the site and approval by the Haverhill Conservation Commission and/or MassDEP, all erosion controls shall be removed.

26. No activity may begin prior to the expiration of the appeal period or until a final decision is issued by the MassDEP if an appeal is filed.

Failure to comply with this certification is grounds for enforcement, including civil and criminal penalties, under MGL c.21 §42, MGL c.21A §16, or other possible actions/penalties as authorized by the General Laws of the Commonwealth.

This Certification does not relieve the applicant of the obligation to comply with other appropriate state or federal statutes or regulations. This includes, but is not limited to, conditions of the individual permit from the U.S. Department of the Army.

Should you have any questions regarding this WQC, please contact Nancy White at the letterhead address or at (978) 694-3359.

Sincerely,

Rachel Freed

Rachel Freed
Section Chief
Wetlands Program

cc: Haverhill Conservation Commission
USACOE-Regulatory Program

Notice of Appeal rights

A) Appeal Rights and Time Limits

Certain persons shall have a right to request an adjudicatory hearing concerning certifications by the MassDEP when an application is required: (a) the applicant or property owner; (b) any person aggrieved by the decision who has submitted written comments during the public comment period; any ten (10) persons of the Commonwealth pursuant to M.G.L. c. 30A where a group member has submitted written comments during the public comment period; or (c) any governmental body or private organization with a mandate to protect the environment which has submitted written comments during the public comment period. Any person aggrieved, any ten (10) persons of the Commonwealth, or a governmental body or private organization with a mandate to protect the environment may appeal without having submitted written comments during the public comment period only when the claim is based on new substantive issues arising from material changes to the scope or impact of the activity and not apparent at the time of pubic notice. To request an adjudicatory hearing pursuant to M.G.L. chapter 30A section 10, a Notice of Claim must be made in writing provided that the request is made by certified mail or hand delivery to the MassDEP, with the appropriate filing fee specified within 310 CMR 4.10 along with a MassDEP Fee Transmittal Form within twenty-one (21) days from the date of issuance of this Certificate, and addressed to:

Case Administrator
Dept of Environmental Protection
One Winter Street- 2nd Floor
Boston, MA 02108

A copy of the request shall at the same time be sent by certified mail or hand delivery to the issuing office of the Wetlands and Waterways Program at:

MassDEP, Northeast Regional Office
205B Lowell Street
Wilmington, MA 01887

B) Contents of Hearing Request

A Notice of Claim for Adjudicatory Hearing shall comply with the MassDEP's Rules for Adjudicatory Proceedings, 310 CMR 1.01 (6), and shall contain the following information pursuant to 314 CMR 9.10(3):

a. the 401 Certification Transmittal Number and MassDEP Wetlands Protection Act File Number;
b. the complete name of the applicant and address of the project;
c. the complete name, address, and fax and telephone numbers of the party filing the request, and, if represented by counsel or other representative, the name, fax, and telephone number of the attorney;
d. if claiming to be a party aggrieved, the specific facts that demonstrate that the party satisfies the definition of "aggrieved person" found at 314 CMR 9.02;
e. a clear and concise statement that an adjudicatory hearing is being requested;

f. a clear and concise statement of (1) the facts which are grounds for the proceedings, (2) the objections to the Certificate, including specifically the manner in which it is alleged to be inconsistent with the MassDEP's Water Quality Regulations, 314 CMR 9.00, and (3) the relief sought through the adjudicatory hearing, including specifically the changes desired in the final written Certification, and

g. a statement that a copy of the request has been sent by certified mail or hand delivery to the applicant, the owner (if different from the applicant), the conservation commission of the city or town where the activity will occur, the Department of Conservation and Recreation (when the certificate concerns projects in Areas of Critical Environmental Concern), the public or private water supplier where the project is located (when the certificate concerns projects in Outstanding Resource Waters), and any other entity with responsibility for the resource where the project is located.

C) Filing Fee and Address

The hearing request along with a MassDEP Fee Transmittal Form and a valid check or money order payable to the Commonwealth of Massachusetts in the amount of one hundred dollars ($100) must be mailed to:

Commonwealth of Massachusetts
Department of Environmental Protection
Commonwealth Master Lockbox
P.O. Box 4062
Boston, MA 02211

The request will be dismissed if the filing fee is not paid, unless the applicant is exempt or granted a waiver. The filing fee is not required if the appellant is a city or town (or municipal agency), county, or district of the Commonwealth of Massachusetts, or a municipal housing authority. The MassDEP may waive the adjudicatory hearing filing fee pursuant to 310 CMR 4.06 (2) for a person who shows that paying the fee will create an undue financial hardship. A person seeking a waiver must file an affidavit setting forth the facts believed to support the claim of undue financial hardship together with the hearing request as provided above.

Camp Dresser & McKee Inc.
One Cambridge Place
50 Hampshire Street
Cambridge, MA 02139

TO: All Bidders of Record

Date Issued: February 25, 2011

SUBJECT: Southern Mound Closure- Haverhill Landfill
Old Groveland Road
Haverhill, Massachusetts
Contract No. 1

RECEIPT OF GENERAL BIDS:
2:00 P.M., March 9, 2011

LOCATION OF BID OPENING:
City Purchasing Department
City Hall, Room 105
4 Summer Street
Haverhill, MA 01830

ADDENDUM NO. 2

This addendum shall be part of the Contract Documents as provided in the Agreement for the above-referenced project.

Acknowledge the receipt of this addendum by inserting its number (No. 2) and date (February 25, 2011) on Page 00300-1 of the Bid Form. Failure to do so may subject the bidder to disqualification.

EXTEND BID OPENING DATE

Sealed Bids for construction of Southern Mound Closure, Haverhill Landfill will be received at the office of the City Purchasing Department, City Hall, Room 105, 4 Summer Street, Haverhill, Massachusetts 01830, until 2:00 P.M. on Wednesday, March 9, 2011, and at that time and place bids will be publicly opened and read aloud.

Camp Dresser & McKee Inc.
One Cambridge Place
50 Hampshire Street
Cambridge, MA 02139

TO: All Bidders of Record **Date Issued:** March 2, 2011

SUBJECT: Southern Mound Closure- Haverhill Landfill
Old Groveland Road
Haverhill, Massachusetts
Contract No. 1

RECEIPT OF GENERAL BIDS:
2:00 P.M., March 9, 2011

LOCATION OF BID OPENING:
City Purchasing Department
City Hall, Room 105
4 Summer Street
Haverhill, MA 01830

ADDENDUM NO. 3

This addendum shall be part of the Contract Documents as provided in the Agreement for the above-referenced project.

Acknowledge the receipt of this addendum by inserting its number (No. 3) and date (March 2, 2011) on Page 00300-1 of the Bid Form. Failure to do so may subject the bidder to disqualification.

Most recent Bidders list is attached.

DRAWINGS

Sheet No. D-1

1. DELETE Detail 6.

SPECIFICATIONS

Section 00100 – Instructions to Bidders

1. ADD under Paragraph 11.1:

   11.1.1 In consideration of Add Alternate No. 1, the lowest bidder will be determined by considering the total base bid amount, the credit amount of Add Alternate No. 1, and the cost to the Owner of extending the Contract duration by one year if Add Alternate No. 1 is selected by the Owner. The cost to the Owner of extending the contract one year is estimated to be $300,000.

2. ADD immediately after Paragraph 11.6:

11.7 If the Contract is to be awarded and within ten days, excluding Saturdays, Sundays, and legal holidays after the actual date of the opening of Bids, Aggregate Industries – Northeast Region, Inc. will give the successful Bidder a letter signed by an officer of the company, certifying that funding exists and is available for one half of the Contract Price.

3. DELETE Paragraph 12.1 in its entirety and replace with

12.1 When OWNER gives a Notice of Award to the Successful Bidder, it will be accompanied by at least six unsigned copies of the Agreement and all other applicable Contract Documents. Within five days, excluding Saturdays, Sundays and legal holidays, after the date of receipt of such notification CONTRACTOR shall execute and return all copies of the Agreement and all other applicable Contract Documents to OWNER. Within ten days thereafter OWNER will deliver one fully signed copy to CONTRACTOR, contingent upon State Revolving Fund approvals from the Massachusetts Department of Environmental Protection, Division of Municipal Services-Boston.

Section 00300 – Bid Form

1. DELETE Section 00300 in its entirety and replace with the attached Section 00300.

Section 00800 – Supplementary Conditions

1. ADD under Paragraph 5.04.A.6:

Add the following new paragraph 5.04.A.7 immediately after paragraph 5.04.A.6 of the General Conditions which is to read as follows:

7. Contractor shall purchase, maintain, and pay any deductible portion of any claim with respect to a Contractor's Pollution Liability Insurance policy with per occurrence and aggregate limits of not less than $10,000,000 responding among other things to claims for bodily injury, property damage and cleanup costs arising on or off the Site out of Contractor's or any subcontractor's performance of the Work or arising out of a pollution incident, and at a minimum have a policy term of not less than ten (10) years from the Effective Date.

Section 01010 – Summary of Work

1. DELETE Section 01010 in its entirety and replace with the attached Section 01010.

Section 01025 – Measurement and Payment

1. DELETE Paragraph 1.02 in its entirety.

2. DELETE Paragraph 1.05 in its entirety and replace with:

1.05 SITE GRADING (ITEM 4)

A. Measurement

1. Measurement for payment under Item 4 on the Bid Form will be on a cubic yard basis measured in place based on the volume of excavated material only (cut) based on the difference between the MassDEP approved revised cap subgrade plan and the pre-construction existing conditions survey (by Owner).

B. Payment

1. Payment for Item 4 on the Bid Form, including grading of earth to the lines and grades shown on the MassDEP approved revised cap subgrade plan, will be made for the quantity determined above at the unit price bid per cubic yard which price and payment shall be full compensation for all work including but not limited to excavation, relocation, placement, grading, and compacting soils; and all other work required to attain subbase grades shown on the revised approved plan suitable for gas venting layer and membrane placement.

Section 02230 – Granular Fill Material

1. DELETE Paragraph 2.01.A in its entirety and replace with:

A. Sand Material

1. Coarse Sand for Sand Drainage Layer shall be of well-graded inorganic non-calcareous material, free from organic substance and other deleterious matter with a minimum permeability of 8×10^{-3} cm/sec or greater at 90% of the maximum density as determined by ASTM D1557. Coarse Sand shall be in particle size gradation within the following limits (ASTM D422) and have a Unified Soil Classification of SW per ASTM D2487.

Sieve Size	Percent Passing by Weight
No. 4	100
No 10	25 to 50
No. 20	5 to 15
No. 40	3 to 12
No. 200	0 to 5

a. Alternative particle size gradations will be considered provided the other conditions of this Specification are met and the D_{15} of the sand divided by the D_{85} of the topsoil is less than or equal to 4.0 and the D_{15} of the sand divided by the D_{15} of the topsoil is greater than or equal to 5.0, where D_x is defined as the particle size at which x percent of the particles are finer.

2. Coarse Sand for Gas Venting Layer shall be of well-graded inorganic non-calcareous material, free from organic substance and other deleterious matter with a minimum permeability of 8×10^{-3} cm/sec or greater at 90% of the maximum density as determined by

ASTM D1557. Coarse Sand shall be in particle size gradation within the following limits (ASTM D422) and have a Unified Soil Classification of SW per ASTM D2487.

Sieve Size	Percent Passing by Weight
No. 4	100
No. 200	0 to 5

3. Coarse Sand that will be in contact with geosynthetic liners shall have rounded to subrounded particle shapes per ASTM D2488 to avoid possible liner damage.

4. Coarse Sand shall have an organic content of no more than 0.1% (ASTM D2974).

5. Coarse Sand shall have a carbonate content of no more than 5% (ASTM D4373).

6. Coarse Sand shall contain no stones, shell fragments or deleterious material larger than 3/16-inch in its largest dimension and is subject to testing at specified intervals.

7. Coarse Sand shall not contain more than 5% by weight material finer than No. 200 mesh sieve.

Section 02647 – Landfill Gas Vents

1. DELETE Paragraph 2.02 in its entirety and replace with:

2.02 PERFORATED PIPE (SCREEN)

A. The perforations shall be drilled into the pipe at the factory after manufacture. The perforated pipe shall have three rows of holes 1/2-in in diameter on 6-in centers, with allowable tolerances 1/16-in on the diameter and plus 1/4-in on the spacing and the rows shall be parallel to the axis of the pipe and 120 plus or minus 5 degrees apart.

B. Perforated holes shall be covered with tape compatible to the pipe material upon delivery to prevent material entering the pipe prior to installation. All tape shall be removed prior to placement in the boreholes.

C. Vertical slotted pipe may be considered and approved as equal provided that Contractor demonstrates the transmitting capacity, open area per foot, and structural strength of the proposed alternate are equal to or greater than the perforated pipe as specified and the slot width is no more than 3/8-inch.

Section 02670 – Monitoring Wells

1. ADD under Paragraph 2.01.F:

1. Casing pipe size shall be 6-inch diameter.

QUESTIONS AND ANSWERS (QUESTIONS ASKED DURING PRE-BID)

The Pre-Bid Conference was held at 11 A.M., February 17, 2011, at the City of Haverhill Wastewater Treatment Plant, 40 South Porter Street in Haverhill Massachusetts. The sign-in sheet from the Pre-Bid Conference is attached. Questions and answers from the Pre-Bid Conference are discussed below.

Q: "Is $10,000,000 Contractor's Pollution Liability required for delivering shaping and grading material?"

A. Contractor's Pollution Liability is required for the entire project. See new paragraph 5.04.A.7 of the General Conditions, above.

Q: "Was the Supplemental Performance Bond Value ($24/cubic yard and $250,000 for one year oversight) specified by CDM?"

A. Yes.

Q: "How will Aggregate Industries guarantee to Bond Surety that funds are available for the project given that they are a not a public agency?"

A. See new Paragraph 11.7 in Section 00100 – Instruction to Bidders, above.

Q: "How is the bidder to provide a price for regrading to revised cap subgrade plan, with the depth of cuts unknown?"

A. The Bid Form and Measurement and Payment Sections have been revised per this Addendum No. 3 to provide more definition of the regrading bid item.

Q: "Does Bid Item 4 include fine grading?"

A. No. Bid Item 4 includes rough grading of the site to the revised cap subgrade plan. Final grading of the entire cap area should be included in the lump sum price for Bid Item 3 (Site Preparation).

Q: "Will Owner consider paying for stored materials if Add Alternate 1 is selected by the Owner, given the volatility of the price of oil and that geomembrane manufacturers will only guarantee their price for 30 days?"

A. Yes. Owner will consider payment for stored materials in accordance with Article 14 of the General Conditions and Supplementary Conditions if Add Alternate 1 is selected by the Owner.

Q: "Are the existing contours shown on the Drawings based on a recent topographic survey?"

A. No. The existing contours shown on the Drawings were from various topographic surveys conducted prior to and during the Phase I and Phase IA shaping and grading projects. The proposed Phase IA shaping and grading contours (representing grades at the conclusion of Phase IA assuming receipt of the full available volume of shaping and grading materials) are also shown on the Drawings. Actual site

topography is somewhere between the two. Current site topography is being surveyed by Owner and shall be used by Engineer to prepare the revised cap subgrade plan which shall be available to Contractor following contract execution. Bid Item 1 has been removed.

Q: "Can a quantity be included for Add Alternate 1 but no credit?"

A. Yes. In that case the bid would be evaluated as the base bid plus the cost to the Owner of extending the contract one year as determined above. The Owner reserves the right to not select Add Alternate 1, so bidder should not include any expected revenue from Add Alternate 1 in their Base Bid.

Q: "When would Add Alternate not be awarded?"

A. The Owner reserves the right to not award Add Alternate 1 if it is determined by the Owners that it is not in their interest(s).

QUESTIONS AND ANSWERS (QUESTIONS SUBMITTED SUBSEQUENT TO PRE-BID)

Q: "Would it be possible to substitute "slotted" PVC screen for the "perforated" screen indicated on the diagram?" {Detail 18 – Gas Monitoring Well}

A. Slotted pipe will be considered for approval as equal provided that Contractor demonstrates the transmitting capacity, open area per foot, and structural strength are equal to or greater than the perforated pipe as specified.

Q: "What is the size of the protective casing to be installed over the gas monitoring wells?"

A. 6-inch diameter Schedule 80 galvanized steel. See new Paragraph 2.01F.1 in Section 02670 above.

Q: "Is soil sampling required during the drilling operation?"

A. No.

Q: "Is this a Massachusetts Prevailing Wage project?"

A. Massachusetts Prevailing Wage Rates and Federal Wage Rates, whichever is higher, apply.

Q: "Are the gas monitoring well locations truck accessible?"

A. Currently, no. Not all gas monitoring well locations are truck accessible.

Q: "Can plans and specifications be provided in electronic format.

A. No.

Q: "Sand Spec Table calls for "100% passing #4 sieve," and below that states "...no...material larger than 1/2"....." Are any grain sizes allowed between #4 and 1/2" ?"

A. See revised Paragraph 2.01.A of Specification Section 02230, above.

Q: "This project's sand gradation spec is not typical to other area landfill closures we have seen lately. It may not lend to just screening bank sand from pits. Would you consider the attached spec as acceptable or an alternative ?"

A. See revised Paragraph 2.01.A of Specification Section 02230, above.

Q: "Any market escalation provisions for liner system and other HDPE materials?"

A. No. However, as described above, Owner will consider payment for stored materials in accordance with Article 14 of the General Conditions and Supplementary Conditions if Add Alternate 1 is selected.

Q: "Site is listed as Superfund. Any exposure to HazMats expected? Any remediation required if encountered? Special training required for work crews? Does contractor need to provide their own LSP?"

A. No exposure to Hazardous Materials or remediation is expected. Contractor shall comply with the training and medical monitoring requirements of 29 CFR 1910.120 as required by Specification Section 01102. Contractor would only need LSP if Add Alternate 1 is selected (see Specification Section 02125).

Q: "Is there an existing SWPPP utilized for the site that is available to the contractor?"

A. There is an existing SWPPP which can be utilized for continuation of the Shaping and Grading Project if Add Alternate 1 is selected. Contractor shall develop SWPPP for landfill closure.

Q: "Are there any conditions, permits or jurisdiction from the Town of Groveland Conservation Commission?"

A. No work is to be performed in the Town of Groveland.

Q: "{Bidder} is concerned with 2 independent Owners and the endless complications which come with that. A specific issue for me is contained in the Agreement Article 4 paragraph 4.1 Contract Price. The paragraph states in part "Contractor acknowledges that the City and Aggregate are not jointly and severally liable for amounts due Contractor, and that Aggregate and the City shall be each liable for one half of the amount due Contractor for the performance of the work completed in accordance with the Contract Documents." This could put the contractor in a difficult position if 1 Owner was in default and the second Owner demanded performance. We would ask that all reference to Aggregate Industries be deleted and we deal with the City of Haverhill as the Owner and the City and Aggregate create an agreement to deal with whatever issues they need documented."

A. Contractor must contract with both the City and Aggregate as described in the Agreement (Section 00500).

Q: "Although {Bidder} as a company has not capped the number of landfills you requested in your RFP, there are a number of our current personnel . . . that have this experience . . . In addition we have the

financial, bonding and insurance strength and specific project knowledge which would make us qualified to perform this work. The specialty subs (liner installer and gas well installer) we will use on this project will have the qualification requirements you are requesting. I would respectfully request that you considered {Bidder} qualified to bid this project. . ."

A.. The Owners have reviewed the qualification requirements outlined in Section 00100 – Instruction to Bidders and no revisions have been made.

Q: "Section 2.02 states – 6 rows of .080 slots on ¼ inch centers...I believe this pattern is for slots to be cut perpendicular to the axis of the pipe. This pattern is typical for monitor wells/or water extraction wells and not for LFG wells. This pattern will not withstand the sidewall stress of the movement and settlement of landfill waste, and is not the drawing as shown on D-1/detail 6.

The slot pattern on D-1 (detail 6) needs added dimensions to determine actual slot lengths and spacing. This vertical slot pattern as shown, is typical for landfill gas wells but is normally either ¼-inch or 3/8-inch width by 8-inches in length and not .080 width. A vertical .080 slot is not recommended by any manufacturer of landfill gas well pipe and would greatly reduce the flow into the pipe. Please note that the 1-inch/1.5-inch stone being installed is large enough to prevent clogging of even the largest slot size (3/8-inch) and allow max flow.

I have attached a detail of the slotted pipe with slot lengths/widths recommended by the manufacturer with a chart showing open area/lf (OA/lf) based on slot width and is installed on most landfills where PVC pipe is used.

Please note that a Threaded Flush Joint pipe is specified (pg 2647-9). The TFJ connection is only 50% of the wall thickness of a belled pipe connection and may not withstand the sidewall stress from waste settlement. Belled end pipe is a stronger connection and the pipe is less costly."

A. See revised Paragraph 2.02 of Specification Section 02647, above.

SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.01 LOCATION OF WORK

A. The former municipal Haverhill Landfill is located off Old Groveland Road in the City of Haverhill. The Haverhill Landfill is a "Superfund Site", as defined by USEPA, but being closed under the Massachusetts Solid Waste Management Regulations (310 CMR 19.000). The Haverhill Landfill consists of two landfill mounds bisected by a former railroad bed now leased by the National Grid on which overhead electrical transmission lines are present. The National Grid property and associated electrical utilities are hereafter referred to as the "National Grid Corridor." The Town of Groveland has an easement for a 24-inch sewer force main along the National Grid corridor which extends to the Haverhill Wastewater Treatment Plant. The Southern Mound is approximately 35 acres of landfilled waste, located south of the National Grid property and bounded to the west by wetlands. The Northern Mound is approximately 20 acres in size and is bound by the National Grid property to the south and the Merrimack River to the north. The subject of this contract is the Southern Mound, hereafter referred to as "the Site".

1.02 EXISTING SITE CONDITION

A. The Southern Mound is in the process of receiving shaping and grading material under the Massachusetts Department of Environmental Protection (MassDEP) COMM-97-001 soils policy. The Owner is using this material to shape and grade the site prior to capping. The proposed grades are based on the approved volume of 640,000 cubic yards. At the conclusion of the soils project on March 31, 2011, approximately 200,000 cubic yards of the approved volume will remain available to be filled.

B. Owner is in the process of surveying existing topography of the Southern Mound. Engineer shall provide to Contractor available survey plans of the site, including the March 2011 topographic survey of the Southern Mound. Such plans will be available in AutoCAD 2008, as prepared by Richard F. Kaminski & Associates of Lawrence, Massachusetts.

1.03 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required to cap and close the Southern Mound of the Haverhill Landfill, including but not limited to mobilization, site preparation, grading, waste consolidation, construction of the landfill capping system, wetland restoration, clean-up, and demobilization as shown on the Drawings and as specified herein.

B. As shown on the Drawings, design of the Southern Mound closure has been based on the Site receiving the full 640,000 cubic yards of volume approved for shaping and grading material. As stated in Paragraph 1.02 above, there remains capacity available for the continued delivery of shaping and grading materials to the Site to meet current design grades. Through the bid process, the OWNER will consider the option of discontinuing the further receipt of shaping and grading materials in which case capping can proceed following regrading of the Site. Alternatively, additional shaping and grading materials can be accepted in some volume not to exceed the

grades shown on the Drawings. For either option, development of a revised grading plan is required prior to the initiation of cap construction.

C. Final shaping and grading of the Site to the final design grades shall be the responsibility of the Contractor subject to the following options to achieve the final grades which shall be selected and directed by the Owner.

1. *Option 1:* No further shaping and grading materials are to be accepted at the site (Base Bid). Under this scenario, work will proceed as follows:

   a. Engineer shall prepare a revised grading plan of landfill cap subgrade elevations using existing site shaping and grading materials, which will be based on Owner's March 2011 survey of existing topography. The revised grading plan shall have 3H:1V and shall not appreciably alter the proposed stormwater management controls shown on the design plans.

   b. Engineer shall submit the revised grading plan to MassDEP as a permit modification.

   c. No regrading work shall occur until MassDEP approves the permit modification and Owner directs Contractor to initiate site work based upon this approval.

   d. Schedule under Option 1 shall be as follows:

Construction Contract Execution	April 1, 2011
MassDEP approval of the modification permit (i.e., revised grading plan) – expected	June 30, 2011
Contractor to be provided access to the Site for initiation of site regrading and closure construction – expected	July 1, 2011
Substantial Completion - completion of all closure construction including seeding	July 1, 2012
Site maintenance – one season assumed Fall 2012	November 15, 2012

2. *Option 2:* Additional shaping and grading materials are to be accepted at the site, based upon Owner's acceptance of Add Alternate No. 1. Under this scenario, work will proceed as follows:

   a. Engineer shall prepare a revised grading plan of landfill cap subgrade elevations using existing site shaping and grading materials and inclusive of additional volume approved for acceptance by Owner based on Add Alternate No. 1 acceptance, which will be based on Owner's March 2011 survey of existing topography and the volume of soil committed by the Contractor. The revised grading plan shall have 3H:1V and shall not appreciably alter the proposed stormwater management controls shown on the design plans. The revised grading plan prepared by Engineer shall include a detailed construction schedule indicating a phased approach to capping and identifying areas of the landfill to be capped during each phase. At a minimum, the cap shall be constructed in three phases, with each phase approximately 12 acres in size based on the following preliminary schedule:

      - First 12 acres shall be completed by November 30, 2011
      - Second 12 acres shall be completed by November 30, 2012
      - Cap construction shall be completed by June 30, 2013

   b. Engineer shall submit the revised grading plan and cap construction phasing plan to MassDEP as a permit modification.

   c. No soils deliveries nor grading work shall occur until MassDEP approves the permit modification and Owner directs Contractor to initiate site work based upon this approval.

   d. Schedule under Option 2 shall be as follows:

Construction Contract Execution	April 1, 2011
MassDEP approval of the modification permit (i.e., revised grading plan) – expected	June 30, 2011
Contractor to be provided access to the Site for initiation of soil deliveries, regrading and closure construction – expected	July 1, 2011
Substantial Completion - completion of all closure construction including seeding, with phasing of cap construction in accordance with the approved cap construction phasing plan	July 1, 2013
Site maintenance – one season assumed Fall 2013	November 15, 2013

D. In addition to the work identified in Options 1 and 2 above, the work also includes, but is not necessarily limited to, the following:

1. Submit required plans and schedules.

2. Install temporary Site Identification Sign. Site Identification Sign shall meet the specifications of the Wetlands Protection Act Order of Conditions issued by the City of Haverhill Conservation Commission (included in Appendix).

3. Locate and flag wetlands based on the wetland lines shown on the Drawings.

4. Locate and stake the municipal boundary between the City of Haverhill and Town of Groveland which coincides with the east edge of Aggregate Industries "Lot 26" within the City of Haverhill. Under no circumstances will work be allowed to occur within the Town of Groveland municipal limits.

5. Establish approved stormwater controls and sedimentation and erosion controls in accordance with the Drawings and Specifications and the Wetlands Protection Act Order of Conditions. All work shall also meet requirements of the Army Corps of Engineers Category 2 Massachusetts General Permit (GP) and MassDEP Water Quality Certification issued for the project (included in Appendix A).

6. Stage construction and maintain the Site in a manner that prevents sedimentation of the surrounding wetlands and protects wetland areas from runoff and sedimentation damage from on-site construction.

7. Prepare a Stormwater Pollution Prevention Plan (SWPPP) in accordance with the U.S. Environmental Protection Agency's National Pollutant Discharge Elimination System (NPDES) regulations and submit a Notice of Intent (NOI) for discharge under the NPDES General Permit for Stormwater Discharges from Construction Activities. The Contractor shall be responsible for implementing, monitoring, and modifying the SWPPP for construction activities to meet changing project site conditions. The SWPPP and NPDES NOI should address required best management practices for soils project activities, should Option 2 be incorporated into the Contract.

8. Construct landfill cap including grading the side slopes and waste consolidation, grading of the top of the landfill, installation of drainage sand, loam and seed, grassed drainage swales, sub-drain piping, and all appurtenant work.

9. Install passive landfill gas management system including passive landfill gas vents and horizontal passive gas collector trenches.

10. Perform all waste relocation and consolidation shown on the plan. Such work shall include removal of soils in the western wetland swale and subsequent wetland restoration.

11. At Engineer's request and subject to Engineer's approval, Contractor shall assume responsibility for site maintenance, including but not limited to ensuring slope stability, maintenance of stormwater controls, and maintenance of erosion/sedimentation controls, etc., from date of contract execution (assumed April 1, 2011) through the date of Contractor's mobilization for the purpose of initiating grading and capping (expected July 1, 2011).

1.04 WORK BY OTHERS

A. As shown on plans, Aggregate Industries shall remove two existing building on land within the Town of Groveland, immediately adjacent to "Lot 26" which lies within the municipal boundary of the City of Haverhill. In addition, Aggregate Industries shall remove a building southwest of Basin #1 and building debris south of Basin #1, as shown on the plans. All such work by Aggregate Industries shall be completed by May 1, 2011, prior to Contractor's mobilization for construction.

B. Two National Grid utility poles within the limits of landfill waste shall be removed by the National Grid prior to the Contractor's initiation of grading and capping (expected July 1, 2011).

1.05 SEQUENCE OF CONSTRUCTION

A. Submit detailed construction schedule based upon option of approach adopted by Owner (see paragraph 1.03C of this Section).

1.06 CONTRACTOR'S USE OF PREMISES

A. Coordinate the scheduling of his work with the City of Haverhill and Aggregate Industries.

B. Contractor may perform work at the site Monday through Friday, 7:00 am to 5:00 pm and Saturday and Sunday with special permission from Owner.

C. Contractor shall assume full responsibility for security of all his and his subcontractors' materials and equipment stored on the site as well as site improvements.

D. Upon mobilization to the site, the Contractor shall be responsible for the following:

1. Installation, monitoring, and maintenance of erosion control measures including existing stormwater basins No. 1 and No. 2 to minimize the amount of material being washed from the site.

2. Control of odors and dust, in accordance with odor control and dust control plans approved by the Engineer, to prevent nuisance conditions at the site.

END OF SECTION

Client Name: City of Haverhill Job Descripti: Southern Mound Closure - Haverhill Landfill

Spec No.					
1	Mcgraw-Hill Const. Dodge Reports Suite 201 34 Crosby Dr. Bedford, MA 01730 Ph. (781) Fax (877) 430-2006 558-8282	☐ General Contractor ☐ Subcontractor Deposit $ ____ ____ CK ____ Cash Other ____ Mailing Fee $ Fedexed Date Issue 2/11/2011 Date Return ____	Addendums-(Date) 1 2/22 7 ____ 2 2/25 8 ____ 3 ____ 9 ____ 4 ____ 10 ____ 5 ____ 11 ____ 6 ____ 12 ____	X ____ Signature for Pick-up X ____ Signature for Check Return Remarks ____	Initials: AM
2	Robert Defusco Purchasing Agent Purchasing Department 4 Summer St. room 105 Haverhill, MA 01830 Ph. ( ) Fax ( )	☐ General Contractor ☐ Subcontractor Deposit $ ____ ____ CK ____ Cash Other ____ Mailing Fee $ Fedexed Date Issue 2/11/2011 Date Return ____	Addendums-(Date) 1 2/22 7 ____ 2 2/25 8 ____ 3 ____ 9 ____ 4 ____ 10 ____ 5 ____ 11 ____ 6 ____ 12 ____	X ____ Signature for Pick-up X ____ Signature for Check Return Remarks ____	Initials: AM
3	J. H. Lynch & Sons, Inc. P.O. Box 319 18 McCracken Rd. Milbury, MA 01527 Ph. (508) Fax (508) 756-6244 755-8913	☐ General Contractor ☐ Subcontractor Deposit $ 100.00 X CK ____ Cash Other ____ Mailing Fee $ obtained room Date Issue 2/14/2011 Date Return ____	Addendums-(Date) 1 2/22 7 ____ 2 2/25 8 ____ 3 ____ 9 ____ 4 ____ 10 ____ 5 ____ 11 ____ 6 ____ 12 ____	X ____ Signature for Pick-up X ____ Signature for Check Return Remarks ____	Initials: AM
4	D. W. White Construction 867 Middle Rd. Acushnet, MA 02743 Ph. (508) Fax (508) 763-8868 997-9998	☐ General Contractor ☐ Subcontractor Deposit $ 100.00 X CK ____ Cash Other ____ Mailing Fee $ obtained room Date Issue 2/14/2011 Date Return ____	Addendums-(Date) 1 2/22 7 ____ 2 2/25 8 ____ 3 ____ 9 ____ 4 ____ 10 ____ 5 ____ 11 ____ 6 ____ 12 ____	X ____ Signature for Pick-up X ____ Signature for Check Return Remarks ____	Initials: AM

Client Name: Job Descripti

Spec No.					
5	Boston Environmental Corp. 338 Howard St. Brockton, MA 02302 Ph. (508) Fax (508) 897-8062 897-8562	☐ General Contractor ☐ Subcontractor Deposit $ 100.00 X CK ____ Cash Other ____ Mailing Fee $ obtained room Date Issue 2/14/2011 Date Return ____	Addendums-(Date) 1 2/22 7 ____ 2 2/25 8 ____ 3 ____ 9 ____ 4 ____ 10 ____ 5 ____ 11 ____ 6 ____ 12 ____	X ____ Signature for Pick-up X ____ Signature for Check Return Remarks ____	Initials: AM
6	E. T. & L. Corp. P.O. Box 873 Great Rd. 295 Stow, MA 01775 Ph. (978) Fax (978) 897-4353 897-0779	☐ General Contractor ☐ Subcontractor Deposit $ 100.00 X CK ____ Cash Other ____ Mailing Fee $ obtained room Date Issue 2/14/2011 Date Return ____	Addendums-(Date) 1 2/22 7 ____ 2 2/25 8 ____ 3 ____ 9 ____ 4 ____ 10 ____ 5 ____ 11 ____ 6 ____ 12 ____	X ____ Signature for Pick-up X ____ Signature for Check Return Remarks ____	Initials: AM
7	Cherango Contracting Inc. 29 Arbutus Rd. Johnson City, NY 13790 Ph. (607) Fax (607) 729-8500 729-2415	☐ General Contractor ☐ Subcontractor Deposit $ 100.00 X CK ____ Cash Other ____ Mailing Fee $ Fedexed Date Issue 2/14/2011 Date Return ____	Addendums-(Date) 1 2/22 7 ____ 2 2/25 8 ____ 3 ____ 9 ____ 4 ____ 10 ____ 5 ____ 11 ____ 6 ____ 12 ____	X ____ Signature for Pick-up X ____ Signature for Check Return Remarks ____	Initials: AM
8	David A. Roach & Sons Inc. P.O. Box 479 Ware, MA 01082 1276 Patrill Hollow Rd. Hardwick, MA 01037 Ph. (413) Fax ( ) 967-1223	☐ General Contractor ☐ Subcontractor Deposit $ 75.00 X CK ____ Cash Other ____ Mailing Fee $ Fedexed Date Issue 2/14/2011 Date Return ____	Addendums-(Date) 1 2/22 7 ____ 2 2/25 8 ____ 3 ____ 9 ____ 4 ____ 10 ____ 5 ____ 11 ____ 6 ____ 12 ____	X ____ Signature for Pick-up X ____ Signature for Check Return Remarks ____	Initials: AM

Client Name: Job Descripti

Spec No.					
9	I. W. Harding Construction 354 Pleasant St. 02379 West Bridgewater, MA Ph. (508) Fax (508) 588-2222 588-3456	☐ General Contractor ☐ Subcontractor Deposit $ 75.00 X CK ___ Cash Other ___ Mailing Fee $ Obtainedfrom Date Issue 2/14/2011 Date Return ___	Addendums-(Date) 1. 2/22 7. ___ 2. 2/25 8. ___ 3. ___ 9. ___ 4. ___ 10. ___ 5. ___ 11. ___ 6. ___ 12. ___	X ___ Signature for Pick-up X ___ Signature for Check Return Remarks ___	Initials: AM
10	Northern Construction Unit 6b 775 Pleasant St. Weymouth, MA 02189 Ph. (781) Fax (781) 340-9440 340-5708	☐ General Contractor ☐ Subcontractor Deposit $ 75.00 X CK ___ Cash Other ___ Mailing Fee $ Fedexacct# Date Issue 2/14/2011 Date Return ___	Addendums-(Date) 1. 2/22 7. ___ 2. 2/25 8. ___ 3. ___ 9. ___ 4. ___ 10. ___ 5. ___ 11. ___ 6. ___ 12. ___	X ___ Signature for Pick-up X ___ Signature for Check Return Remarks ___	Initials: AM
11	R.I.D Site Development 7 Hemlock Lane Groveland, MA 01834 Ph. (978) Fax (978) 374-4353 702-4408	☐ General Contractor ☐ Subcontractor Deposit $ 75.00 X CK ___ Cash Other ___ Mailing Fee $ Obtainedfrom Date Issue 2/14/2011 Date Return ___	Addendums-(Date) 1. 2/22 7. ___ 2. 2/25 8. ___ 3. ___ 9. ___ 4. ___ 10. ___ 5. ___ 11. ___ 6. ___ 12. ___	X ___ Signature for Pick-up X ___ Signature for Check Return Remarks ___	Initials: AM
12	R.I.D Enterprises P.O. Box 247 196 Old Point Ave. Madison, Maine 04950 Ph. (207) Fax (207) 696-3964 696-0815	☐ General Contractor ☐ Subcontractor Deposit $ 75.00 X CK ___ Cash Other ___ Mailing Fee $ Fedexacct# Date Issue 2/14/2011 Date Return ___	Addendums-(Date) 1. 2/22 7. ___ 2. 2/25 8. ___ 3. ___ 9. ___ 4. ___ 10. ___ 5. ___ 11. ___ 6. ___ 12. ___	X ___ Signature for Pick-up X ___ Signature for Check Return Remarks ___	Initials: AM

Client Name: Job Descripti

Spec No.					
13	Waterline Industries 7 London Lane Seabrook, NH 03874 Ph. (603) Fax (603) 474-7477 474-8578	☐ General Contractor ☐ Subcontractor Deposit $ 75.00 X CK ___ Cash Other ___ Mailing Fee $ Fedexacct# Date Issue 2/14/2011 Date Return ___	Addendums-(Date) 1. 2/22 7. ___ 2. 2/25 8. ___ 3. ___ 9. ___ 4. ___ 10. ___ 5. ___ 11. ___ 6. ___ 12. ___	X ___ Signature for Pick-up X ___ Signature for Check Return Remarks ___	Initials: AM
14	MIG Corporation, Inc Suite 209 One Acton Place Acton, MA 01720 Ph. (978) Fax (978) 264-4800 264-0123	☐ General Contractor ☐ Subcontractor Deposit $ 75.00 X CK ___ Cash Other ___ Mailing Fee $ Fedexacct# Date Issue 2/14/2011 Date Return ___	Addendums-(Date) 1. 2/22 7. ___ 2. 2/25 8. ___ 3. ___ 9. ___ 4. ___ 10. ___ 5. ___ 11. ___ 6. ___ 12. ___	X ___ Signature for Pick-up X ___ Signature for Check Return Remarks ___	Initials: AM
15	The Middlesex Corp. One Spectacle Pond Rd. Littleton, MA 01462 Ph. (978) Fax (978) 742-4400 742-4434	☐ General Contractor ☐ Subcontractor Deposit $ 75.00 X CK ___ Cash Other ___ Mailing Fee $ Fedexacct# Date Issue 2/14/2011 Date Return ___	Addendums-(Date) 1. 2/22 7. ___ 2. 2/25 8. ___ 3. ___ 9. ___ 4. ___ 10. ___ 5. ___ 11. ___ 6. ___ 12. ___	X ___ Signature for Pick-up X ___ Signature for Check Return Remarks ___	Initials: AM
16	P. Gioioso & Sons, Inc 50 Sprague St. Hyde Park, MA 02136 Ph. (617) Fax (617) 364-5800 364-9462	☐ General Contractor ☐ Subcontractor Deposit $ 100.00 X CK ___ Cash Other ___ Mailing Fee $ Fedexacct# Date Issue 2/14/2011 Date Return ___	Addendums-(Date) 1. 2/22 7. ___ 2. 2/25 8. ___ 3. ___ 9. ___ 4. ___ 10. ___ 5. ___ 11. ___ 6. ___ 12. ___	X ___ Signature for Pick-up X ___ Signature for Check Return Remarks ___	Initials: AM

Client Name:	Job Descripti			
Spec No.	☐ General Contractor ☐ Subcontractor	Addendums-(Date)	X Signature for Pick-up	
The Dow Company, Inc.	Deposit $ 100.00	1. 2/22	7	X Signature for Check Return
17 1112 Broadway Rd.	X CK ___ Cash	2. 2/25	8	
Initials Dracut, MA 01826	Other	3	9	Remarks
AM Ph. (978) 682-1414 Fax (978) 654-5191	Mailing Fee $ Obtain ordered	4	10	
	Date Issue 2/15/2011	5	11	
	Date Return	6	12	
Spec No.	☐ General Contractor ☐ Subcontractor	Addendums-(Date)	X Signature for Pick-up	
G. Lopes Construction	Deposit $ 100.00	1. 2/22	7	X Signature for Check Return
18 490 Winthrop St.	X CK ___ Cash	2. 2/25	8	
Initials Taunton, MA 02780	Other	3	9	Remarks
AM Ph. (508) 824-4834 Fax (508) 880-3115	Mailing Fee $ Obtain ordered	4	10	
	Date Issue 2/15/2011	5	11	
	Date Return	6	12	
Spec No.	☐ General Contractor ☐ Subcontractor	Addendums-(Date)	X Signature for Pick-up	
Mr. Dennis Lydon Aggregate Industries-	Deposit $ ___	1. 2/22	7	X Signature for Check Return
19 Northeast Region Inc. 9 Chester Rd. P.O. Box 1048	___ CK ___ Cash	2. 2/25	8	
Initials Raymond, NH 03077	Other	3	9	Remarks
AM Ph. ( ) Fax ( )	Mailing Fee $ U.S. Postal	4	10	
	Date Issue 2/15/2011	5	11	
	Date Return	6	12	
Spec No.	☐ General Contractor ☐ Subcontractor	Addendums-(Date)	X Signature for Pick-up	
Mr. Robert E. Ward Deputy Director Dep. of Public Works	Deposit $ ___	1. 2/22	7	X Signature for Check Return
20 City of Haverhill 40 South Porter St.	___ CK ___ Cash	2. 2/25	8	
Initials Haverhill, MA 01835	Other	3	9	Remarks
AM Ph. ( ) Fax ( )	Mailing Fee $ U.S. Postal	4	10	
	Date Issue 2/15/2011	5	11	
	Date Return	6	12	

Client Name:	Job Descripti			
Spec No.	☐ General Contractor ☐ Subcontractor	Addendums-(Date)	X Signature for Pick-up	
Michael Lean, Esq Nutter, McClennen &	Deposit $ ___	1. 2/22	7	X Signature for Check Return
Fish, LLP 21 155 Seaport Blvd.	___ CK ___ Cash	2. 2/25	8	
Initials Boston, MA 02210	Other	3	9	Remarks
AM Ph. ( ) Fax ( )	Mailing Fee $ U.S. Postal	4	10	
	Date Issue 2/15/2011	5	11	
	Date Return	6	12	
Spec No.	☐ General Contractor ☐ Subcontractor	Addendums-(Date)	X Signature for Pick-up	
Mr. Andrew C. Culbert Masterman, Culbert &	Deposit $ ___	1. 2/22	7	X Signature for Check Return
22 Tully LLP, Attorney One Lewis Wharf	___ CK ___ Cash	2. 2/25	8	
Initials Boston, MA 02110	Other	3	9	Remarks
AM Ph. ( ) Fax ( )	Mailing Fee $ U.S. Postal	4	10	
	Date Issue 2/15/2011	5	11	
	Date Return	6	12	
Spec No.	☐ General Contractor ☐ Subcontractor	Addendums-(Date)	X Signature for Pick-up	
Craig Campbell, Esq Attorney at Law	Deposit $ ___	1. 2/22	7	X Signature for Check Return
23 30 Gingerbread Hill	___ CK ___ Cash	2. 2/25	8	
Initials Marblehead, MA 01945	Other	3	9	Remarks
AM Ph. ( ) Fax ( )	Mailing Fee $ U.S. Postal	4	10	
	Date Issue 2/15/2011	5	11	
	Date Return	6	12	
Spec No.	☐ General Contractor ☐ Subcontractor	Addendums-(Date)	X Signature for Pick-up	
Mr. Scott Colby - Regional Env. Land Services Manager	Deposit $ ___	1. 2/22	7	X Signature for Check Return
Aggregate Industries - Northeast 24 497B Broadway	___ CK ___ Cash	2. 2/25	8	
Initials Saugus, MA 01906	Other	3	9	Remarks
AM Ph. ( ) Fax ( )	Mailing Fee $ U.S. Postal	4	10	
	Date Issue 2/15/2011	5	11	
	Date Return	6	12	

Client Name: Job Descripti

Spec No.		Deposit / Mailing Fee	Addendums-(Date)	Signature / Remarks
25	George Cairns & Sons Inc. 8 Ledge Rd. Windham, NH 03087	☐ General Contractor ☐ Subcontractor Deposit $ 100.00 X CK ___ Cash Other ___ Mailing Fee $ Obtained on Date Issue 2/15/2011 Date Return ___	1 2/22 2 2/25 3 4 5 6 7 8 9 10 11 12	X Signature for Pick-up X Signature for Check Return Remarks Email: Glenn Cairns @gcairns inc.com
Initials: AM	Ph. (603) 421-1888 Fax (603) 421-9211			
Spec No. 26	Terrafix Environmental USA Inc. P.O. Box 1226 770 Main St. Lewiston, ME 04240	☐ General Contractor ☐ Subcontractor Deposit $ 50.00 X CK ___ Cash Other ___ Mailing Fee $ Fedexacct# Date Issue 2/15/2011 Date Return ___	1 2/22 2 2/25 3 4 5 6 7 8 9 10 11 12	X Signature for Pick-up X Signature for Check Return Remarks Kriddle @ TerrafixGeo.com
Initials: AM	Ph. (207) 786-6808 Fax (207) 786-6835			
Spec No. 27	Wes Construction Corp. 650 Industrial Drive Halifax, MA 02338	☐ General Contractor ☐ Subcontractor Deposit $ 100.00 X CK ___ Cash Other ___ Mailing Fee $ Fedexacct# Date Issue 2/16/2011 Date Return ___	1 2/22 2 2/25 3 4 5 6 7 8 9 10 11 12	X Signature for Pick-up X Signature for Check Return Remarks KVogel@ WesConstruction Corp.com
Initials: AM	Ph. (781) 294-1080 Fax (781) 294-1067			
Spec No. 28	New England Liner Systems 40 Westfield Dr. Plantsville, CT 06479	☐ General Contractor ☐ Subcontractor Deposit $ 100.00 X CK ___ Cash Other ___ Mailing Fee $ Obtained on Date Issue 2/16/2011 Date Return ___	1 2/22 2 2/25 3 4 5 6 7 8 9 10 11 12	X Signature for Pick-up X Signature for Check Return Remarks ___
Initials: AM	Ph. (860) 426-1880 Fax (860) 426-0237			

Client Name: Job Descripti

Spec No.		Deposit / Mailing Fee	Addendums-(Date)	Signature / Remarks
29	T.W. Harding Const. 354 Pleasant St. West Bridgewater, MA 02379	☐ General Contractor ☐ Subcontractor Deposit $ 75.00 X CK ___ Cash Other ___ Mailing Fee $ Fedexacct# Date Issue 2/16/2011 Date Return ___	1 2/22 2 2/25 3 4 5 6 7 8 9 10 11 12	X Signature for Pick-up X Signature for Check Return Remarks ___
Initials: AM	Ph. (508) 588-2222 Fax (508) 588-3456			
Spec No. 30	Bruce Haskell CDM Cambridge	☐ General Contractor ☐ Subcontractor Deposit $ ___ ___ CK ___ Cash Other ___ Mailing Fee $ ___ Date Issue 2/15/2011 Date Return ___	1 2/22 2 2/25 3 4 5 6 7 8 9 10 11 12	X Signature for Pick-up X Signature for Check Return Remarks ___
Initials: AM	Ph. ( ) Fax ( )			
Spec No. 31	Andy Miller CDM Cambridge	☐ General Contractor ☐ Subcontractor Deposit $ ___ ___ CK ___ Cash Other ___ Mailing Fee $ ___ Date Issue 2/15/2011 Date Return ___	1 2/22 2 2/25 3 4 5 6 7 8 9 10 11 12	X Signature for Pick-up X Signature for Check Return Remarks ___
Initials: AM	Ph. ( ) Fax ( )			
Spec No. 32	Susan Grzskiewicz CDM Cambridge	☐ General Contractor ☐ Subcontractor Deposit $ ___ ___ CK ___ Cash Other ___ Mailing Fee $ ___ Date Issue 2/16/2011 Date Return ___	1 2/22 2 2/25 3 4 5 6 7 8 9 10 11 12	X Signature for Pick-up X Signature for Check Return Remarks ___
Initials: AM	Ph. ( ) Fax ( )			

Client Name: | Job Descripti

Spec No.					
33	Defelice Corp. 386 Broadway Rd. Dracut, MA 01826 Ph. (978) 452-6967 Fax (978) 452-6903	☐ General Contractor ☐ Subcontractor Deposit $ 100.00 X CK ___ Cash Other ___ Mailing Fee $ Obtained on Date Issue 2/18/2011 Date Return ___	Addendums-(Date) 1 2/22 7 ___ 2 2/25 8 ___ 3 ___ 9 ___ 4 ___ 10 ___ 5 ___ 11 ___ 6 ___ 12 ___	X ___ Signature for Pick-up X ___ Signature for Check Return Remarks ___
Initials: AM				
Spec No.					
34	A.A. Will Corporation 145 Island St. Stoughton, MA 02072 Ph. (781) 341-4800 Fax (781) 341-4404	☐ General Contractor ☐ Subcontractor Deposit $ 75.00 X CK ___ Cash Other ___ Mailing Fee $ Obtained on Date Issue 2/18/2011 Date Return ___	Addendums-(Date) 1 2/22 7 ___ 2 2/25 8 ___ 3 ___ 9 ___ 4 ___ 10 ___ 5 ___ 11 ___ 6 ___ 12 ___	X ___ Signature for Pick-up X ___ Signature for Check Return Remarks ___
Initials: AM				
Spec No.					
35	CYN Environmental Services P.O. Box 119 100 TOSCA Drive Stoughton, MA 02072 Ph. (781) 341-1777 Fax ( )	☐ General Contractor ☐ Subcontractor Deposit $ 100.00 X CK ___ Cash Other ___ Mailing Fee $ Obtained on Date Issue 2/18/2011 Date Return 2/24/2011	Addendums-(Date) 1 2/22 7 ___ 2 2/25 8 ___ 3 ___ 9 ___ 4 ___ 10 ___ 5 ___ 11 ___ 6 ___ 12 ___	X ___ Signature for Pick-up X ___ Signature for Check Return Remarks ___
Initials: AM				
Spec No.					
36	Reed Construction Data Suite 100 30 Technology Pkwy South Norcross, GA 30092 Ph. (800) 424-3996 Fax (800) 303-8629	☐ General Contractor ☐ Subcontractor Deposit $ ___ ___ CK ___ Cash Other ___ Mailing Fee $ Fedexed Date Issue 2/18/2011 Date Return ___	Addendums-(Date) 1 2/22 7 ___ 2 2/25 8 ___ 3 ___ 9 ___ 4 ___ 10 ___ 5 ___ 11 ___ 6 ___ 12 ___	X ___ Signature for Pick-up X ___ Signature for Check Return Remarks ___
Initials: AM				

Client Name: | Job Descripti

Spec No.					
37	ISQFT Plan Room C/o Service Point 5 Commonwealth Ave. Units Woburn, MA 01801 Ph. (800) 364-2059 Fax (866) 570-8187	☐ General Contractor ☐ Subcontractor Deposit $ 100.00 X CK ___ Cash Other ___ Mailing Fee $ Fedexed Date Issue 2/21/2011 Date Return ___	Addendums-(Date) 1 2/22 7 ___ 2 2/25 8 ___ 3 ___ 9 ___ 4 ___ 10 ___ 5 ___ 11 ___ 6 ___ 12 ___	X ___ Signature for Pick-up X ___ Signature for Check Return Remarks ___
Initials: AM				
Spec No.					
38	E.J. Prescott, Inc. P.O. Box 761 Ent 14 762 North Main St. Middleton, MA 01949 Ph. (978) 777-7738 Fax (978) 774-3853	☐ General Contractor ☐ Subcontractor Deposit $ 100.00 X CK ___ Cash Other ___ Mailing Fee $ Obtained on Date Issue 2/23/2011 Date Return ___	Addendums-(Date) 1 2/22 7 ___ 2 2/25 8 ___ 3 ___ 9 ___ 4 ___ 10 ___ 5 ___ 11 ___ 6 ___ 12 ___	X ___ Signature for Pick-up X ___ Signature for Check Return Remarks ___
Initials: AM				
Spec No.					
39	C.Projects.com STE 30 Controls Dr. 200 Shelton, CT 06484 Ph. (203) 925-0444 Fax ( )	☐ General Contractor ☐ Subcontractor Deposit $ ___ ___ CK ___ Cash Other ___ Mailing Fee $ Fedexed Date Issue 2/23/2011 Date Return ___	Addendums-(Date) 1 2/23 7 ___ 2 2/25 8 ___ 3 ___ 9 ___ 4 ___ 10 ___ 5 ___ 11 ___ 6 ___ 12 ___	X ___ Signature for Pick-up X ___ Signature for Check Return Remarks ___
Initials: AM				
Spec No.					
40	Brighter Horizons Env Corp. P.O. Box 219 4 Courthouse Lane Suite 14 Chelmsford, MA 01824 Ph. (978) 970-0500 Fax (978) 970-0501	☐ General Contractor ☐ Subcontractor Deposit $ 100.00 X CK ___ Cash Other ___ Mailing Fee $ Obtained on Date Issue 2/25/2011 Date Return ___	Addendums-(Date) 1 2/25 7 ___ 2 2/25 8 ___ 3 ___ 9 ___ 4 ___ 10 ___ 5 ___ 11 ___ 6 ___ 12 ___	X ___ Signature for Pick-up X ___ Signature for Check Return Remarks JSquegliaO BHENV.com
Initials: AM				

Client Name:	Job Descripti			
Spec No. 41	C.R.C. Company, Inc. 77 Federal Ave. Quincy, MA 02169	☐ General Contractor ☐ Subcontractor Deposit $ 100.00 X CK ___ Cash Other ___ Mailing Fee $ obtain/acom Date Issue 2/25/2011 Date Return ___	Addendums-(Date) 1 2/25 7 ___ 2 2/25 8 ___ 3 ___ 9 ___ 4 ___ 10 ___ 5 ___ 11 ___ 6 ___ 12 ___	X ___ Signature for Pick-up X ___ Signature for Check Return Remarks ___
Initials AM	Ph. (617) 328-0800 Fax (617) 773-2499			
Spec No.		☐ General Contractor ☐ Subcontractor Deposit $ ___ ___ CK ___ Cash Other ___ Mailing Fee $ ___ Date Issue ___ Date Return ___	Addendums-(Date) 1 ___ 7 ___ 2 ___ 8 ___ 3 ___ 9 ___ 4 ___ 10 ___ 5 ___ 11 ___ 6 ___ 12 ___	X ___ Signature for Pick-up X ___ Signature for Check Return Remarks ___
Initials	Ph. ( ) Fax ( )			
Spec No.		☐ General Contractor ☐ Subcontractor Deposit $ ___ ___ CK ___ Cash Other ___ Mailing Fee $ ___ Date Issue ___ Date Return ___	Addendums-(Date) 1 ___ 7 ___ 2 ___ 8 ___ 3 ___ 9 ___ 4 ___ 10 ___ 5 ___ 11 ___ 6 ___ 12 ___	X ___ Signature for Pick-up X ___ Signature for Check Return Remarks ___
Initials	Ph. ( ) Fax ( )			
Spec No.		☐ General Contractor ☐ Subcontractor Deposit $ ___ ___ CK ___ Cash Other ___ Mailing Fee $ ___ Date Issue ___ Date Return ___	Addendums-(Date) 1 ___ 7 ___ 2 ___ 8 ___ 3 ___ 9 ___ 4 ___ 10 ___ 5 ___ 11 ___ 6 ___ 12 ___	X ___ Signature for Pick-up X ___ Signature for Check Return Remarks ___
Initials	Ph. ( ) Fax ( )			

Southern Mound Closure- Haverhill Landfill
Old Groveland Road
Haverhill, Massachusetts
Contract No. 1

Sign in Sheet

Pre-Bid Conference – 11 A.M., February 17, 2011 at City of Haverhill Wastewater Treatment Plant, 40 South Porter Street, Haverhill, MA

Name	Company	Phone	Fax	email
David Welch	New England Liner Systems.	860-426-1880	860-426-9937	dawelch@aol.com
Darryl Roach	David G. Roach & Sons	413-967-6733	413-967-5140	roachsitework@gmail.com
Nathan Lanier	David G. Roach & Sons	413-967-6733	413-967-5140	ROACHSITEWORK@GMAIL.COM
Jim Murray	E.T. & L. Corp	978-897-4353	978-897-0779	jmurray@ETLcorp.com
Chris Czesnak	J. Bates & Son, LLC	978-368-7001	978-368-7005	cczesnak@jbatesandson.com
John Smith	J. Bates & Son LLC	978-368-7001	978-368-7005	jsmith@jbatesandson.com
Ryan Cairns	George Cairns & Sons	603-421-1888	603-421-9011	glenncairns@gcairnsinc.com
Dennis Lydon	AT	603-231-7225		
Mike Toomey	Boston Env	617-877-6648	508-897-8562	Toomey@Bostonenv.com
David Howe	J. Derenzo Co	617-212-4508	508-897-8016	Dhowe@JDerenzo.com
Bruce Haskell	CDM	617 452-6541	617 452-6541	Haskellbw@cdm.com
Bob DeFusco	City of Haverhill	978-420-3606		RDEFUSCO@CITYOFHAVERHILL.com
Nathan Jones	CDM	617 452-6563	617 452-6563	jonesnc@cdm.com

Sign in Sheet

Pre-Bid Conference – 11 A.M., February 17, 2011 at City of Haverhill Wastewater Treatment Plant, 40 South Porter Street, Haverhill, MA

Name	Company	Phone	Fax	email
Dennis Bousquet	J.H. LYNCH	508 756 6244	[illegible]	dbousquet@jhlynch.com
John Cole	Boston End	508-897-8025	508-897-8525	JCole@BostonEndCorp.com

BID FORM
TO
CITY OF HAVERHILL, MASSACHUSETTS AND
AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
OLD GROVELAND ROAD
HAVERHILL, MASSACHUSETTS
CONTRACT NO. 1

PROJECT NO. CWSRF-3403

The undersigned declares that the only persons or parties interested in this Bid as principals are as stated; that the Bid is made without any collusion with other persons, firms, or corporations; that he/she has carefully examined all the Contract Documents as prepared by Camp Dresser & McKee Inc., One Cambridge Place, 50 Hampshire Street, Cambridge, MA 02139 and dated October 2010 and revised February 2011 that he/she has informed himself fully in regard to all conditions pertaining to the Work and the place where it is to be done, and from them the undersigned makes this Bid. These prices shall cover all expenses incurred in performing the Work required under the Contract Documents, of which this Bid Form is a part.

The time period for holding bids, where Federal approval is not required is 30 days, Saturdays, Sundays and legal holidays excluded, after the opening of General Bids and where Federal approved is required, the time period for holding bids is 30 days, Saturdays, Sundays and holidays excluded after Federal approval.

The Bid Security accompanying this Bid shall be in the amount of 5 percent of the Bid. The Bid Security shall be sealed in a separate envelope from the Bid and then attached to the envelope containing the Bid.

If a Notice of Award accompanied by at least six unsigned copies of the Agreement and all other applicable Contract Documents is delivered to the undersigned within ten days, excluding Saturdays, Sundays, and legal holidays, after the actual date of the opening of the Bids, the undersigned will within five days, excluding Saturdays, Sundays, and legal holidays, after the date of receipt of such notification, execute and return all copies of the Agreement and all other applicable Contract Documents to OWNER. The premiums for all Bonds required shall be paid by CONTRACTOR and shall be included in the Contract Price. The undersigned further agrees that the Bid Security accompanying this Bid shall become the property of OWNER if the Bidder fails to execute the Agreement as stated above.

The undersigned hereby agrees that the Contract Time shall commence on the date of execution of the Agreement and to fully complete the Work of the Base Bid within 595 Calendar Days in accordance with the terms as stated in the Agreement. If the Bid Alternate is awarded, the Contract Time shall be 960 Calendar Days from the date of execution of the Agreement in accordance with the terms as stated in the Agreement. The undersigned further agrees to pay OWNER, as liquidated damages, $3,500.00 per day for each calendar day beyond the Contract Time Limit or extension thereof that the Work remains incomplete, in accordance with the terms of the Agreement.

The undersigned acknowledges receipt of addenda numbered:

_____

In accordance with the above understanding, the undersigned proposes to perform the Work, furnish all materials and complete the Work in its entirety in the manner and under the conditions required at the prices listed as follows:

CITY OF HAVERHILL, MASSACHUSETTS AND
AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
OLD GROVELAND ROAD
HAVERHILL, MASSACHUSETTS
CONTRACT NO. 1

PROJECT NO. CWSRF-3403

BID FORM

PART 1 – BASE BID

Item No.	Estimated Quantity	Brief Description of Items With Unit Bid Price In Words	Unit Bid Price In Figures	Amount In Figures
1	-	Deleted		
2	L.S.	Mobilization/Demobilization – not to exceed 5 percent of Base Bid less this item _____ per lump sum		$_____
3	L.S.	Site preparation including removal of required items, clearing and grubbing, and all other work not covered in other items but required by the Contract Documents. _____ per lump sum		$_____
4	50,000 Cubic yards	Regrading to revised cap subgrade plan including excavation, grading, and compacting and all other work required to obtain subbase grades shown on the revised approved plan. _____ per cubic yard	$_____	$_____
5	9,750 linear feet	Erosion Control (Furnish, install and maintain hay bales and silt fence) _____ per linear foot	$_____	$_____

Subtotal Page 00300-2 $_____

CITY OF HAVERHILL, MASSACHUSETTS AND
AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
OLD GROVELAND ROAD
HAVERHILL, MASSACHUSETTS
CONTRACT NO. 1

PROJECT NO. CWSRF-3403

BID FORM

PART 1 – BASE BID

Item No.	Estimated Quantity	Brief Description of Items With Unit Bid Price In Words	Unit Bid Price In Figures	Amount In Figures
6	109,200 square yards	Furnish and install erosion control fabric on all side slopes 4H:1V or steeper including all appurtenant work and materials. _____ per square yard	$_____	$_____
7a	9,400 linear feet	Furnish and install Vegetated Drainage Swale including all appurtenant work and materials. _____ per linear foot	$_____	$_____
7b	3,700 linear feet	Furnish and install Riprap Drainage Swale including all appurtenant work and materials. _____ per linear foot	$_____	$_____
8a	L.S.	Reconstruct stormwater Basin 1 including excavation, riprap, outlet structure and pipe, loam and seed, and all appurtenant work and materials. _____ per lump sum		$_____
8b	L.S.	Construct stormwater Basin 3 including excavation, riprap, outlet structure and pipe, loam and seed, and all appurtenant work and materials. _____ per lump sum		$_____

Subtotal Page 00300-3 $_____

CITY OF HAVERHILL, MASSACHUSETTS AND
AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
OLD GROVELAND ROAD
HAVERHILL, MASSACHUSETTS
CONTRACT NO. 1

PROJECT NO. CWSRF-3403

BID FORM

PART 1 – BASE BID

Item No.	Estimated Quantity	Brief Description of Items With Unit Bid Price In Words	Unit Bid Price In Figures	Amount In Figures
8c	L.S.	Construct stormwater Basin 4 including excavation, riprap, outlet structure and pipe, loam and seed, and all appurtenant work and materials and perform inspection of receiving culvert (18" RCP beneath old landfill access road).		
		_____ per lump sum		$_____
9	150,000 square yards	Furnish and install 6-in gas venting layer including all appurtenant work and materials.		
		_____ per square yard	$_____	$_____
10	150,000 square yards	Furnish and install 40-mil textured LLDPE geomembrane including all appurtenant work and materials.		
		_____ per square yard	$_____	$_____
11	4,900 linear feet	Furnish and install the anchor trench including all appurtenant work and materials.		
		_____ per linear foot	$_____	$_____
12	165,000 square yards	Furnish and install 12-in sand drainage layer including all appurtenant work and materials.		
		_____ per square yard	$_____	$_____

Subtotal Page 00300-4 $_____

CITY OF HAVERHILL, MASSACHUSETTS AND
AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
OLD GROVELAND ROAD
HAVERHILL, MASSACHUSETTS
CONTRACT NO. 1

PROJECT NO. CWSRF-3403

BID FORM

PART 1 – BASE BID

Item No.	Estimated Quantity	Brief Description of Items With Unit Bid Price In Words	Unit Bid Price In Figures	Amount In Figures
13	20,800 linear feet	Furnish and install 18" perforated flat panel pipe including all appurtenant work and materials.		
		_____ per linear foot	$_____	$_____
14	475 linear feet	Furnish and install mortared riprap downchute including all appurtenant work and materials.		
		_____ per linear foot	$_____	$_____
15	211,000 square yards	Furnish and install 8-in thick topsoil, lime, fertilizer, and seed on landfill cap and other disturbed areas, including all appurtenant work and materials.		
		_____ per square yard	$_____	$_____
16	2,700 square yards	Furnish and install 12-in thick organic content loam, lime, fertilizer, and seed on disturbed wetland resource areas, including all appurtenant work and materials.		
		_____ per square yard	$_____	$_____
17a	11 each	Furnish and install *Acer rubrum* 'Red Maple', 1.0'-1.5' cal., including excavation and all necessary material to complete planting.		
		_____ per each	$_____	$_____

Subtotal Page 00300-5 $_____

CITY OF HAVERHILL, MASSACHUSETTS AND
AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
OLD GROVELAND ROAD
HAVERHILL, MASSACHUSETTS
CONTRACT NO. 1

PROJECT NO. CWSRF-3403

BID FORM

PART 1 – BASE BID

Item No.	Estimated Quantity	Brief Description of Items With Unit Bid Price In Words	Unit Bid Price In Figures	Amount In Figures
17b	13 each	Furnish and install *Fraxinus pensylvanica* 'Green Ash', 1.0'-1.5' cal., including excavation and all necessary material to complete planting.		
		_____ per each	$_____	$_____
17c	41 each	Furnish and install *Alnus Incan* 'Speckled Alder', 4.0-5.0 ht., including excavation and all necessary material to complete planting.		
		_____ per each	$_____	$_____
17d	21 each	Furnish and install *Cornus amomum*, 'Silky Dogwood', 4.0-5.0 ht., including excavation and all necessary material to complete planting.		
		_____ per each	$_____	$_____
17e	37 each	Furnish and install *Salix Discolor*, 'Pussy Willow', 4.0-5.0 ht., including excavation and all necessary material to complete planting.		
		_____ per each	$_____	$_____
18	2,650 vertical feet	Furnish and install passive landfill gas vents including all appurtenant work and materials.		
		_____ per vertical foot	$_____	$_____

Subtotal Page 00300-6 $_____

CITY OF HAVERHILL, MASSACHUSETTS AND
AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
OLD GROVELAND ROAD
HAVERHILL, MASSACHUSETTS
CONTRACT NO. 1

PROJECT NO. CWSRF-3403

BID FORM

PART 1 – BASE BID

Item No.	Estimated Quantity	Brief Description of Items With Unit Bid Price In Words	Unit Bid Price In Figures	Amount In Figures
19	39 each	Furnish and install landfill gas passive vent flare including all appurtenant work and materials.		
		_____ each	$_____	$_____
20	L.S.	Construct passive horizontal gas collection trench including all appurtenant work and materials.		
		_____ per lump sum		$_____
21	293 vertical feet	Furnish and install gas monitoring wells including all appurtenant work and materials.		
		_____ per vertical foot	$_____	$_____
22	3,700 square yards	Design and construct two gravel access roads including clearing, grubbing, grading; providing structural fill, processed gravel base, and dense graded crushed stone surface; and, all appurtenant work and materials.		
		_____ per square yard	$_____	$_____
23	1,680 linear feet	Furnish and install 6-ft Chain Link Fence including all appurtenant work and materials.		
		_____ per linear foot	$_____	$_____

Subtotal Page 00300-7 $_____

CITY OF HAVERHILL, MASSACHUSETTS AND
AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
OLD GROVELAND ROAD
HAVERHILL, MASSACHUSETTS
CONTRACT NO. 1

PROJECT NO. CWSRF-3403

BID FORM

PART 1 – BASE BID

Item No.	Estimated Quantity	Brief Description of Items With Unit Bid Price In Words	Unit Bid Price In Figures	Amount In Figures
24	5 each	Furnish and install 12-ft wide double leaf chain link swing gate including all appurtenant work and materials.		
		_____ per each	$_____	$_____
25	1 each	Furnish and install 26-ft wide vehicle entry gate including all appurtenant work and materials.		
		_____ per each	$_____	$_____
26	14,850 cubic yards	Removal of waste from outside the cap limits and relocation to beneath the cap including all appurtenant work and materials.		
		_____ per cubic yard	$_____	$_____
27	15,000 cubic yards	Removal and relocation of sludge including all appurtenant work and materials.		
		_____ per cubic yard	$_____	$_____
28	850 cubic yards	Removal of wetland soil and relocation to beneath the cap including all appurtenant work and materials.		
		_____ per cubic yard	$_____	$_____

Subtotal Page 00300-8 $_____

CITY OF HAVERHILL, MASSACHUSETTS AND
AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
OLD GROVELAND ROAD
HAVERHILL, MASSACHUSETTS
CONTRACT NO. 1

PROJECT NO. CWSRF-3403

BID FORM

PART 1 – BASE BID

Item No.	Estimated Quantity	Brief Description of Items With Unit Bid Price In Words	Unit Bid Price In Figures	Amount In Figures
29	L.S.	Implement re-use of piles on Lot 26 _____ per lump sum		$_____
30	L.S.	Miscellaneous Work and Cleanup _____ per lump sum		$_____
31	L.S.	Site maintenance from time of contract execution to construction mobilization twenty-five thousand and no cents per lump sum		$25,000.00

Subtotal Page 00300-9	$_____
Subtotal Page 00300-8	$_____
Subtotal Page 00300-7	$_____
Subtotal Page 00300-6	$_____
Subtotal Page 00300-5	$_____
Subtotal Page 00300-4	$_____
Subtotal Page 00300-3	$_____
Subtotal Page 00300-2	$_____
PART I TOTAL BASE BID	$_____

Of the TOTAL BASE BID, fifty percent (50%) is SRF eligible payable by the City of Haverhill and fifty percent (50%) is not eligible for SRF which is payable by Aggregate Industries.

CITY OF HAVERHILL, MASSACHUSETTS AND
AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
OLD GROVELAND ROAD
HAVERHILL, MASSACHUSETTS
CONTRACT NO. 1

PROJECT NO. CWSRF-3403

BID FORM

PART II - ADD ALTERNATE UNIT PRICES

The OWNER is offering the availability of remaining air space at the Site for the acceptance of up to 200,000 cubic yards of shaping and grading materials. This is an opportunity for the OWNER to earn revenue by selling all or a portion of the available air space. If this Bid Alternate is selected by the OWNER, the revenues earned will be applied as a project credit to offset closure construction costs of the Total Base Bid for Part I above. Materials delivered and placed must meet the requirements of the Site's soil project approvals from the Massachusetts Department of Environmental Protection (MassDEP) in accordance with the Specifications (Section 02125). Bidders having the availability of such material may provide a bid for the alternate listed below.

Add Alternate No. 1 – Acceptance of Shaping and Grading Material

Bidder commits to delivering and placing _____ cubic yards of shaping and grading material in accordance with Section 02125 of the specifications for a lump sum credit of:

insert volume up to 200,000 cyds

Credit Amount in Words	Credit Amount In Figures
_____	$_____
Lump sum credit	

The following is to summarize the bid totals of Part I and Part II.

BID SUMMARY

PART I - TOTAL BASE BID (Page 00300-9): $_____

PART II – ADD ALTERNATE NO. 1 CREDIT (Page 00300-10): ($_____)

TOTAL BID INCLUDING ADD ALTERNATE CREDIT: $_____

Of the TOTAL BID INCLUDING ADD ALTERNATE CREDIT, fifty percent (50%) is SRF eligible payable by the City of Haverhill and fifty percent (50%) is not eligible for SRF payable by Aggregate Industries-Northeast Region, Inc.

The undersigned agrees that extra work, if any, will be performed in accordance with Article 10 of the Conditions of the Contract and will be paid for in accordance with Article 11 of the Conditions of the Contract.

The bidding and award of this Contract will be in accordance with M.G.L. Chapter 30, Section 39M.

The undersigned must furnish a 100 percent Performance Bond and a 100 percent Payment Bond with a surety company acceptable to OWNER.

If Add Alternate No. 1 is selected by the OWNER, the undersigned must furnish a Supplemental Performance Bond with a surety company acceptable to OWNER, in accordance with the requirements of Section 01025.

Amounts shall be shown in both words and figures, where indicated. In case of discrepancy, the amount shown in words will govern.

The above prices shall include all labor, materials, bailing, shoring, removal, overhead, profit, insurance and incidentals required to complete the Work.

The names and residences of all persons and parties interested in the foregoing Bid as principals are as follows:

(Give first and last names in full. In the case of a corporation, see Article 8.3 of the Instructions to Bidders, in the case of a limited liability company (LLC), see Article 8.4 of the Instructions to Bidders, in the case of a partnership, see Article 8.5 of the Instructions to Bidders.)

_____

_____

_____

The attached Minority Business Participation and the Women Business Participation Forms (EEO-DEP-190C & 191C) and Vendor Information Form (EEO-DEP-VIF-C) must be completed and submitted as part of the Bid.

The attached Massachusetts Diesel Retrofit Program (MDRP) Form must be completed and submitted as part of the Bid Proposal.

Pursuant to M.G.L. Ch. 62C, sec. 49A, I certify under the penalties of perjury that I, to my best knowledge and belief, have filed all state tax returns and paid all state taxes required under law.

The undersigned hereby certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work; that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee.

The undersigned bidder hereby certifies he/she will comply with the minority workforce percentage ratio and specific affirmative action steps contained in the EEO/AA provisions of this Contract, including compliance with the Minority/Woman Business Enterprise as required under these contract provisions.

The Contractor receiving the award of the contract shall be required to obtain from each of its subcontractors a copy of the certification by said subcontractor, regardless of tier, that it will comply with the minority workforce ratio and specific affirmative action steps contained in these EEO/AA contract provisions and submit it to the contracting agency prior to the award of such subcontract.
Bidders must fully comply with Subpart C of 2 CFR Part 180 and 2 CFR Part1532, entitled Responsibilities of Participants Regarding Transactions (Doing Business with Other Persons). Contractors, subcontractors, or suppliers that appear on the Excluded Parties List System at www.epls.gov are not eligible for award of any contracts funded by the Massachusetts State Revolving Fund.

The undersigned hereby certifies under the penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this section, the word "person" shall mean any natural person, joint venture, partnership, corporation, or other business or legal entity. The undersigned further certifies under penalty of perjury that the said undersigned is not presently debarred from doing public construction work in the Commonwealth under the provisions of Section Twenty-nine F of Chapter Twenty-nine, or any other applicable debarment provisions of any other chapter of the General Laws or any rule or requisition promulgated thereunder; and is not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department of agency.

_____
Social Security Number
or Federal Identification
Number

_____
Signature of Individual or
Corporate Name

By: _____
Corporate Officer (if applicable)

Notice of acceptance should be mailed, faxed, or delivered to the following:

_____
(Name)

By: _____
(Title)

_____
(Business Address)

_____
(City and State)

Date _____

MINORITY AND WOMEN BUSINESS ENTERPRISE PARTICIPATION
MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF MUNICIPAL SERVICES

SCHEDULE OF PARTICIPATION FOR SRF CONSTRUCTION

Project Title: _____ **Project Location:** _____

Minority Business Enterprise Participation in the SRF Loan Work

Name & Address of MBE	Nature of Participation	Dollar Value of Participation
1.		
2.		
3.		
	Total MBE Commitment:	$
	Percentage MBE Participation = (Total MBE Commitment) / (SRF Loan Bid Price) =	%

Women Business Enterprise Participation in the SRF Loan Work

Name & Address of WBE	Nature of Participation	Dollar Value of Participation
1.		
2.		
3.		
	Total WBE Commitment:	$
	Percentage WBE Participation = (Total WBE Commitment) / (SRF Loan Bid Price) =	%

The Bidder agrees to furnish implementation reports as required by the Awarding Authority to indicate the M/WBE(s) which it has used or intends to use. Breach of this commitment constitutes a breach of the contract.

Name of General Bidder: _____

Date: _____ By: _____
Signature

NOTE: Participation of a Minority-owned or Women-owned enterprise may be counted in only their certified category; the same dollar participation cannot be used in computing the percentage of Minority participation and again of Women participation.

MINORITY AND WOMEN BUSINESS ENTERPRISE PARTICIPATION
MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF MUNICIPAL SERVICES

LETTER OF INTENT FOR SRF CONSTRUCTION

This form is to be completed by the MBE and WBE and must be submitted by the Bidder as part of the bid. A separate form must be completed for each MBE and WBE involved in the project.

Project Title: _____ Project Location: _____

TO: _____
(Name of Bidder)

FROM: _____
(Please Indicate Status [ ] MBE or [ ] WBE)

° I/we intend to perform work in connection with the above project as (check one):

[ ] An individual
[ ] A corporation
[ ] Other (explain): _____
[ ] A partnership
[ ] A joint venture with: _____

° It is understood that if you are awarded the contract, you intend to enter into an agreement to perform the activity described below for the prices indicated.

MBE/WBE PARTICIPATION

Description of Activity	Date of Project Commencement	$ Amount	% SRF Loan Bid Price
		$	%

° The undersigned certify that they will enter into a formal agreement upon execution of the contract for the above referenced project.

BIDDER	MBE/WBE
(Authorized Original Signature) Date ADDRESS:	(Authorized Original Signature) Date ADDRESS:
TELEPHONE #:	TELEPHONE #:

ORIGINALS:
- **Compliance Mgr. City/Town Project Location**
- **DEP Program Manager for DEP's AAO Director**

*** Attach a copy of current (within 2 years) SOMWBA Certification**

If it is determined that one or more of the MBE/WBE subcontractors as submitted by the Bidder on this form is not SOMWBA certified or certified by the Local Government Unit in accordance with the provisions of Executive Order 237, the Bidder shall have an opportunity, following notification, to either find a certified MBE/WBE subcontractor to perform work equal to or greater than that of the uncertified subcontractor or to submit a waiver request.

Attachment A-1

Contractor's Certification

A contractor will not be eligible for award of a contract unless such contractor has submitted the following certification, which is deemed a part of the resulting contract:

CONTRACTOR'S CERTIFICATION

_____

Name of the General Contractor

certifies that:

1. It intends to use the following listed construction trades in the work under contract:

_____

_____

2. Will comply with the minority workforce ratio and specific affirmative action steps contained herein: and

3. Will obtain from each of its subcontractors and submit to the contracting or administering agency prior to the award of any subcontract under this contract the subcontractor's certification required by these bid conditions.

_____

Signature of Authorized
Representative or Contractor

Attachment A-2

Subcontractor's Certification

Prior to the award of any subcontract, regardless of tier, the prospective subcontractor must execute and submit to the General Contractor the following certification, which will be deemed a part of the resulting subcontract:

SUBCONTRACTOR'S CERTIFICATION

_____

Name of the Subcontractor

certifies that:

1. It intends to use the following construction trades in the work under the contract:

   _____

   _____

2. Will comply with the minority workforce ratio and specific affirmative action steps herein: and

3. Will obtain from each of its subcontractors prior to the award of any subcontract under this contract the subcontractor's certification required by these bid conditions.

_____

Signature of Authorized
Representative of Subcontractor

STATEMENT OF INTENT TO COMPLY

This form must be signed and submitted by the bidder as part of the bid.

Local Governmental Unit _____ SRF Project No. _____

Contract No. _____ Contact Title _____

Bidder _____

The undersigned, on behalf of the above-named Bidder, agrees that, if awarded the Contract:

1. the Bidder shall comply with the Department of Environmental Protection's ("DEP") Diesel Retrofit Program by ensuring that all diesel powered non-road construction equipment and vehicles greater than 50 brake horsepower which will be used in the performance of the work under the Contract are equipped or retrofitted with a pollution control device in accordance with the Diesel Retrofit Program Standard;

2. the Bidder shall require all Subcontractors to comply with MassDEP's Diesel Retrofit Program by ensuring all diesel powered non-road construction equipment and vehicles greater than 50 brake horsepower which will be used in the performance of the work under the Contract are equipped or retrofitted with a pollution control device in accordance with the Diesel Retrofit Program Standard; and

3. The Bidder shall submit and shall require each Subcontractor to submit a Diesel Retrofit Program Contractor Certification (form attached) with a Diesel Retrofit List to DEP (NAME and ADDRESS) and the Bidder within 10 days of the bidder being notified that it has been awarded the Contract. The Bidder shall require each Subcontractor to update such Certification and List within 2 days of using additional Diesel Construction Equipment on the project under the Contract.

_____

(Signature of Bidder's Authorized Representative) (Date)

Commonwealth of Massachusetts
Vendor Information Form – SRF Construction

Awarding Authority:

Contract Name: | Contract Project Number:

Company Name:

Street Address 1:

Street Address 2:

City: | State: | Zip Code:

Telephone Number: ( )____ - ____ | Fax Number: ( )____ - ____ | E-mail Address:

WWW Address: | Dunn & Bradstreet Number: | Federal Employer ID No.

County: | Contact Person:

What geographic area does your firm service?

- ☐ Metropolitan Boston
- ☐ Southeastern Mass
- ☐ Western Mass
- ☐ North of Boston
- ☐ Massachusetts (Entire State)
- ☐ Rhode Island
- ☐ New Hampshire
- ☐ Connecticut
- ☐ Vermont
- ☐ New Jersey
- ☐ New York
- ☐ Connecticut

Primary SIC Code | **Secondary SIC Code**

Date company was founded

Gross Annual Sales

- ☐ $0 - $49,999
- ☐ $50,000 - $99,999
- ☐ $100,000 - $ $499,999
- ☐ $500,000 - $999,999
- ☐ $1,000,000 - $2,499,999
- ☐ $2,500,000 - $4,999,999
- ☐ $5,000,000 - $10,000,000
- ☐ Over $10,000,000

Number of Employees

- ☐ 1- 10 employees
- ☐ 10 – 20 employees
- ☐ 20 – 30 employees
- ☐ 30 – 50 employees
- ☐ OVER 50 employees

Bonding Capacity

- ☐ $0 - $49,999
- ☐ $50,000 - $99,999
- ☐ $100,000 - $ $499,999
- ☐ $500,000 - $999,999
- ☐ $1,000,000 - $2,499,999
- ☐ $2,500,000 - $4,999,999
- ☐ $5,000,000 - $10,000,000
- ☐ Over $10,000,000

Business Structure

- ☐ Profit
- ☐ Non-Profit
- ☐ S Corporation
- ☐ C Corporation
- ☐ Sole Proprietor
- ☐ Partnership
- ☐ Joint Ventures
- ☐ LLC

Are you a minority-owned firm?	☐ Yes	☐ No
Are you a women-owned firm?	☐ Yes	☐ No
Are you certified by the State Office of Minority and Women Business Assistance (SOMWBA)?	☐ Yes	☐ No
If you are SOMWBA certified are you certified as an? ☐ MBE	☐ WBE	☐ DBE
Are you certified by Division of Capital Assets Management and Maintenance formerly know as DCPO?	☐ Yes	☐ No
Are you pre-qualified with the Massachusetts Highway Department?	☐ Yes	☐ No

Revised 09/11/00

Commonwealth of Massachusetts
Vendor Information Form - SRF Construction (Page 2)

Largest State Contract:

☐ $0 - $49,999	☐ $500,000 - $999,999	☐ $5,000,000 - $10,000,000
☐ $50,000 - $99,999	☐ $1,000,000 - $2,499,999	☐ Over $10,000,000
☐ $100,000 - $ $499,999	☐ $2,500,000 - $4,999,999	

Contracting Agency for Largest State Contract:

Company Comments: (Include a brief description of the goods and/or services your company provides.

Name of President or CEO	Date:
Telephone Number:	
Name of Individual Completing the Form	Date:
Telephone Number:	

Camp Dresser & McKee Inc.
One Cambridge Place
50 Hampshire Street
Cambridge, MA 02139

TO: All Bidders of Record **Date Issued**: March 3, 2011

SUBJECT: Southern Mound Closure- Haverhill Landfill
Old Groveland Road
Haverhill, Massachusetts
Contract No. 1

RECEIPT OF GENERAL BIDS:
2:00 P.M., March 9, 2011

LOCATION OF BID OPENING:
City Purchasing Department
City Hall, Room 105
4 Summer Street
Haverhill, MA 01830

ADDENDUM NO. 4
This addendum shall be part of the Contract Documents as provided in the Agreement for the above-referenced project.

Acknowledge the receipt of this addendum by inserting its number (No. 4) and date (March 3, 2011) on Page 00300-1 of the Bid Form. Failure to do so may subject the bidder to disqualification.

DRAWINGS

100-scale figure showing the location of three large-diameter (8-10 feet) corrugated steel culverts to be removed is included as Figure Add 4-1.

Sheet No. C-4 – National Grid Focus Plan

1. ADD the following note:

   8. Except as required to remove culverts that cross National Grid property, existing gravel access road on National Grid property shall not be blocked at any time during construction. Removal of culverts and restoration of National Grid property shall be completed in one day or less.

2. REVISE note leading to Utility Poles #27-84 and #29-84 as follows:

   Utility poles in waste to be removed by National Grid prior to or during construction. Contractor shall coordinate, with National Grid, schedule and access to Work area to complete this removal.

SPECIFICATIONS

Section 01025 – Measurement and Payment

1. DELETE Paragraph 1.32.B.1 in its entirety and replace with:

   1. Payment for Item 30 will be made at the lump sum price bid which price and payment shall be full compensation for providing and complying with a site specific Health and Safety Plan, all temporary facilities and utilities, all odor and dust controls, all grading and restoration of disturbed areas not covered in other items, removal of drainage line below the National Grid corridor to Basin 2, removal of large diameter corrugated steel pipes, relocation of groundwater monitoring wells, final site cleanup, restoration of private property, easements and rights-of-way as specified, and all else required to complete the work for which separate payment is not provided under other Items.

Section 02230 – Granular Fill Material

1. ADD under Paragraph 2.02.B.6:

   7. For each borrow source, collect and analyze an additional sample for each additional 1,000 cubic yards of material delivered to the project site.

Section 02901 – Miscellaneous Work and Cleanup

1. ADD after Paragraph 1.02.D:

   E. Monitoring Wells are included in Section 02670.

2. ADD at end of Section:

   1.08 REMOVAL OF LARGE DIAMETER CORRUGATED PIPE

   A. Remove offsite and recycle 3 large-diameter (8 to 10 feet) corrugated steel pipes currently present above ground surface in the southwest corner of the landfill property.

      1. Remove any debris located within the pipes and dispose offsite as solid waste.

      2. Remove any soil located in the pipes and place on top of Southern Mound beneath the cap.

   1.09 GROUNDWATER MONITORING WELL REPLACEMENT

   A. Construct and develop replacement monitoring wells MW-10-S/M/D and MW-17S.

      1. Well construction shall be same as original wells as shown on attached well completion logs.

2. New monitoring wells MW-10S/M/D shall be installed approximately 20 feet to the east of the existing monitoring wells MW-10S/M/D at a location approved by Engineer.

3. Monitoring Well MW-17S shall be installed approximately 70 feet to the west of the existing monitoring well MW-17S, west of the Lot 24/Lot 26 property boundary, at a location approved by Engineer.

Section 02930 – Topsoil and Hydroseeding

2. ADD under Paragraph 2.01.B.6:

7. For each borrow source, collect and analyze an additional sample for each additional 1,000 cubic yards of material delivered to the project site.

Section 02955 – Wetlands Restoration

2. ADD under Paragraph 2.01.L.4:

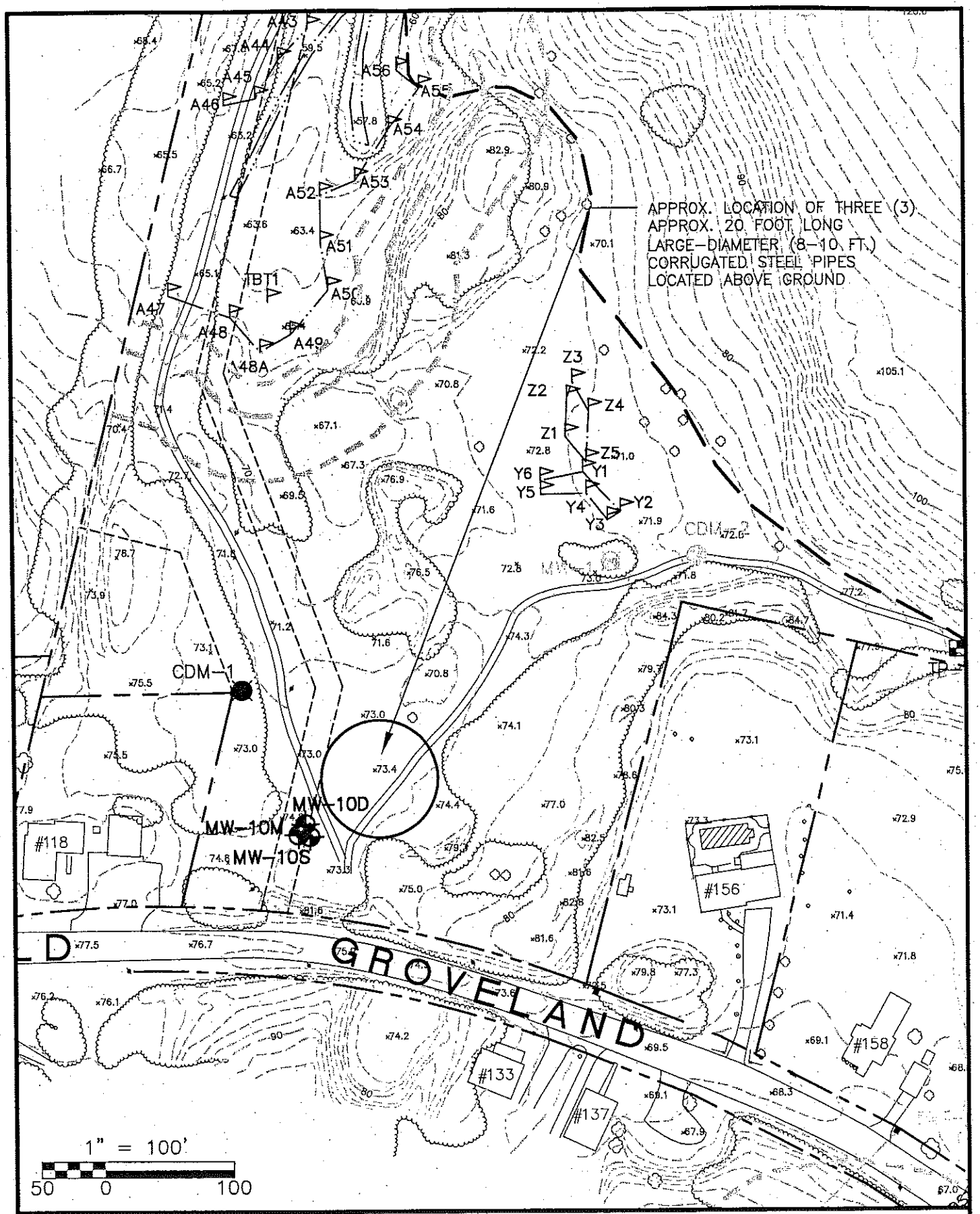
5. For each borrow source, collect and analyze an additional sample for each additional 1,000 cubic yards of material delivered to the project site.

QUESTIONS AND ANSWERS

Q: "The seed application rate of 6 pounds per 1,000 sf as stated in section 02930 3.01B seems excessive. Is this rate correct?"

A. Yes. The rate is correct.

Attachments
Figure Add 4-1
Well completion logs



LARGE DIAMETER PIPES TO BE REMOVED

CITY OF HAVERHILL / AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
HAVERHILL, MASSACHUSETTS

SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
CORRECTIVE ACTION DESIGN

FIGURE ADD 4-1

pw: \\dacpwapp1.cdminc.internal.cdm.com:PW_XM1\Documents\0522\78856\04 Design Services NM_100%\15 Bidding Services\04 Addenda\CSTPL104.dwg

CAMP DRESSER & McKEE
CDM
50 Hampshire Street
Cambridge, MA 02139

MONITORING WELL DETAIL
MW-10S

Client: Town of Haverhill
Project Location: Haverhill, MA
Project Name: Haverhill Landfill
Project Number: 0522-30958-rt.fld

Drilling Contractor: GeoLogic
Drilling Method/Rig: HSA/NX/ATV rig w/ tracks
Drillers: Jon Galvin
Drilling Date: **Start:** 11-29-00 **End:** 11-30-00
Borehole Coordinates:
N E
Development Date: **Start** **End**

Surface Elevation (ft.):
Total Depth (ft.): 17
Groundwater Elevation (December 2000): 10
Development Method:
Field Screening Instrument: OVM
Logged By: J. Zarnetske
Top of Riser Elevation (ft.):

Sample Type	Sample Number	Field Instrument Reading (ppm)	Blows per 6 Inches	Sample Recovery (inches)	Stratum Designation	Material Description	Graphic Log	Elev. Depth (ft.)	Well Construction Detail
									Protective Casing Top of Riser @ 2.5 ft.
									Ground Surface
SS	001	0.0	3 9 6 7	24/15	ML	0-2ft: Moist, stiff, dark brown, SILT, some fine Sand		0	0-2ft: Concrete Seal
SS	002	0.0	7 7 6 11	24/18	SM	2-6ft: Moist, m. dense, light brown, fine SAND and SILT, trace Gravel			2-4ft: Bentonite Seal
SS	003	0.0	14 18 22 22	24/20				5	4-17ft: 0 Sand
SS	004	0.0	34 25 28 35	24/20	SW	6-10ft: Moist, dense, light brown, m-f SAND, little fine Gravel and Silt			6-16ft: 10 Slot Screen
SS	005	0.0	23 45 37 32	24/8					
					SW	10-17ft: Wet, v. dense, brown/orange m-f SAND, some Silt		10	
SS	006	0.0	56 30 40 42	24/15				15	
						17ft: Bottom of Excavation			16-16.5ft: Sediment Sump 17ft: Bottom of Excavation

2.0
4.0
6.0
16.0
16.5
17.0

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

Reviewed by: Bruce Haskell Date: 6-1-01

LUCENT_MW_HAVHILL.GPJ CDM_MA.GDT 2/2/01

CAMP DRESSER & McKEE
CDM
50 Hampshire Street
Cambridge, MA 02139

MONITORING WELL DETAIL
MW-10M

Client: Town of Haverhill
Project Name: Haverhill Landfill
Project Location: Haverhill, MA
Project Number: 0522-30958-rt.fld

Drilling Contractor: GeoLogic
Drilling Method/Rig: HSA/NX/ATV rig w/ tracks
Drillers: Jon Galvin
Drilling Date: **Start:** 11-28-00 **End:** 11-29-00
Borehole Coordinates:
N E
Development Date: **Start** **End**

Surface Elevation (ft.):
Total Depth (ft.): 71
Groundwater Elevation (December 2000): 10
Development Method:
Field Screening Instrument: OVM
Logged By: J. Zarnetske
Top of Riser Elevation (ft.):

Sample Type	Sample Number	Field Instrument Reading (ppm)	Blows per 6 Inches	Sample Recovery (Inches)	Stratum Designation	Material Description	Graphic Log	Elev. Depth (ft.)	Well Construction Detail
									Protective Casing Top of Riser @ 2.5 ft.
									Ground Surface
SS	001	0.0	3 9 6 7	24/15	ML	0-2ft: Moist, stiff, dark brown, SILT, some fine Sand		0	0-1ft: Cement Seal
SS	002	0.0	7 7 6 11	24/18	SM	2-6ft: Moist, m. dense, light brown, fine SAND and SILT, trace Gravel			
SS	003	0.0	14 18 22 22	24/20				5	1-56ft: Cement:Bentonite (95:5) Grout
SS	004	0.0	34 25 28 35	24/20	SW	6-10ft: Moist, dense, light brown, m-f SAND, little fine Gravel and Silt			
SS	005	0.0	23 45 37 32	24/8					
					SW	10-16ft: Wet, v. dense, brown/orange m-f SAND, some Silt		10	
SS	006	0.0	56 30 40 42	24/15				15	
					SM	16-21ft: Wet, hard, gray, SILT, some m-f Sand, trace fine Gravel (Till)			
			24						

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
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BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

Reviewed by: B. Haskell Date: 6.1.01

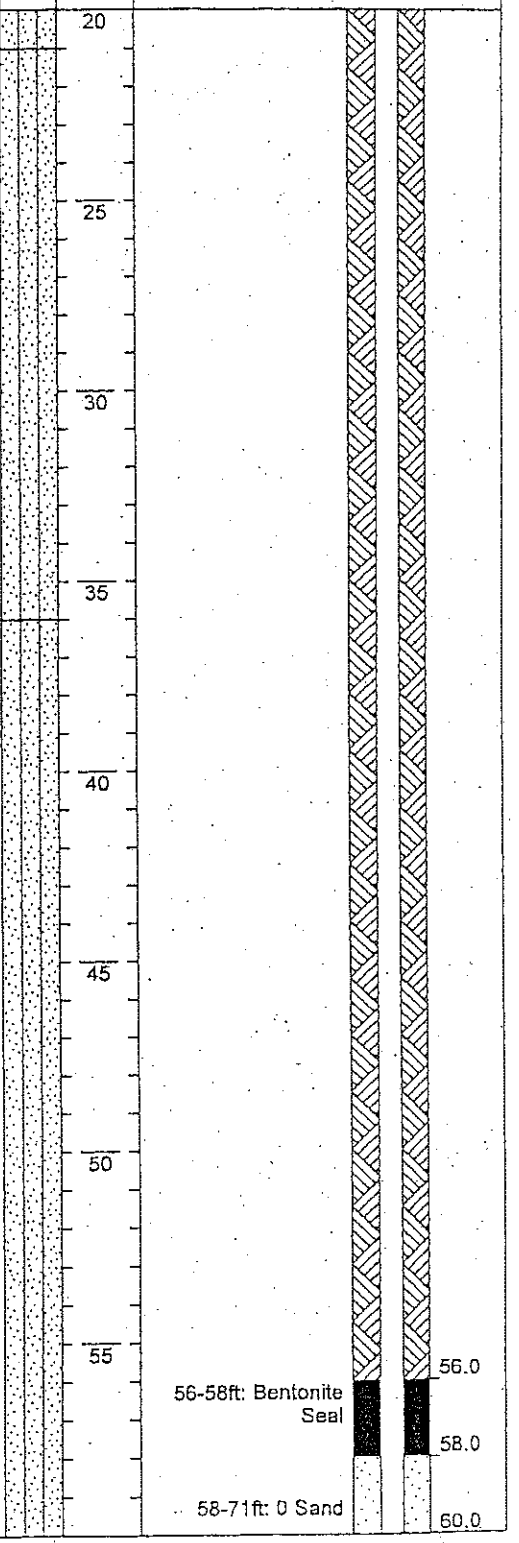
LUCENT_MW HAVHILL.GPJ CDM_MA.GDT 2/2/01

CAMP DRESSER & McKEE
CDM
50 Hampshire Street
Cambridge, MA 02139

MONITORING WELL DETAIL
MW-10M

Client: Town of Haverhill
Project Name: Haverhill Landfill
Project Location: Haverhill, MA
Project Number: 0522-30958-rt.fld

Sample Type	Sample Number	Field Instrument Reading (ppm)	Blows per 6 Inches	Sample Recovery (Inches)	Stratum Designation	Material Description
SS	007	0.0	28 59	24/14		
					SM	21-36ft: Wet, v. dense, brown, f. SAND, some Silt, trace f. Gravel (Till)
SS	008	0.0	36 56 49 63	24/16		
SS	009	0.0	21 115 120-4"	24/12		
SS	010	0.0	90 92 126-6"	24/16		
					SM	36-71ft: Wet, v. dense, l. gray, fine SAND, some Silt, trace m-f Gravel (Till)
SS	011	0.0	103 125-6"	24/10		
SS	012	0.0	38 87 131-6"	24/18		
SS	013	0.0	136-6"	24/6		
SS	014	0.0	104 172-6"	24/10		
			77			



LUCENT_MW HAVHILL.GPJ CDM_MA.GDT 2/2/01

CAMP DRESSER & McKEE
CDM
50 Hampshire Street
Cambridge, MA 02139

MONITORING WELL DETAIL
MW-10M

Client: Town of Haverhill
Project Name: Haverhill Landfill
Project Location: Haverhill, MA
Project Number: 0522-30958-rt.fld

Sample Type	Sample Number	Field Instrument Reading (ppm)	Blows per 6 Inches	Sample Recovery (inches)	Stratum Designation	Material Description
SS	015	0.0	150-6"	24/10		
SS	016	0.0	71 146-6"	24/12		
SS	017	0.0	38 120-6"	24/12		71ft: Bottom of Excavation

Graphic Log

Elev. Depth (ft.): 60, 65, 70, 75, 80, 85, 90, 95

Well Construction Detail

60-70ft: 10 Slot Screen

Sediment Sump

70.0
70.5
71.0

71ft: Bottom of Excavation

LUCENT_MW HAVHILL.GPJ CDM_MA.GDT 2/2/01

CAMP DRESSER & McKEE
CDM
50 Hampshire Street
Cambridge, MA 02139

MONITORING WELL DETAIL
MW-10D

Client: Town of Haverhill
Project Name: Haverhill Landfill
Project Location: Haverhill, MA
Project Number: 0522-30958-rt.fld

Drilling Contractor: GeoLogic
Drilling Method/Rig: HSA/NX/ATV rig w/ tracks
Drillers: Jon Galvin
Drilling Date: **Start:** 11-15-00 **End:** 11-30-00
Borehole Coordinates:
N E
Development Date: **Start** **End**

Surface Elevation (ft.):
Total Depth (ft.): 126
Groundwater Elevation (December 2000): 10
Development Method:
Field Screening Instrument: OVM
Logged By: J. Zametske
Top of Riser Elevation (ft.):

Sample Type	Sample Number	Field Instrument Reading (ppm)	Blows per 6 Inches	Sample Recovery (inches)	Stratum Designation	Material Description	Graphic Log	Elev. Depth (ft.)	Well Construction Detail
									Protective Casing Top of Riser @ 2.5 ft.
									Ground Surface
SS	001	0.0	3 9 6 7	24/15	ML	0-2ft: Moist, stiff, dark brown, SILT, some fine Sand		0	0-1ft: Cement Seal
SS	002	0.0	7 7 6 11	24/18	SM	2-6ft: Moist, m. dense, light brown, fine SAND and SILT, trace Gravel			
SS	003	0.0	14 18 22 22	24/20				5	1-110ft: Cement:Bentonite (95:5) Grout
SS	004	0.0	34 25 28 35	24/20	SW	6-10ft: Moist, dense, light brown, m-f SAND, little fine Gravel and Silt			
SS	005	0.0	23 45 37 32	24/8					
					SW	10-16ft: Wet, v. dense, brown/orange m-f SAND, some Silt		10	
SS	006	0.0	56 30 40 42	24/15				15	
					SM	16-21ft: Wet, hard, gray, SILT, some m-f Sand, trace fine Gravel (Till)			
			24						

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

Reviewed by: B. Huskell Date: 6-1-01

LUCENT_MW HAVHILL.GPJ CDM_MA.GDT 2/2/01

CAMP DRESSER & McKEE
CDM
50 Hampshire Street
Cambridge, MA 02139

MONITORING WELL DETAIL
MW-10D

Client: Town of Haverhill
Project Name: Haverhill Landfill
Project Location: Haverhill, MA
Project Number: 0522-30958-rt.fld

Sample Type	Sample Number	Field Instrument Reading (ppm)	Blows per 6 Inches	Sample Recovery (inches)	Stratum Designation	Material Description
SS	007	0.0	28 59	24/14		
					SM	21-36ft: Wet, v. dense, brown, f. SAND, some Silt, trace f. Gravel (Till)
SS	008	0.0	36 56 49 53	24/16		
SS	009	0.0	21 115 120-4"	24/12		
SS	010	0.0	90 92 126-6"	24/16		
					SM	36-76ft: Wet, v. dense, l. gray, fine SAND, some Silt, trace m-f Gravel (Till)
SS	011	0.0	103 125-6"	24/10		
SS	012	0.0	38 87 131-6"	24/18		
SS	013	0.0	136-6"	24/6		
SS	014	0.0	104 172-6"	24/10		
			77			

Graphic Log | Elev. Depth (ft.) | Well Construction Detail

20
25
30
35
40
45
50
55

CAMP DRESSER & McKEE
CDM
50 Hampshire Street
Cambridge, MA 02139

MONITORING WELL DETAIL
MW-10D

Client: Town of Haverhill
Project Name: Haverhill Landfill
Project Location: Haverhill, MA
Project Number: 0522-30958-rt.fld

Sample Type	Sample Number	Field Instrument Reading (ppm)	Blows per 6 Inches	Sample Recovery (inches)	Stratum Designation	Material Description
SS	015	0.0	150-6"	24/10		
SS	016	0.0	71 146-6"	24/12		
SS	017	0.0	38 120-6"	24/12		
SS	018	0.0	41 85 75 83	24/20		
					BLD	76-89ft: Gravel and Boulders
SS	019	0.0	24 61 84 120-2"	24/16	SM	89-99.2ft: Wet, v. dense, l. gray, fine SAND, some Silt, trace m-f Gravel (Till)
SS	020	0.0	150-6"	6/0		
SS	021	0.0	120-4"	6/0	BRK	

Graphic Log

Elev. Depth (ft.): 60, 65, 70, 75, 80, 85, 90, 95

Well Construction Detail

LUCENT_MW HAVHILL.GPJ CDM_MA.GDT 2/2/01

CAMP DRESSER & McKEE
CDM
50 Hampshire Street
Cambridge, MA 02139

MONITORING WELL DETAIL
MW-10D

Client: Town of Haverhill
Project Name: Haverhill Landfill
Project Location: Haverhill, MA
Project Number: 0522-30958-rt.fld

Sample Type	Sample Number	Field Instrument Reading (ppm)	Blows per 6 Inches	Sample Recovery (inches)	Stratum Designation	Material Description	Graphic Log	Elev. Depth (ft.)	Well Construction Detail
						99.2-126ft: Moderately hard, fresh, gray, Aphanitic Slate, with extremely close, low angle jointing and very low persistance, tight smooth, planar roughness aperatures.		100 105 110 115 120 125	110-111ft: Bentonite Seal 111-126ft: 0 Sand 115.5-125.5ft: 10 Slot Screen 110.0 111.0 115.5 125.5 126.0 126ft: Bottom of Excavation
						126ft: Bottom of Excavation		130 135	

LUCENT_MW HAVHILL.GPJ CDM_MA.GDT 2/2/01

CAMP DRESSER & McKEE
CDM
50 Hampshire Street
Cambridge, MA 02139

MONITORING WELL DETAIL
MW-17S

Client: Town of Haverhill
Project Name: Haverhill Landfill
Project Location: Haverhill, MA
Project Number: 0522-30958-rt.fld

Drilling Contractor: GeoLogic
Drilling Method/Rig: HSA/NX/ATV rig w/ tracks
Drillers: Tony and Mike
Drilling Date: **Start:** 01-31-01 **End:** 01-31-01
Borehole Coordinates:
N E
Development Date: **Start** **End**

Surface Elevation (ft.):
Total Depth (ft.): 31
Groundwater Elevation (December 2000): 21
Development Method:
Field Screening Instrument: OVM
Logged By: J. Zarnetske
Top of Riser Elevation (ft.):

Sample Type	Sample Number	Field Instrument Reading (ppm)	Blows per 6 Inches	Sample Recovery (inches)	Stratum Designation	Material Description	Graphic Log	Elev. Depth (ft.)	Well Construction Detail
									Protective Casing Top of Riser @ 2.5 ft. *Ground Surface*
SS	001	0.0	10 63/4	24/8	SP	0-2 ft: (frozen) Moist, v. dense, grey, c-f SAND, some c-f gravel (SP)		0	0-1 ft: Cemtent Seal
SS	002	0.0	8 9 10 8	24/11	SW	4-6 ft: Moist, firm, tan, c-f SAND (SW)		5	1-16ft: Cement:Bentonite (95:5) Grout
SS	003	0.0	6 6 10 12	24/13		6-8 ft: same as above			
SS	004	0.0	10 11 11 14	24/12	SP	8-10 ft: Moist, firm, tan c-f SAND, little c-f gravel (SP)		10	
SS	005	N/A	10 14 10 8	24/0		14-16 ft: N/A– large piece of gravel jammed tip of split spoon.		15	16.0 16-18 ft: Bentonite Seal 18.0 18-31 ft: 0 Sand
			8			19-21 ft: N/A– again gravel in tip of split			20.0

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.5" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

Reviewed by: B. Haskell Date: 6-1-01

LUCENT_MW HAVHILL.GPJ CDM_MA.GDT 2/2/01

CAMP DRESSER & McKEE
CDM
50 Hampshire Street
Cambridge, MA 02139

MONITORING WELL DETAIL
MW-17S

Client: Town of Haverhill
Project Name: Haverhill Landfill
Project Location: Haverhill, MA
Project Number: 0522-30958-rt.fld

Sample Type	Sample Number	Field Instrument Reading (ppm)	Blows per 6 inches	Sample Recovery (inches)	Stratum Designation	Material Description
SS	006	N/A	26 28	24/0		spoon causes zero recovery.
SS	007	0.0	23 22 16 12	24/16	SW	24-26 ft: Wet, m. dense, tan, m-f SAND (SW)

Graphic Log

Elev. Depth (ft.): 20, 25, 30, 35, 40, 45, 50, 55

Well Construction Detail

20-30 ft: 10 Slot Screen

30.0

31.0

31 ft: Bottom

LUCENT_MW HAVHILL.GPJ CDM_MA.GDT 2/2/01

TECHNICAL SPECIFICATIONS

TABLE OF CONTENTS
CORRECTIVE ACTION DESIGN

CITY OF HAVERHILL, MASSACHUSETTS AND
AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
OLD GROVELAND ROAD
HAVERHILL, MASSACHUSETTS
CONTRACT NO. 1

PROJECT NO. CWSRF-3403

INVITATION TO BID

Sealed Bids for construction of Southern Mound Closure, Haverhill Landfill will be received by the City of Haverhill, Massachusetts (the City) and Aggregate Industries – Northeast Region Inc. (Aggregate, together with the City hereinafter referred to as "Owner") at the office of the City Purchasing Department, City Hall, Room 105, 4 Summer Street, Haverhill, Massachusetts 01830, until 2:00 P.M. on Thursday, March 3, 2011 and at that time and place bids will be publicly opened and read aloud.

The work of this Contract shall consist of closure of the Southern Mound of the former Haverhill Landfill located off of Old Groveland Road in Haverhill, Massachusetts. The Southern Mound is approximately 35 acres in size. The work includes furnishing all labor, materials, equipment and incidentals required to complete the landfill cap, including but not limited to clearing, grubbing, grading, relocation of waste, installing a sand gas venting layer, a 40-mil LLDPE membrane, a sand drainage layer, a topsoil cover layer, loaming and seeding, passive gas vent system, stormwater drainage controls, wetland restoration, erosion and siltation controls, fencing, cleanup and associated miscellaneous work. If selected by Owner, the work of Add Alternate No. 1 shall allow Bidder to obtain rights at the Southern Mound to deliver and place shaping and grading materials that meet the Massachusetts Department of Environmental Protection Policy No. COMM-97-001.

The Contract Time shall be 595 Calendar Days commencing on the date of execution of the Agreement, and includes substantial completion of landfill closure on or before July 1, 2012 and completion of fall site maintenance by November 15, 2012.

Contract Documents may be examined and/or obtained at the office of Camp Dresser & McKee Inc., One Cambridge Place, 50 Hampshire St., Cambridge, MA 02139.

Contract Documents are available for examination at McGraw-Hill Construction Dodge, Plan Room, 17 Everberg Road, Unit C, Woburn, MA 01801, Ph: (781) 430-2008, and at the City of Haverhill Purchasing Department, City Hall, Room 105, 4 Summer Street, Haverhill, Massachusetts 01830.

A deposit of $100.00 in cash, bank or certified check payable to the City of Haverhill, Massachusetts will be required for each set of the Contract Documents. Up to two complete sets of Contract Documents will be available to Bidders. A refund of the deposit will be made for such Documents returned in good condition within 30 days after the Bids are received. Additional sets may be purchased by bidders.

Bidders requesting Contract Documents by mail shall include an additional non-refundable check payable to Camp Dresser & McKee in the amount of $30.00 per set to cover costs of handling and mailing.

Each Bid shall be submitted in accordance with the Instructions to Bidders and shall be accompanied by a Bid Security in the amount of 5 percent of the Bid. Surety is to be in the form of a certified cashier or treasurers' check, drawn on a responsible bank of trust company, or Bid Bond issued by a company licensed to do business in the Commonwealth.

A Pre-Bid Conference will be held at the City of Haverhill Wastewater Treatment Plant, 40 South Porter Street, Haverhill, MA at 11:00 A.M. on Thursday, February 17, 2011, followed by a site visit.

Bidders may not withdraw their Bids for a period of sixty days, excluding Saturdays, Sundays, and legal holidays after the actual date of the opening of the Bids.

The Successful Bidder must furnish a 100 percent Performance Bond and a 100 percent Payment Bond with a surety company acceptable to the Owner. If Add Alternate No. 1 is selected by Owner, the Successful Bidder shall furnish a Supplemental Performance Bond with a surety company acceptable to Owner.

Complete instructions for filing Bids are included in the Instructions to Bidders.

Minimum Wage Rates as determined by the Commissioner of Department of Workforce Development under the provision of the Massachusetts General Laws, Chapter 149, Section 26 to 27D, as amended, apply to this project. It is the responsibility of the Contractor, before bid opening, to request if necessary, any additional information on Minimum Wage Rates for those tradespeople who may be employed for the proposed work under this Contract. Federal Minimum Wage Rages as determined by the United States Department of Labor under the Davis-Bacon Act also apply to this project.

Wage rates for this Project are also subject to the minimum Federal Wage Rates.

The bidding and award of this Contract will be under the provisions of M.G.L. Chapter 30, Section 39M.

The Owner reserves the right to waive any informality in or to reject any or all Bids if deemed to be in its best interest.

The work under this Contract is funded in part by the Massachusetts Division of Water Pollution Abatement Trust (the "Trust").

Minority Business Enterprise (MBE) and Women's Business Enterprise (WBE) policies of the Commonwealth of Massachusetts and the City of Haverhill, Massachusetts are applicable to the total dollars paid to the construction contract. The "Fair Share" construction goal for this project is a minimum of five point three zero (5.30) percent MBE participation and four point four zero (4.40) percent WBE participation by state-certified MBEs and WBEs. The bidder shall submit completed MBE/WBE forms (EEO-DEP-190C & 191C) and Vendor Information Forms (VIF) with the bid. Failure to comply with the requirements of this paragraph may be deemed to render a proposal non-responsive. No waiver of any provision of this section will be granted unless approved by the Department of Environmental Protection.

This Project requires compliance with the Massachusetts Diesel Retrofit Program (MDRP) by use of after-engine emission controls that are EPA certified, or their equivalent, on all of the off-road (non-registered) diesel vehicles/equipment, greater than 50 brake horsepower, which will be used in the performance of the work.

The Successful Bidder agrees to exercise their best effort and ensure that thirty percent of the total employees hours are completed by Haverhill residents in compliance with City of Haverhill General Code, Chapter 132: Construction Projects Public, Article I Employment of Residents.

JAMES J. FIORENTINI, MAYOR
CITY OF HAVERHILL, MASSACHUSETTS

and

GRAHAM HARDWICK, PRESIDENT
AGGREGATE INDUSTRIES – NORTHEAST REGION, INC.

CITY OF HAVERHILL, MASSACHUSETTS AND
AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
OLD GROVELAND ROAD
HAVERHILL, MASSACHUSETTS
CONTRACT NO. 1

PROJECT NO. CWSRF-3403

INSTRUCTIONS TO BIDDERS

ARTICLE 1. QUALIFICATIONS OF BIDDERS

1.1 Bidders may be investigated by OWNER to determine if they are qualified to perform the Work. All Bidders shall be prepared to submit within twenty-four hours of OWNER's or ENGINEER's request, additional written evidence of such information and data necessary to make this determination, beyond that required in Paragraph 1.3 below.

1.2 The investigation of a Bidder will seek to determine whether the organization is adequate in size, is authorized to do business in the jurisdiction where the project is located, has had previous experience and whether available equipment and financial resources are adequate to assure OWNER that the Work will be completed in accordance with the terms of the Agreement. The amount of other work to which the Bidder is committed may also be considered.

1.3 In evaluating Bids, OWNER will consider the qualifications of only those Bidders whose Bids are in compliance with the following requirements:

1.3.1 Bidders must submit with their bid a Statement of Qualifications. The Statement shall provide the following information:

a. A list of all landfills expanded or capped by the Bidder (a minimum of 5 projects with a combined minimum total of 50 acres of cap construction). For each, provide the project start and end date, and the contract value. Give the name and address of the owner and engineer for whom the work was performed. Include the names, telephone numbers and email addresses of individuals to contact;

b. A list of all contracts entered into during the past three years indicating the type of work and value of the contract. Give the name and address of the owner and engineer under whose supervision the work was performed. Include the names, telephone numbers and email addresses of individuals to contact;

c. State in dollars the total value of the largest single contract which has been entered into by Bidder's present organization;

d. A list of all major items of equipment which Bidder has available for use on this job and state the extent of ownership interest which Bidder has in each of these pieces;

e. A list of current contracts, the anticipated completion date, the current percent complete, and equipment and manpower dedicated to each project; and

f. Provide the name and telephone number of the Bidder's bonding agent.

1.3.2 Within twenty-four hours of the bid opening, the three apparent low bidders shall furnish to ENGINEER a brief financial statement of as recent date as possible. Such material will be kept strictly confidential. Give financial references such as banks or concerns from whom substantial quantities of materials have been purchased. Include name of individuals to contact, telephone number and email addresses.

1.4 OWNER reserves the right to reject any Bid if the evidence submitted by, or the investigation of, such Bidder fails to satisfy OWNER that such Bidder is properly qualified to carry out the obligations of the Contract Documents and to complete the Work contemplated therein.

ARTICLE 2. COPIES OF CONTRACT DOCUMENTS

2.1 Complete sets of Contract Documents shall be used in preparing Bids; neither OWNER nor ENGINEER assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Contract Documents.

2.2 OWNER and ENGINEER in making copies of Contract Documents available do so only for the purpose of obtaining Bids on the Work and do not confer a license or grant for any other use.

ARTICLE 3. EXAMINATION OF CONTRACT DOCUMENTS AND SITE

3.1 Before submitting a Bid, each Bidder must (a) examine the Contract Documents thoroughly, (b) visit the site to become familiar with local conditions that may in any manner affect cost, progress or performance of the Work, (c) become familiar with Federal, State and local laws, ordinances, rules and regulations that may in any manner affect cost, progress or performance of the Work; and (d) study and carefully correlate Bidder's observations with the requirements of the Contract Documents.

3.2 Surveys and investigative reports of subsurface or latent physical conditions at the site which have been relied upon by the ENGINEER in preparing the Contract Documents are identified in Article 4 of the Supplementary Conditions. Copies of these reports are included in the Appendix to the Project Manual. These reports are not guaranteed or warranted as to accuracy or completeness, nor are they part of the Contract Documents.

3.3 Before submitting a Bid, Bidders may, at their own expense, make such investigations and tests as they may deem necessary to determine their Bid for performance of the Work in accordance with the time, price and other terms and conditions of the Contract Documents.

3.4 On request, OWNER will provide each Bidder access to the site to conduct such investigations and tests as each Bidder deems necessary for the submission of a Bid.

3.5 The lands upon which the Work is to be performed, rights-of-way for access thereto and other lands designated for use by CONTRACTOR in performing the Work are identified in the Supplementary Conditions, General Requirements or on the Drawings.

3.6 The submission of a Bid will constitute an incontrovertible representation that the Bidder has complied with every requirement of this Article 3 and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the Work.

ARTICLE 4. INTERPRETATIONS

4.1 All questions about the meaning or intent of the Contract Documents shall be received in writing by Camp Dresser & McKee Inc., One Cambridge Place, 50 Hampshire St., Cambridge, MA 02139 Attn: Mr. Nathan Jones, P.E., at least nine calendar days before the date set herein for the opening of bids.

4.2 Written clarifications or interpretations will be issued by Addenda not later than five calendar days before the bid opening date. Only questions answered by formal written Addenda will be binding. Oral and other clarifications or interpretations will be without legal effect. Addenda will be emailed and mailed via certified mail with return receipt requested, to all parties recorded as having received the Contract Documents.

4.3 Bidders are responsible for determining that they have received all Addenda issued.

ARTICLE 5. PRE-BID CONFERENCE

5.1 A pre-bid conference will be held on Thursday, February 17, 2011 at 11:00 a.m. at the City of Haverhill Wastewater Treatment Plant, 40 South Porter Street, Haverhill, MA to discuss the requirements of the Contract Documents bid conditions, and Affirmative Action Guidelines.

ARTICLE 6. BID SECURITY

6.1 Each Bid must be accompanied by cash, bid bond, or a certified check on, or a treasurer's or cashier's check issued by, a responsible bank or trust company, payable to OWNER. The Bid Security shall be in the amount stated in the Invitation To Bid. Bid Security shall be sealed in a separate envelope from the Bid and then attached to the envelope containing the Bid. All Bid Securities except those of the three lowest responsible and eligible Bidders will be returned within five days, Saturdays, Sundays, and legal holidays excluded, after opening of the Bids. All Bid Securities will be returned on the execution of the Agreement or if no award is made, within sixty days, excluding Saturdays, Sundays and legal holidays after the actual date of opening of the Bids, unless forfeited under the conditions herein stipulated.

6.2 In case a party to whom a Contract is awarded shall fail or neglect to execute the Agreement and furnish the satisfactory bonds within the time specified, OWNER may determine that the Bidder has abandoned the Contract, and thereupon the Bid Forms and acceptance shall be null and void and the Bid Security accompanying the Bid Form shall be forfeited to OWNER as liquidated damages for such failure or neglect and to indemnify said OWNER for any loss which may be sustained by failure of the Bidder to execute the Agreement and furnish the bonds as aforesaid, provided that the amount forfeited to OWNER shall not exceed the difference between the Bid Price of said Bidder and that of the next lowest responsible and eligible bidder and provided further that, in case of death, disability, or other unforeseen circumstances affecting the Bidder, such Bid Security may be returned to the Bidder. After execution of the Agreement and acceptance of the bonds by OWNER, the Bid Security accompanying the Bid Form of the Successful Bidder will be returned.

ARTICLE 7. PERFORMANCE, PAYMENT AND OTHER BONDS

7.1 Performance, Payment and other Bonds shall be provided in accordance with Article 5 of the Conditions of the Contract.

7.2 All Bonds required as Contract Security shall be furnished with the executed Agreement.

ARTICLE 8. BID FORM

8.1 Each Bid shall be submitted on the Bid Form on the perforated pages appended to the Project Manual. The Bid Form shall be removed and submitted separately. All blank spaces for Bid prices must be filled in with the unit price for the item or the lump sum for which the Bid is made.

8.2 Bid Forms shall be completed in ink or by typewriter. The Bid price of each item on the form shall be stated in words, and figures. If unit prices are required on the Bid Form, discrepancies between unit prices and their respective total amounts will be resolved in favor of the unit prices. Discrepancies between words and figures will be resolved in favor of words. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

8.3 Bids by corporations shall be executed in the corporate name by the president or a vice president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.

8.4 Bids by Limited Liability Companies shall be executed in the Limited Liability name by the Manager (or other Limited Liability Company officer/representative accompanied by evidence of authority to sign.) The Limited Liability Company address and state where the Limited Liability Company was formed shall be shown below the signature.

8.5 Bids by partnerships shall be executed in the partnership name and signed by a partner, whose title shall appear under the signature. The official address of the partnership shall be shown below the signature.

8.6 All names shall be typed or printed below the signature.

8.7 The Bid shall contain an acknowledgement of receipt of all Addenda (the numbers of which shall be filled in on the Bid Form).

8.8 The address to which communications regarding the Bid are to be directed shall be shown.

8.9 One copy of each Bid shall be submitted in a sealed opaque envelope bearing on the outside the Bidder's name, address, and the Project Title for which the Bid is submitted. (If forwarded by mail, Bid and sealed envelope marked as described above shall be enclosed in another envelope with the notation "BID ENCLOSED" on the face and addressed as indicated in the Invitation to Bid.) The Bid Security shall be submitted in a separate envelope from the Bid and attached to the envelope containing the Bid.

ARTICLE 9. RECEIPT OF BIDS

9.1 Sealed Bids for the work of this Contract will be received at the time and place indicated in the Invitation to Bid.

9.2 OWNER may consider informal any Bid not prepared and submitted in accordance with the provisions hereof.

9.3 Bidders are cautioned that it is the responsibility of each individual bidder to assure that their bid is in the possession of the responsible official or the designated alternate prior to the stated time and at the place of the Bid Opening. OWNER is not responsible for bids delayed by mail and/or delivery services, of any nature.

ARTICLE 10. MODIFICATION AND WITHDRAWAL OF BIDS

10.1 Bids may be modified only by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.

10.2 Bids may be withdrawn prior to the scheduled time (or authorized postponement thereof) for the opening of Bids.

10.3 Any Bid received after the time and date specified shall not be considered. No Bid may be withdrawn for a period of sixty days, excluding Saturdays, Sundays, and legal holidays after the actual date of the opening of the Bids.

ARTICLE 11. AWARD OF CONTRACT

11.1 The Contract will be awarded to the lowest responsible and eligible Bidder (Successful Bidder). Such a Bidder shall possess the skill, ability, and integrity necessary for the faithful performance of the work. The term "lowest responsible and eligible Bidder" as used herein shall mean the Bidder whose Bid is the lowest of those Bidders possessing the skill, ability and integrity necessary to the faithful performance of the Work.

11.2 Add Alternate No. 1. The OWNER may elect to increase the scope of work by selecting Add Alternate No. 1.

11.3 OWNER reserves the right to reject any and all Bids, to waive any and all informalities if it is in Owner's best interest to do so, and the right to disregard all nonconforming, non-responsive or conditional Bids.

11.4 A Bid which includes for any item a Bid Price that is abnormally low or high may be rejected as unbalanced.

11.5 OWNER also reserves the right to reject the Bid of any Bidder that OWNER considers to be unqualified relative to Article 1 above.

11.6 If the Contract is to be awarded, OWNER will give the Successful Bidder a Notice of Award within ten days, excluding Saturdays, Sundays, and legal holidays after the actual date of the opening of the Bids. All bids shall remain open for thirty days, excluding Saturdays, Sundays, and legal holidays after the actual date of the opening of the Bids but OWNER may, at OWNER's sole discretion, release any Bid and return the Bid Security prior to that date.

ARTICLE 12. EXECUTION OF AGREEMENT

12.1 When OWNER gives a Notice of Award to the Successful Bidder, it will be accompanied by at least six unsigned copies of the Agreement and all other applicable Contract Documents. Within five days, excluding Saturdays, Sundays and legal holidays, after the date of receipt of such notification CONTRACTOR shall execute and return all copies of the Agreement and all other applicable Contract Documents to OWNER. Within ten days thereafter OWNER will deliver one fully signed copy to CONTRACTOR.

12.2 To preserve funding under the State Revolving Fund (SRF), execution of the Agreement must be completed by April 1, 2011.

ARTICLE 13. SAFETY AND HEALTH REGULATIONS

13.1 This project is subject to the Safety and Health regulations of the U.S. Department of Labor set forth in Title 29 CFR, Part 1926 and to all subsequent amendments, and to the Massachusetts Department of Labor and Industries, Division of Industrial Safety "Rules and Regulations for the Prevention of Accidents in Construction Operations" (Chapter 454 CMR 10.00 et seq.). Contractors shall be familiar with the requirements of these regulations.

13.2 The Successful Bidder shall comply with the Department of Labor Safety and Health Regulations for Construction promulgated under the Occupational Safety and Health Act of 1970 (PL-91-596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL-91-54).

13.3 The Successful Bidder shall have a competent person or persons, as required under the Occupational Safety and Health Act on the Site to inspect the Work and to supervise the conformance of the Work with the regulations of the Act.

ARTICLE 14. FEDERAL WAGE RATES

14.1 Federal wage rates apply to this project. The Federal Wage Determination is included in Part II of the Supplementary Conditions. Davis Bacon (DB) Prevailing Wage Requirements;

14.1.1 The following clauses shall apply to any contract in excess of $2,000 which is entered into for the actual construction, alteration and/or repair, including painting and decorating, of a treatment work under the CWSRF or a construction project under the DWSRF financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution (except where a different meaning is expressly indicated), and which is subject to the labor standards provisions of any of the acts listed in § 5.1 or the FY 2010 appropriation:

(1) Minimum wages.

(i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1 (b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(l)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in § 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(l)(ii) of this section) and the Davis-Bacon

poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(ii)(A) The Owner(s), on behalf of EPA, shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The State award official shall approve a request for an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known),or their representatives, and the Owner(s) agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), documentation of the action taken and the request, including the local wage determination shall be sent by the Owner (s) to the State award official. The State award official will transmit the request, to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210 and to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification request within 30 days of receipt and so advise the State award official or will notify the State award official within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the Owner(s) do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the award official shall refer the request and the local wage determination, including the views of all interested parties and the recommendation of the State award official, to the Administrator for determination. The request shall be sent to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt of the request and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(l)(ii)(B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(2) Withholding. The Owner(s), shall upon written request of the EPA Award Official or an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the (Agency) may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(3) Payrolls and basic records.

(i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section l(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(l)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section l(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(A) The contractor shall submit weekly, for each week in which any contract work is performed, a copy of all payrolls to the Owner, that is, the entity that receives the sub-grant or loan from the State capitalization grant recipient. Such documentation shall be available on request of the State recipient or EPA. As to each payroll copy received, the Owner shall provide written confirmation in a form satisfactory to the State indicating whether or not the project is in compliance with the requirements of 29 CFR 5.5(a)(l) based on the most recent payroll copies for the specified week. The payrolls shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on the weekly payrolls. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/esa/whd/forms/wh347instr.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the Owner(s) for transmission to the State or EPA if requested by EPA, the State, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the Owner(s).

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under § 5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under § 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the State, EPA or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency or State may, after written notice to the contractor^ sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) Apprentices and trainees

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is

registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

(5) Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

(6) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(l) through (10) and such other clauses as the EPA determines may by appropriate, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

(7) Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

(8) Compliance with Davis-Bacon and Related Act requirements. AH rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1,3, and 5 are herein incorporated by reference in this contract.

(9) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and Owner(s), State, EPA, the U.S. Department of Labor, or the employees or their representatives.

(10)Certification of eligibility.

(i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(l).

(11)No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(l).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

19.1.2 Contract Provision for Contracts in Excess of $100,000.

(a) Contract Work Hours and Safety Standards Act. The following clauses set forth in paragraphs (a)(l), (2), (3), and (4) of this section in full shall apply to any contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall apply in addition to the clauses required by Item 1, above or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (a)(l) of this section the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (a)(l) of this section, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (a)(l) of this section.

(3) Withholding for unpaid wages and liquidated damages. The Owner, upon written request of the EPA Award Official or an authorized representative of the Department of Labor, shall withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by

the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b)(2) of this section.

(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (a)(l) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (a)(l) through (4) of this section.

(b) In addition to the clauses contained in Item 1, above, in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in 29 CFR 5.1, the Owner shall insert a clause requiring that the contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, the Owner shall insert in any such contract a clause providing that the records to be maintained under this paragraph shall be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the (write the name of agency) and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

14.2 It is the responsibility of the Contractor before the bid opening to request, if necessary, any additional information on Federal Wage Rates for those tradespeople who are not covered by the applicable Federal Wage Determination, but who may be employed for the proposed work under this Contract.

14.3 All construction associated with this Contract will be governed by Heavy and Highway Rates.

ARTICLE 15. SUSPENSION AND DEBARMENT

15.1 Bidders must fully comply with Subpart C of 2 CFR Part 180 and 2 CFR Part 1532, entitled Responsibilities of Participants Regarding Transactions (Doing Business with Other Persons). Contractors, subcontractors, or suppliers that appear on the Excluded Parties List System at www.epls.gov are not eligible for award of any contracts funded by the Massachusetts State Revolving Fund.

ARTICLE 16. MANUFACTURER'S EXPERIENCE

16.1 Whenever it is written that an equipment manufacturer must have a specified period of experience with his product, equipment which does not meet the specified experience period can be considered if the equipment supplier or manufacturer is willing to provide an Efficiency Guarantee Bond or cash deposit for the duration of the specified time period which will guarantee replacement of that equipment in the event of failure.

ARTICLE 17. ACCESS TO WORK

17.1 Representatives of the Commonwealth and any local and federal agencies having a direct interest in the Work shall have access to the Work under this contract wherever it is in preparation or progress and the Contractor shall provide proper facilities for such access and inspection.

ARTICLE 18. CHANGE ORDERS

18.1 Change orders will be processed in accordance with the "Change Order Forms" which are included in Part II of the Supplementary Conditions.

ARTICLE 19. COMMONWEALTH OF MASSACHUSETTS - SUPPLEMENTAL PROGRAM

19.1 The Contractor and all Subcontractors shall comply with all of the requirements of The Commonwealth of Massachusetts Modified Supplemental Equal Employment Opportunity, Anti-Discrimination and Affirmative Action Program including the certifications attached thereto. A copy of these requirements and the certification forms are included in Part II of the Supplementary Conditions.

ARTICLE 20. SALES TAX

20.1 The material and supplies to be used in the Work will be subject to the requirements of Paragraph 6.10 of the Conditions of the Contract.

ARTICLE 21. UTILITY UNDERGROUND PLANT DAMAGE PREVENTION SYSTEM

21.1 All excavations within public or private ways are subject to the requirements of Massachusetts General Law, Chapter 82, Section 40 included in PART II of the Supplementary Conditions.

ARTICLE 22. WAGE RATES

22.1 Minimum Wage Rates as determined by the Commissioner of Department of Workforce Development under the provision of the Massachusetts General Laws, Chapter 149, Section 26 to 27D, as amended, apply to this project. It is the responsibility of the Contractor, before bid opening, to request if necessary, any additional information on Minimum Wage Rates for those tradespeople who may be employed for the proposed work under this Contract. Federal Minimum Wage Rates as determined by the United States Department of Labor under the Davis-Bacon Act also apply to this project.

22.2 Both Federal and State schedules of minimum wage rates are included in Part II of the Supplementary Conditions. Where rates differ, the higher rate shall be considered as the minimum rate.

ARTICLE 23. COMPETITIVE BIDDING

23.1 The bidding and award of the Contract shall be in full compliance with Section 39 M inclusive of Chapter 30 of the General Laws of the Commonwealth of Massachusetts as last revised.

ARTICLE 24. MINORITY AND AFFIRMATIVE ACTION WORKFORCE REPORTING SYSTEM

24.1 The Contractor will be required to comply with the following minority and affirmative action workforce reporting system procedures.

a. Contractors must submit the Contractor's Quarterly Projected Workforce Table (CAD 85-1) prior to the commencement of work and no later than five working days prior to the start of each new quarter to the MassDEP's Contract Compliance Officer.

b. Contractors must submit the Certificate of Work Start-Up By Minority/Women Business Enterprise (Form EEO-DEP-290) within ten days after work start-up for each minority/women business to the MassDEP's Contract Compliance Officer.

c. Contractors must submit the Contractor's Weekly Workforce Utilization Report (CAD 85) to the MassDEP's Contract Compliance Officer no later than the following Tuesday of each week.

d. The Owner's Contract Compliance Officer must prepare the Agency's Quarterly Contract Compliance Report (CAD 75) for Minority Workforce Utilization and MBE/WBE Contract Activities Report and send them to MCAD no later than the 15th of the month following the end of each quarter.

e. The Prime Contractor is responsible for the submission of all reports from all of his/her sub-contractors.

f. The OWNER must submit (within 30 days of submission by the General Contractor of the Final Pay Estimate) the MBE/WBE Contract Completion Verification (Form EEO-DEP-590) to the MassDEP's Contract Compliance Officer with a copy to the MassDEP's Program Manager.

ARTICLE 25. GUARANTEE

25.1 The Contractor guarantees that the Work and Services to be performed under the Contract, and all workmanship, materials and equipment performed, furnished, used or installed in the construction of the same shall be free from defects and flaws, and shall be performed and furnished in strict accordance with the Drawings, Specifications, and other contract documents, that the strength of all parts of all manufactured equipment shall be adequate and as specified and that the performance test requirements of the Contract shall be fulfilled. This guarantee shall be for a period of one year from and after the date of completion and acceptance of the Work as stated in the final estimate. If part of the Work is accepted in accordance with that subsection of this AGREEMENT titled "Partial Acceptance," the guarantee for that part of the Work shall be for a period of one year from the date fixed for such acceptance.

25.2 If at any time within the said period of guarantee any part of the Work requires repairing, correction or replacement, the Owner may notify the Contractor in writing to make the required repairs, corrections or replacements. If the Contractor neglects to commence making such repairs, corrections or replacements to the satisfaction of the Owner within seven (7) days from the date of receipt of such notice, or having commenced fails to prosecute such Work with diligence, the Owner may employ other persons to make said repairs, corrections or replacements, and charge the costs, including compensation for additional professional services, to the Contractor.

ARTICLE 26. MASSACHUSETTS DIESEL RETROFIT PROGRAM (MDRP)

26.1 This project is subject to the requirements of the Massachusetts Diesel Retrofit Program (MDRP). Bidders must submit a signed and dated Statement of Intent to Comply form as part of their bid proposal documents. Additional requirements are included in Part II of the Supplementary Conditions.

ARTICLE 27. MASSACHUSETTS GENERAL LAWS AND REGULATIONS

27.1 Applicable provisions of Massachusetts General Laws and Regulations and/or the United States Code and Code of Federal Regulations govern this Contract and any provision in violation of the foregoing shall be deemed null, void and of no effect. Where conflict between Code of Federal Regulations and State Laws and Regulations exist, the more stringent requirement shall apply.

ARTICLE 28. CITY OF HAVERHILL REQUIREMENTS

28.1 The Successful Bidder agrees to exercise their best effort and ensure that 30% of the total employees hours are completed by Haverhill residents in compliance with the City of Haverhill General Code, Chapter 132: Construction Projects Public, Article I Employment of Residents

JAMES J. FIORENTINI, MAYOR
CITY OF HAVERHILL, MASSACHUSETTS

and

GRAHAM HARDWICK, PRESIDENT
AGGREGATE INDUSTRIES – NORTHEAST REGION, INC.

ET+L

BID FORM
TO
CITY OF HAVERHILL, MASSACHUSETTS AND
AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
OLD GROVELAND ROAD
HAVERHILL, MASSACHUSETTS
CONTRACT NO. 1

PROJECT NO. CWSRF-3403

The undersigned declares that the only persons or parties interested in this Bid as principals are as stated; that the Bid is made without any collusion with other persons, firms, or corporations; that he/she has carefully examined all the Contract Documents as prepared by Camp Dresser & McKee Inc., One Cambridge Place, 50 Hampshire Street, Cambridge, MA 02139 and dated October 2010 and revised February 2011 that he/she has informed himself fully in regard to all conditions pertaining to the Work and the place where it is to be done, and from them the undersigned makes this Bid. These prices shall cover all expenses incurred in performing the Work required under the Contract Documents, of which this Bid Form is a part.

The time period for holding bids, where Federal approval is not required is 30 days, Saturdays, Sundays and legal holidays excluded, after the opening of General Bids and where Federal approved is required, the time period for holding bids is 30 days, Saturdays, Sundays and holidays excluded after Federal approval.

The Bid Security accompanying this Bid shall be in the amount of 5 percent of the Bid. The Bid Security shall be sealed in a separate envelope from the Bid and then attached to the envelope containing the Bid.

If a Notice of Award accompanied by at least six unsigned copies of the Agreement and all other applicable Contract Documents is delivered to the undersigned within ten days, excluding Saturdays, Sundays, and legal holidays, after the actual date of the opening of the Bids, the undersigned will within five days, excluding Saturdays, Sundays, and legal holidays, after the date of receipt of such notification, execute and return all copies of the Agreement and all other applicable Contract Documents to OWNER. The premiums for all Bonds required shall be paid by CONTRACTOR and shall be included in the Contract Price. The undersigned further agrees that the Bid Security accompanying this Bid shall become the property of OWNER if the Bidder fails to execute the Agreement as stated above.

The undersigned hereby agrees that the Contract Time shall commence on the date of execution of the Agreement and to fully complete the Work of the Base Bid within 595 Calendar Days in accordance with the terms as stated in the Agreement. If the Bid Alternate is awarded, the Contract Time shall be 960 Calendar Days from the date of execution of the Agreement in accordance with the terms as stated in the Agreement. The undersigned further agrees to pay OWNER, as liquidated damages, $3,500.00 per day for each calendar day beyond the Contract Time Limit or extension thereof that the Work remains incomplete, in accordance with the terms of the Agreement.

The undersigned acknowledges receipt of addenda numbered:

#1 - 2-22-2011 #2 - 2-25-2011 #3 - 3-2-2011 #4 - 3-3-2011

In accordance with the above understanding, the undersigned proposes to perform the Work, furnish all materials and complete the Work in its entirety in the manner and under the conditions required at the prices listed as follows:

CITY OF HAVERHILL, MASSACHUSETTS AND
AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
OLD GROVELAND ROAD
HAVERHILL, MASSACHUSETTS
CONTRACT NO. 1

PROJECT NO. CWSRF-3403

BID FORM

PART 1 – BASE BID

Item No.	Estimated Quantity	Brief Description of Items With Unit Bid Price In Words	Unit Bid Price In Figures	Amount In Figures
1	-	Deleted		
2	L.S.	Mobilization/Demobilization – not to exceed 5 percent of Base Bid less this item Two Hundred Thousand Dollars per lump sum		$200,000.00
3	L.S.	Site preparation including removal of required items, clearing and grubbing, and all other work not covered in other items but required by the Contract Documents. One Hundred Eighty Thousand Dollars per lump sum		$180,000.00
4	50,000 Cubic yards	Regrading to revised cap subgrade plan including excavation, grading, and compacting and all other work required to obtain subbase grades shown on the revised approved plan. Four Dollars and Sixty Cents per cubic yard	$ 4.60	$230,000.00
5	9,750 linear feet	Erosion Control (Furnish, install and maintain hay bales and silt fence) Nine Dollars per linear foot	$ 9.00	$ 87,750.00

Subtotal Page 00300-2 $ 697,750.00

CITY OF HAVERHILL, MASSACHUSETTS AND
AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
OLD GROVELAND ROAD
HAVERHILL, MASSACHUSETTS
CONTRACT NO. 1

PROJECT NO. CWSRF-3403

BID FORM

PART 1 – BASE BID

Item No.	Estimated Quantity	Brief Description of Items With Unit Bid Price In Words	Unit Bid Price In Figures	Amount In Figures
6	109,200 square yards	Furnish and install erosion control fabric on all side slopes 4H:1V or steeper including all appurtenant work and materials.		
		One Dollar and Forty Five Cents per square yard	$ 1.45	$ 158,340.00
7a	9,400 linear feet	Furnish and install Vegetated Drainage Swale including all appurtenant work and materials.		
		Fifty Three Dollars per linear foot	$ 53.00	$ 498,200.00
7b	3,700 linear feet	Furnish and install Riprap Drainage Swale including all appurtenant work and materials.		
		Eighty Two Dollars per linear foot	$ 82.00	$ 303,400.00
8a	L.S.	Reconstruct stormwater Basin 1 including excavation, riprap, outlet structure and pipe, loam and seed, and all appurtenant work and materials.		
		Thirteen Thousand Five Hundred Dollars per lump sum		$ 13,500.00
8b	L.S.	Construct stormwater Basin 3 including excavation, riprap, outlet structure and pipe, loam and seed, and all appurtenant work and materials.		
		Fifty Two Thousand Dollars per lump sum		$ 52,000.00

Subtotal Page 00300-3 $ 1,025,440.00

CITY OF HAVERHILL, MASSACHUSETTS AND
AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
OLD GROVELAND ROAD
HAVERHILL, MASSACHUSETTS
CONTRACT NO. 1

PROJECT NO. CWSRF-3403

BID FORM

PART 1 – BASE BID

Item No.	Estimated Quantity	Brief Description of Items With Unit Bid Price In Words	Unit Bid Price In Figures	Amount In Figures
8c	L.S.	Construct stormwater Basin 4 including excavation, riprap, outlet structure and pipe, loam and seed, and all appurtenant work and materials and perform inspection of receiving culvert (18" RCP beneath old landfill access road).		
		Thirty Four Thousand Dollars per lump sum		$34,000.00
9	150,000 square yards	Furnish and install 6-in gas venting layer including all appurtenant work and materials.		
		Three Dollars and Ninety Five Cents per square yard	$3.95	$592,500.00
10	150,000 square yards	Furnish and install 40-mil textured LLDPE geomembrane including all appurtenant work and materials.		
		Four Dollars and Fifteen Cents per square yard	$4.15	$622,500.00
11	4,900 linear feet	Furnish and install the anchor trench including all appurtenant work and materials.		
		Forty Four Dollars per linear foot	$44.00	$215,600.00
12	165,000 square yards	Furnish and install 12-in sand drainage layer including all appurtenant work and materials.		
		Nine Dollars and Ten Cents per square yard	$9.10	$1,501,500.00

Subtotal Page 00300-4 $2,966,100.00

CITY OF HAVERHILL, MASSACHUSETTS AND
AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
OLD GROVELAND ROAD
HAVERHILL, MASSACHUSETTS
CONTRACT NO. 1

PROJECT NO. CWSRF-3403

BID FORM

PART 1 – BASE BID

Item No.	Estimated Quantity	Brief Description of Items With Unit Bid Price In Words	Unit Bid Price In Figures	Amount In Figures
13	20,800 linear feet	Furnish and install 18" perforated flat panel pipe including all appurtenant work and materials.		
		Five Dollars and Ten Cents per linear foot	$ 5.10	$ 106,080.00
14	475 linear feet	Furnish and install mortared riprap downchute including all appurtenant work and materials.		
		Two Hundred Sixty Dollars per linear foot	$ 260.00	$ 123,500.00
15	211,000 square yards	Furnish and install 8-in thick topsoil, lime, fertilizer, and seed on landfill cap and other disturbed areas, including all appurtenant work and materials.		
		Six Dollars and Fifty Cents per square yard	$ 6.50	$ 1,371,500.00
16	2,700 square yards	Furnish and install 12-in thick organic content loam, lime, fertilizer, and seed on disturbed wetland resource areas, including all appurtenant work and materials.		
		Eleven Dollars and Twenty Five Cents per square yard	$ 11.25	$ 30,375.00
17a	11 each	Furnish and install *Acer rubrum* 'Red Maple', 1.0'-1.5' cal., including excavation and all necessary material to complete planting.		
		One Hundred Dollars per each	$ 100.00	$ 1,100.00

Subtotal Page 00300-5 $ 1,632,555.00

CITY OF HAVERHILL, MASSACHUSETTS AND
AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
OLD GROVELAND ROAD
HAVERHILL, MASSACHUSETTS
CONTRACT NO. 1

PROJECT NO. CWSRF-3403

BID FORM

PART 1 – BASE BID

Item No.	Estimated Quantity	Brief Description of Items With Unit Bid Price In Words	Unit Bid Price In Figures	Amount In Figures
17b	13 each	Furnish and install *Fraxinus pensylvanica* 'Green Ash', 1.0'-1.5' cal., including excavation and all necessary material to complete planting. One Hundred Eighty Dollars per each	$ 180.00	$ 2,340.00
17c	41 each	Furnish and install *Alnus Incan* 'Speckled Alder', 4.0-5.0 ht., including excavation and all necessary material to complete planting. Sixty Eight Dollars per each	$ 68.00	$ 2,788.00
17d	21 each	Furnish and install *Cornus amomum*, 'Silky Dogwood', 4.0-5.0 ht., including excavation and all necessary material to complete planting. Sixty Dollars per each	$ 60.00	$ 1,260.00
17e	37 each	Furnish and install *Salix Discolor*, 'Pussy Willow', 4.0-5.0 ht., including excavation and all necessary material to complete planting. Sixty Eight Dollars per each	$ 68.00	$ 2,516.00
18	2,650 vertical feet	Furnish and install passive landfill gas vents including all appurtenant work and materials. One Hundred Ten Dollars per vertical foot	$ 110.00	$ 291,500.00

Subtotal Page 00300-6 $ 300,404.00

CITY OF HAVERHILL, MASSACHUSETTS AND
AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
OLD GROVELAND ROAD
HAVERHILL, MASSACHUSETTS
CONTRACT NO. 1

PROJECT NO. CWSRF-3403

BID FORM

PART 1 – BASE BID

Item No.	Estimated Quantity	Brief Description of Items With Unit Bid Price In Words	Unit Bid Price In Figures	Amount In Figures
19	39 each	Furnish and install landfill gas passive vent flare including all appurtenant work and materials.		
		Three Thousand Six Hundred Dollars each	$ 3,600.00	$ 140,400.00
20	L.S.	Construct passive horizontal gas collection trench including all appurtenant work and materials.		
		Seventeen Thousand Five Hundred Dollars per lump sum		$ 17,500.00
21	293 vertical feet	Furnish and install gas monitoring wells including all appurtenant work and materials.		
		Eighty Two Dollars per vertical foot	$ 82.00	$ 24,026.00
22	3,700 square yards	Design and construct two gravel access roads including clearing, grubbing, grading; providing structural fill, processed gravel base, and dense graded crushed stone surface; and, all appurtenant work and materials.		
		Twelve Dollars per square yard	$ 12.00	$ 44,400.00
23	1,680 linear feet	Furnish and install 6-ft Chain Link Fence including all appurtenant work and materials.		
		Thirty Seven Dollars per linear foot	$ 37.00	$ 62,160.00

Subtotal Page 00300-7 $ 288,486.00

CITY OF HAVERHILL, MASSACHUSETTS AND
AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
OLD GROVELAND ROAD
HAVERHILL, MASSACHUSETTS
CONTRACT NO. 1

PROJECT NO. CWSRF-3403

BID FORM

PART 1 – BASE BID

Item No.	Estimated Quantity	Brief Description of Items With Unit Bid Price In Words	Unit Bid Price In Figures	Amount In Figures
24	5 each	Furnish and install 12-ft wide double leaf chain link swing gate including all appurtenant work and materials.		
		One Thousand Five Hundred Dollars per each	$ 1,500.00	$ 7,500.00
25	1 each	Furnish and install 26-ft wide vehicle entry gate including all appurtenant work and materials.		
		Five Thousand Three Hundred Dollars per each	$ 5,300.00	$ 5,300.00
26	14,850 cubic yards	Removal of waste from outside the cap limits and relocation to beneath the cap including all appurtenant work and materials.		
		Nineteen Dollars and Fifty Cents per cubic yard	$ 19.50	$ 289,575.00
27	15,000 cubic yards	Removal and relocation of sludge including all appurtenant work and materials.		
		Nineteen Dollars and Fifty Cents per cubic yard	$ 19.50	$ 292,500.00
28	850 cubic yards	Removal of wetland soil and relocation to beneath the cap including all appurtenant work and materials.		
		Twenty Three Dollars per cubic yard	$ 23.00	$ 19,550.00

Subtotal Page 00300-8 $ 614,425.00

CITY OF HAVERHILL, MASSACHUSETTS AND
AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
OLD GROVELAND ROAD
HAVERHILL, MASSACHUSETTS
CONTRACT NO. 1

PROJECT NO. CWSRF-3403

BID FORM

PART I – BASE BID

Item No.	Estimated Quantity	Brief Description of Items With Unit Bid Price In Words	Unit Bid Price In Figures	Amount In Figures
29	L.S.	Implement re-use of piles on Lot 26 Thirteen Thousand Five Hundred Dollars per lump sum		$13,500.00
30	L.S.	Miscellaneous Work and Cleanup One Hundred Thirty Five Thousand Dollars per lump sum		$135,000.00
31	L.S.	Site maintenance from time of contract execution to construction mobilization twenty-five thousand and no cents per lump sum		$25,000.00

Subtotal Page 00300-9	$173,500.00
Subtotal Page 00300-8	$614,425.00
Subtotal Page 00300-7	$288,486.00
Subtotal Page 00300-6	$300,404.00
Subtotal Page 00300-5	$1,632,555.00
Subtotal Page 00300-4	$2,966,100.00
Subtotal Page 00300-3	$1,025,440.00
Subtotal Page 00300-2	$697,750.00
PART I TOTAL BASE BID	$7,698,660.00

Of the TOTAL BASE BID, fifty percent (50%) is SRF eligible payable by the City of Haverhill and fifty percent (50%) is not eligible for SRF which is payable by Aggregate Industries.

CITY OF HAVERHILL, MASSACHUSETTS AND
AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
OLD GROVELAND ROAD
HAVERHILL, MASSACHUSETTS
CONTRACT NO. 1

PROJECT NO. CWSRF-3403

BID FORM

PART II - ADD ALTERNATE UNIT PRICES

The OWNER is offering the availability of remaining air space at the Site for the acceptance of up to 200,000 cubic yards of shaping and grading materials. This is an opportunity for the OWNER to earn revenue by selling all or a portion of the available air space. If this Bid Alternate is selected by the OWNER, the revenues earned will be applied as a project credit to offset closure construction costs of the Total Base Bid for Part I above. Materials delivered and placed must meet the requirements of the Site's soil project approvals from the Massachusetts Department of Environmental Protection (MassDEP) in accordance with the Specifications (Section 02125). Bidders having the availability of such material may provide a bid for the alternate listed below.

Add Alternate No. 1 – Acceptance of Shaping and Grading Material

Bidder commits to delivering and placing 150 000 cubic yards of shaping and grading material in accordance with Section 02125 of the specifications for a lump sum credit of:

insert volume up to 200,000 cyds

Credit Amount in Words	Credit Amount In Figures
Seven Hundred Thousand Dollars *Lump sum credit*	$ 700,000.00

The following is to summarize the bid totals of Part I and Part II.

BID SUMMARY

PART I - TOTAL BASE BID (Page 00300-9): $7,698,660.00

PART II – ADD ALTERNATE NO. 1 CREDIT (Page 00300-10): ($ 700,000.00)

TOTAL BID INCLUDING ADD ALTERNATE CREDIT: $6,998,660.00

Of the TOTAL BID INCLUDING ADD ALTERNATE CREDIT, fifty percent (50%) is SRF eligible payable by the City of Haverhill and fifty percent (50%) is not eligible for SRF payable by Aggregate Industries-Northeast Region, Inc.

The undersigned agrees that extra work, if any, will be performed in accordance with Article 10 of the Conditions of the Contract and will be paid for in accordance with Article 11 of the Conditions of the Contract.

The bidding and award of this Contract will be in accordance with M.G.L. Chapter 30, Section 39M.

The undersigned must furnish a 100 percent Performance Bond and a 100 percent Payment Bond with a surety company acceptable to OWNER.

If Add Alternate No. 1 is selected by the OWNER, the undersigned must furnish a Supplemental Performance Bond with a surety company acceptable to OWNER, in accordance with the requirements of Section 01025.

Amounts shall be shown in both words and figures, where indicated. In case of discrepancy, the amount shown in words will govern.

The above prices shall include all labor, materials, bailing, shoring, removal, overhead, profit, insurance and incidentals required to complete the Work.

The names and residences of all persons and parties interested in the foregoing Bid as principals are as follows:

(Give first and last names in full. In the case of a corporation, see Article 8.3 of the Instructions to Bidders, in the case of a limited liability company (LLC), see Article 8.4 of the Instructions to Bidders, in the case of a partnership, see Article 8.5 of the Instructions to Bidders.)

Jennie Lee Colosi, PE, President + Treasurer 873 Great Rd, Stow MA 01775

Garry P. Balbini, PE, Secretary 873 Great Rd, Stow MA 01775

The attached Minority Business Participation and the Women Business Participation Forms (EEO-DEP-190C & 191C) and Vendor Information Form (EEO-DEP-VIF-C) must be completed and submitted as part of the Bid.

The attached Massachusetts Diesel Retrofit Program (MDRP) Form must be completed and submitted as part of the Bid Proposal.

Pursuant to M.G.L. Ch. 62C, sec. 49A, I certify under the penalties of perjury that I, to my best knowledge and belief, have filed all state tax returns and paid all state taxes required under law.

The undersigned hereby certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work; that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee.

The undersigned bidder hereby certifies he/she will comply with the minority workforce percentage ratio and specific affirmative action steps contained in the EEO/AA provisions of this Contract, including compliance with the Minority/Woman Business Enterprise as required under these contract provisions.

The Contractor receiving the award of the contract shall be required to obtain from each of its subcontractors a copy of the certification by said subcontractor, regardless of tier, that it will comply with the minority workforce ratio and specific affirmative action steps contained in these EEO/AA contract provisions and submit it to the contracting agency prior to the award of such subcontract.
Bidders must fully comply with Subpart C of 2 CFR Part 180 and 2 CFR Part1532, entitled Responsibilities of Participants Regarding Transactions (Doing Business with Other Persons).
Contractors, subcontractors, or suppliers that appear on the Excluded Parties List System at www.epls.gov are not eligible for award of any contracts funded by the Massachusetts State Revolving Fund.

The undersigned hereby certifies under the penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this section, the word "person" shall mean any natural person, joint venture, partnership, corporation, or other business or legal entity. The undersigned further certifies under penalty of perjury that the said undersigned is not presently debarred from doing public construction work in the Commonwealth under the provisions of Section Twenty-nine F of Chapter Twenty-nine, or any other applicable debarment provisions of any other chapter of the General Laws or any rule or requisition promulgated thereunder; and is not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department of agency.

04-3447032
Social Security Number
or Federal Identification
Number

E.T.&L. Corp.
Signature of Individual or
Corporate Name

By: [signature]
Corporate Officer (if applicable)
Kenneth M. Straney
Vice President

Attest:
Susan Y. Kelleher
Susan Y. Kelleher, Assistant Clerk

Notice of acceptance should be mailed, faxed, or delivered to the following:

E.T.&L. Corp.
(Name)

By: Kenneth M. Straney
(Title) Vice President

873 Great Rd, PO Box 295
(Business Address)

Stow, MA 01775
(City and State)

Date 3/9/11

Incorporated in Massachusetts

MINORITY AND WOMEN BUSINESS ENTERPRISE PARTICIPATION
MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF MUNICIPAL SERVICES

SCHEDULE OF PARTICIPATION FOR SRF CONSTRUCTION

Project Title: Southern Mound Closure Haverhill Landfill **Project Location:** Haverhill, MA

Minority Business Enterprise Participation in the SRF Loan Work

Name & Address of MBE	Nature of Participation	Dollar Value of Participation
1. XQUISITE LANDSCAPING INC.	LANDSCAPE	338,048.00
2. HENRY GENERAL CONTRACTORS INC.	SUPPLY TRAP ROCK	70,000.00
3.		
	Total MBE Commitment:	$ 408,048
Percentage MBE Participation = (Total MBE Commitment) / (SRF Loan Bid Price) =		5.13 %

Women Business Enterprise Participation in the SRF Loan Work

Name & Address of WBE	Nature of Participation	Dollar Value of Participation
1. E.T & L. Corp. 873 Great Rd, Stow MA 01775	EARTHWORK	338,750.00
2.		
3.		
	Total WBE Commitment:	$ 338,750.00
Percentage WBE Participation = (Total WBE Commitment) / (SRF Loan Bid Price) =		4.40 %

The Bidder agrees to furnish implementation reports as required by the Awarding Authority to indicate the M/WBE(s) which it has used or intends to use. Breach of this commitment constitutes a breach of the contract.

Name of General Bidder: E.T. & L. Corp.

Date: 3/9/11 By: [signature] Signature

Kenneth M. Straney, Vice President

NOTE: Participation of a Minority-owned or Women-owned enterprise may be counted in only their certified category; the same dollar participation cannot be used in computing the percentage of Minority participation and again of Women participation.

MINORITY AND WOMEN BUSINESS ENTERPRISE PARTICIPATION
MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF MUNICIPAL SERVICES

LETTER OF INTENT FOR SRF CONSTRUCTION

This form is to be completed by the MBE and WBE and must be submitted by the Bidder as part of the bid. A separate form must be completed for each MBE and WBE involved in the project.

Project Title: Southern Mound Closure Haverhill Landfill Project Location: Haverhill, MA

TO: E.T.&L. Corp.
(Name of Bidder)

FROM: E.T.&L. Corp.
(Please Indicate Status [ ] MBE or [✓] WBE)

° I/we intend to perform work in connection with the above project as (check one):

[ ] An individual
[✓] A corporation
[ ] Other (explain):
[ ] A partnership
[ ] A joint venture with:

° It is understood that if you are awarded the contract, you intend to enter into an agreement to perform the activity described below for the prices indicated.

MBE/WBE PARTICIPATION

Description of Activity	Date of Project Commencement	$ Amount	% SRF Loan Bid Price
Earthwork	4/11	$338,750.00	4.4 %

° The undersigned certify that they will enter into a formal agreement upon execution of the contract for the above referenced project.

BIDDER E.T.&L. Corp.	MBE/WBE E.T.&L. Corp.
(Authorized Original Signature) 3/9/11 Date	(Authorized Original Signature) 3/9/11 Date
Kenneth M. Straney, Vice President	Jennie Lee Colosi, PE, President
ADDRESS: 873 Great Rd Stow, MA 01775	ADDRESS: 873 Great Rd Stow MA 01775
TELEPHONE #: 978-897-4353	TELEPHONE #: 978-897-4353

ORIGINALS:
- **Compliance Mgr. City/Town Project Location**
- **DEP Program Manager for DEP's AAO Director**

*** Attach a copy of current (within 2 years) SOMWBA Certification**

If it is determined that one or more of the MBE/WBE subcontractors as submitted by the Bidder on this form is not SOMWBA certified or certified by the Local Government Unit in accordance with the provisions of Executive Order 237, the Bidder shall have an opportunity, following notification, to either find a certified MBE/WBE subcontractor to perform work equal to or greater than that of the uncertified subcontractor or to submit a waiver request.

COMMONWEALTH OF MASSACHUSETTS

EXECUTIVE OFFICE FOR ADMINISTRATION AND FINANCE

SUPPLIER DIVERSITY OFFICE

Massachusetts Transportation Building
Ten Park Plaza, Suite 3740, Boston, MA 02116

DEVAL L. PATRICK
GOVERNOR

TIMOTHY P. MURRAY
LIEUTENANT GOVERNOR

REGINALD A. NUNNALLY
EXECUTIVE DIRECTOR

TELEPHONE:
(617) 973-8692

FACSIMILE:
(617) 973-8637

February 23, 2011

Ms. Jennie Lee Colosi
E.T.& L. Corp.
873 Great Road
Stow, MA 01775

Dear Ms. Lee Colosi:

The Supplier Diversity Office (SDO) is in receipt of your certification renewal information (application). This consists of your request to renew the certification of E.T.& L. Corp. and the required certification renewal information and documentation. Accordingly, SDO has updated your file with this information and documentation. No substantive review of your company was done at this time. **This letter serves as sole and exclusive proof of your firm's SDO certification.**

Based on your certification renewal information (application), the certification of E.T.& L. Corp. as a woman-owned business enterprise (WBE) with the business description of HEAVY, DAM AND HIGHWAY CONSTRUCTION, BRIDGE CONSTRUCTION, LANDFILL CLOSURES AND EXPANSIONS, SITE EXCAVATION, UTILITIES has been renewed effective the date of this letter. The company will remain listed in the SDO Directory of certified businesses and The Central Register, which is published by the Office of the Secretary of State unless its certification is revoked. Unless revoked, this certification will last for a period of two years and will automatically expire as of March 9, 2013, unless by that date, the certification of the company is renewed again or the company is recertified.

To renew the company's certification at that time, you will need to submit the following information to SDO no later than 30 business days prior to March 9, 2013.

1) All company financial statements since the date of the company's then most recent SDO certification;
2) A signed copy of all U.S. Tax Returns and Schedules since the date of the company's then most recent SDO renewal;
3) Corporations must submit all Annual Reports/Letters of Good Standing filed with the Secretary of (YOUR) State since the date of the company's then most recent renewal; and

PLEASE NOTE THAT THE FOLLOWING ITEMS 4-6 CAN BE COMBINED ON ONE NOTARIZED STATEMENT

4) A notarized statement that indicates:

"I certify under the pains and penalties of perjury that no significant changes affecting eligibility as a certified Minority/Minority-Women/Woman business enterprise have occurred since the date of the

company's then most recent date of SDO certification as defined in State regulations 425 CMR 2.00 The Massachusetts Supplier Diversity Office."

5) A notarized statement that indicates either "A or B" as referenced below.

A. "I certify under the pains and penalties of perjury that (Insert your Company Name) has not received any contract(s) as a result of having been SDO certified."

B. "I certify under the pains and penalties of perjury that: (Insert your Company Name) has received a contract(s) as a result of having been SDO certified." List all contract names, contract amounts and the names of the agencies with which you have contracted from the date of your last SDO renewal."

6) A notarized statement that indicates:

"I certify under the pains and penalties of perjury that (Insert your Company Name) has (number) of employees for each year end given; include owner(s)."

Furthermore, you have a continuing duty to notify SDO of a change in any information that is relevant to the firm's certification eligibility and to ensure that the information and documentation relied upon by SDO to certify or to maintain the certification of the business enterprise is accurate, complete and not misleading. You are required to notify SDO in writing of any change of such information or documentation within thirty calendar days. By way of example and not limitation, any change in ownership, control, investment, ongoing or independence may be considered material. Failure to abide by the continuing duty requirements shall constitute grounds for the business entity's decertification.

Additionally, every six years, certified companies that wish to remain certified must undergo a substantive review of their certification status with a SDO certification specialist who will re-evaluate the company to determine whether it continues to meet the applicable certification criteria. If you wish to recertify your company when it becomes due for substantive review, you will need to submit the applicable recertification application and all required information and documentation to SDO no later than forty-five (45) business days prior to the date of certification expiration (i.e., the recertification date). At that time, a certification specialist will be assigned to evaluate your company and will make a report and recommendation to the Certification Committee (CC) on whether or not the company continues to meet the applicable certification criteria.

As provided above in 425 CMR 2.00, if your company has a change of address or telephone number, please send a signed letter within thirty days of the change on company letterhead to notify SDO of the new address or telephone number.

During the period of your certification, if you have any further questions regarding your certification renewal, please direct them to Ms. Nedra D. White, Certification Specialist, at (617) 973-8648.

Very truly yours,

Reginald A. Nunnally
Executive Director

MINORITY AND WOMEN BUSINESS ENTERPRISE PARTICIPATION
MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF MUNICIPAL SERVICES

LETTER OF INTENT FOR SRF CONSTRUCTION

This form is to be completed by the MBE and WBE and must be submitted by the Bidder as part of the bid. A separate form must be completed for each MBE and WBE involved in the project.

Project Title: Haverhill Landfill Project Location: Haverhill, MA

TO: ET &L
(Name of Bidder)

FROM: Xquisite Landscaping, Inc.
(Please Indicate Status [X] MBE or [ ] WBE)

* I/we intend to perform work in connection with the above project as (check one):

[ ] An individual
[X] A corporation
[ ] Other (explain):
[ ] A partnership
[ ] A joint venture with:

* It is understood that if you are awarded the contract, you intend to enter into an agreement to perform the activity described below for the prices indicated.

MBE/WBE PARTICIPATION

Description of Activity	Date of Project Commencement	$ Amount	% SRF Loan Bid Price
Landscape Installation	4/11	$ 338 048	4.39 %

* The undersigned certify that they will enter into a formal agreement upon execution of the contract for the above referenced project.

BIDDER	MBE/WBE
(Authorized Original Signature) Date 3/9/11	(Authorized Original Signature) Date 3/8/2011
ADDRESS: ETL Corp 873 Great Rd Stow MA 01775	ADDRESS: 1600 Washington Street Stoughton, MA 02072
TELEPHONE #: 978-897-4353	TELEPHONE #: 781.318.7070

ORIGINALS:
* Compliance Mgr. City/Town Project Location
* DEP Program Manager for DEP's AAO Director

* Attach a copy of current (within 2 years) SOMWBA Certification

If it is determined that one or more of the MBE/WBE subcontractors as submitted by the Bidder on this form is not SOMWBA certified or certified by the Local Government Unit in accordance with the provisions of Executive Order 237, the Bidder shall have an opportunity, following notification, to either find a certified MBE/WBE subcontractor to perform work equal to or greater than that of the uncertified subcontractor or to submit a waiver request.

COMMONWEALTH OF MASSACHUSETTS

DEPARTMENT OF BUSINESS AND TECHNOLOGY

STATE OFFICE OF MINORITY AND WOMEN BUSINESS ASSISTANCE

Massachusetts Transportation Building

Ten Park Plaza, Suite 3740, Boston, MA 02116

www.mass.gov/somwba

DEVAL L. PATRICK
GOVERNOR

TIMOTHY P. MURRAY
LIEUTENANT GOVERNOR

REGINALD A. NUNNALLY
EXECUTIVE DIRECTOR

TELEPHONE:
(617) 973-8692

FACSIMILE:
(617) 973-8637

April 23, 2010

Ms. Michelle Romeiro
Xquisite Landscaping, Inc.
1800 Washington Street
Stoughton, MA 02072

Dear Ms. Romeiro:

Congratulations on your certification! The State Office of Minority and Women Business Assistance (SOMWBA) is pleased to notify you that your firm was certified as a minority-owned business enterprise (MBE) with the certified business description, LANDSCAPING INSTALLATION, SITE CONTRACTING, IRRIGATION, GRADING, DRAINAGE, ASPHALT, SITE EXCAVATION AND SITE AMENITIES.

Your company will be listed in both the SOMWBA Directory and in the Massachusetts Central Register, which are published at regular intervals. The SOMWBA Directory is sent to other state agencies and private organizations that seek to fulfill MBE utilization requirements.

Furthermore, you have a continuing duty to notify SOMWBA of a change in any information that is relevant to the firm's certification eligibility and to ensure that the information and documentation relied upon by SOMWBA to certify or to maintain the certification of the business enterprise is accurate, complete and not misleading. You are required to notify SOMWBA in writing of any change of such information or documentation within thirty calendar days. By way of example and not limitation, any change in ownership, control, investment, ongoing or independence may be considered material. Failure to abide by the continuing duty requirements shall constitute grounds for the business entity's decertification.

Certification is not a fixed designation and SOMWBA reserves the right to monitor your company, do random spot checks, site visits and to conduct periodic reviews of your company's books, contracts, company structure, facilities, job locations; to seek other relevant information and documentation; and to revoke certification of your firm should this become necessary.

Your company's certification will automatically expire two years from the date of certification. If your company continues to meet all applicable certification criteria, no later than thirty (30) business days before your firm's certification renewal date of April 22, 2012, and every two years thereafter, please send SOMWBA the following documents to renew your certification:

1) All company financial statements since the date of the company's then most recent SOMWBA certification;

2) A signed copy of all U.S. Tax Returns and Schedules since the date of the company's then most recent SOMWBA renewal;
3) Corporations must submit all Annual Reports/Letters of Good Standing filed with the Secretary of (YOUR) State since the date of the company's then most recent renewal; and

PLEASE NOTE THAT THE FOLLOWING ITEMS 4-6 CAN BE COMBINED ON ONE NOTARIZED STATEMENT:

4) A notarized statement that indicates:
"I certify under the pains and penalties of perjury that no significant changes affecting eligibility as a certified Minority/Minority-Women/Woman business enterprise have occurred since the date of the company's then most recent date of SOMWBA certification as defined in State regulations 425 CMR 2.00 State Office of Minority and Women Business Assistance."
5) A notarized statement that indicates either "A or B" as referenced below.
A. "I certify under the pains and penalties of perjury that (Insert your Company Name) has not received any contract(s) as a result of having been SOMWBA certified."
B. "I certify under the pains and penalties of perjury that: (Insert your Company Name) has received a contract(s) as a result of having been SOMWBA certified." List all contract names, contract amounts and the names of the agencies with which you have contracted from the date of your last SOMWBA renewal."
6) A notarized statement that indicates:
"I certify under the pains and penalties of perjury that (Insert your Company Name) has (number) of employees for each year end given; include owner(s)."

Additionally, every six years, certified companies that wish to remain certified must undergo a substantive review of their certification status with a SOMWBA certification specialist who will re-evaluate the company to determine whether it continues to meet the applicable certification criteria. If you wish to recertify your company when it becomes due for substantive review, you will need to submit the applicable recertification application and all required information and documentation to SOMWBA no later than forty-five (45) business days prior to the date of certification expiration (i.e., the recertification date). At that time, a certification specialist will be assigned to evaluate your company and will make a report and recommendation to the Certification Committee (CC) on whether or not the company continues to meet the applicable certification criteria.

As provided above in 425 CMR 2.00, if your company has a change of company name, address or telephone number, please send a signed letter within thirty days of the change on company letterhead to notify SOMWBA of the change. Please be sure to inform the agency or awarding authority you are contracting with of this change for proper payment.

Very truly yours,

Reginald A. Nunnally
Executive Director

MINORITY AND WOMEN BUSINESS ENTERPRISE PARTICIPATION
MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF MUNICIPAL SERVICES

LETTER OF INTENT FOR SRF CONSTRUCTION

This form is to be completed by the MBE and WBE and must be submitted by the Bidder as part of the bid. A separate form must be completed for each MBE and WBE involved in the project.

Project Title: SOUTHERN MOUND CLOSURE HAVERHILL LANDFILL Project Location: HAVERHILL MA

TO: ET. & L. CORP.
(Name of Bidder)

FROM: Henry General Contractors Inc
(Please Indicate Status [X] MBE or [ ] WBE)

* I/we intend to perform work in connection with the above project as (check one):

[ ] An individual
[X] A corporation
[ ] Other (explain):
[ ] A partnership
[ ] A joint venture with:

* It is understood that if you are awarded the contract, you intend to enter into an agreement to perform the activity described below for the prices indicated.

MBE/WBE PARTICIPATION

Description of Activity	Date of Project Commencement	$ Amount	% SRF Loan Bid Price
Supply TRAP Rock	4/11	$ 70,000	0.09 %

* The undersigned certify that they will enter into a formal agreement upon execution of the contract for the above referenced project.

BIDDER	MBE/WBE
3/9/11	3/8/11
(Authorized Original Signature) Date	(Authorized Original Signature) Date
ADDRESS: ET. & L CORP 873 GREAT RD STOW MA 01775	ADDRESS: 261 Oakmore Ave Springfield MA 01109
TELEPHONE #: 978-897-4353	TELEPHONE #: 413-301-5655

ORIGINALS:
* Compliance Mgr. City/Town Project Location
* DEP Program Manager for DEP's AAO Director

* Attach a copy of current (within 2 years) SOMWBA Certification

If it is determined that one or more of the MBE/WBE subcontractors as submitted by the Bidder on this form is not SOMWBA certified or certified by the Local Government Unit in accordance with the provisions of Executive Order 237, the Bidder shall have an opportunity, following notification, to either find a certified MBE/WBE subcontractor to perform work equal to or greater than that of the uncertified subcontractor or to submit a waiver request.

COMMONWEALTH OF MASSACHUSETTS

DEPARTMENT OF BUSINESS AND TECHNOLOGY

STATE OFFICE OF MINORITY AND WOMEN BUSINESS ASSISTANCE

Massachusetts Transportation Building
Ten Park Plaza, Suite 3740, Boston, MA 02116
www.mass.gov/somwba

DEVAL L. PATRICK
GOVERNOR

TIMOTHY P. MURRAY
LIEUTENANT GOVERNOR

REGINALD A. NUNNALLY
EXECUTIVE DIRECTOR

TELEPHONE:
(617) 973-8692

FACSIMILE:
(617) 973-8637

December 14, 2009

Mr. Brian Henry
Henry General Contractors, Inc.
265 Poole Street
Ludlow, MA 01056

Dear Mr. Henry;

The State Office of Minority and Women Business Assistance (SOMWBA) is in receipt of your certification renewal information (application). This consists of your request to renew the certification of Henry General Contractors, Inc. and the required certification renewal information and documentation. Accordingly, SOMWBA has updated your file with this information and documentation. No substantive review of your company was done at this time.

Based on your certification renewal information (application), the certification of Henry General Contractors, Inc. as a minority-owned business enterprise (MBE) with the business description of FINISHED CARPENTRY, NEW CONSTRUCTION AND REMODELING OF RESIDENTIAL AND COMMERCIAL PROPERTIES, FRAMING; SITE EXCAVATION, CURBING, LANDSCAPING; TRANSPORTATION OF CONSTRUCTION MATERIALS, GRAVEL, LOAM, ASPHALT AND FILL has been renewed effective the date of this letter. The company will remain listed in the SOMWBA Directory of certified businesses and The Central Register, which is published by the Office of the Secretary of State unless its certification is revoked. Unless revoked, this certification will last for a period of two years and will automatically expire as of November 10, 2011, unless by that date, the certification of the company is renewed again or the company is recertified.

To renew the company's certification at that time, you will need to submit the following information to SOMWBA no later than 30 business days prior to November 10, 2011.

1) All company financial statements since the date of the company's then most recent SOMWBA certification;
2) A signed copy of all U.S. Tax Returns and Schedules since the date of the company's then most recent SOMWBA renewal;
3) Corporations must submit all Annual Reports/Letters of Good Standing filed with the Secretary of (YOUR) State since the date of the company's then most recent renewal; and

PLEASE NOTE THAT THE FOLLOWING ITEMS 4-6 CAN BE COMBINED ON ONE NOTARIZED STATEMENT

4) A notarized statement that indicates:

"I certify under the pains and penalties of perjury that no significant changes affecting eligibility as a certified Minority/Minority-Women/Woman business enterprise have occurred since the date of the

company's then most recent date of SOMWBA certification as defined in State regulations 425 CMR 2.00 State Office of Minority and Women Business Assistance."

5) A notarized statement that indicates either "A or B" as referenced below.

A. "I certify under the pains and penalties of perjury that (Insert your Company Name) has not received any contract(s) as a result of having been SOMWBA certified."

B. "I certify under the pains and penalties of perjury that: (Insert your Company Name) has received a contract(s) as a result of having been SOMWBA certified." List all contract names, contract amounts and the names of the agencies with which you have contracted from the date of your last SOMWBA renewal."

6) A notarized statement that indicates:

"I certify under the pains and penalties of perjury that (Insert your Company Name) has (number) of employees for each year end given; include owner(s)."

Furthermore, you have a continuing duty to notify SOMWBA of a change in any information that is relevant to the firm's certification eligibility and to ensure that the information and documentation relied upon by SOMWBA to certify or to maintain the certification of the business enterprise is accurate, complete and not misleading. You are required to notify SOMWBA in writing of any change of such information or documentation within thirty calendar days. By way of example and not limitation, any change in ownership, control, investment, ongoing or independence may be considered material. Failure to abide by the continuing duty requirements shall constitute grounds for the business entity's decertification.

Additionally, every six years, certified companies that wish to remain certified must undergo a substantive review of their certification status with a SOMWBA certification specialist who will re-evaluate the company to determine whether it continues to meet the applicable certification criteria. If you wish to recertify your company when it becomes due for substantive review, you will need to submit the applicable recertification application and all required information and documentation to SOMWBA no later than forty-five (45) business days prior to the date of certification expiration (i.e., the recertification date). At that time, a certification specialist will be assigned to evaluate your company and will make a report and recommendation to the Certification Committee (CC) on whether or not the company continues to meet the applicable certification criteria.

As provided above in 425 CMR 2.00, if your company has a change of address or telephone number, please send a signed letter within thirty days of the change on company letterhead to notify SOMWBA of the new address or telephone number.

During the period of your certification, if you have any further questions regarding your certification renewal, please direct them to Ms. Nedra D. White, Certification Specialist, at (617) 973-8648.

Very truly yours,

Reginald A. Nunnally
Executive Director

Attachment A-1

Contractor's Certification

A contractor will not be eligible for award of a contract unless such contractor has submitted the following certification, which is deemed a part of the resulting contract:

CONTRACTOR'S CERTIFICATION

E.T. & L. Corp.
Name of the General Contractor

certifies that:

1. It intends to use the following listed construction trades in the work under contract:

Laborers, Equipment Operators, Teamsters

2. Will comply with the minority workforce ratio and specific affirmative action steps contained herein: and

3. Will obtain from each of its subcontractors and submit to the contracting or administering agency prior to the award of any subcontract under this contract the subcontractor's certification required by these bid conditions.

Signature of Authorized Representative or Contractor

Kenneth M. Straney
Vice President

Attachment A-2

Subcontractor's Certification

Prior to the award of any subcontract, regardless of tier, the prospective subcontractor must execute and submit to the General Contractor the following certification, which will be deemed a part of the resulting subcontract:

SUBCONTRACTOR'S CERTIFICATION

_____

Name of the Subcontractor

certifies that:

1. It intends to use the following construction trades in the work under the contract:

   _____

   _____

2. Will comply with the minority workforce ratio and specific affirmative action steps herein: and

3. Will obtain from each of its subcontractors prior to the award of any subcontract under this contract the subcontractor's certification required by these bid conditions.

_____

Signature of Authorized
Representative of Subcontractor

STATEMENT OF INTENT TO COMPLY

This form must be signed and submitted by the bidder as part of the bid.

Local Governmental Unit City of Haverhill MA SRF Project No. 3403

Contract No. 1 Contact Title Southern Mound Closure Haverhill Landfill

Bidder E.T.&L. Corp.

The undersigned, on behalf of the above-named Bidder, agrees that, if awarded the Contract:

1. the Bidder shall comply with the Department of Environmental Protection's ("DEP") Diesel Retrofit Program by ensuring that all diesel powered non-road construction equipment and vehicles greater than 50 brake horsepower which will be used in the performance of the work under the Contract are equipped or retrofitted with a pollution control device in accordance with the Diesel Retrofit Program Standard;

2. the Bidder shall require all Subcontractors to comply with MassDEP's Diesel Retrofit Program by ensuring all diesel powered non-road construction equipment and vehicles greater than 50 brake horsepower which will be used in the performance of the work under the Contract are equipped or retrofitted with a pollution control device in accordance with the Diesel Retrofit Program Standard; and

3. The Bidder shall submit and shall require each Subcontractor to submit a Diesel Retrofit Program Contractor Certification (form attached) with a Diesel Retrofit List to DEP (NAME and ADDRESS) and the Bidder within 10 days of the bidder being notified that it has been awarded the Contract. The Bidder shall require each Subcontractor to update such Certification and List within 2 days of using additional Diesel Construction Equipment on the project under the Contract.

(Signature of Bidder's Authorized Representative) 3/9/11 (Date)

Kenneth M. Straney
Vice President

Commonwealth of Massachusetts

Vendor Information Form – Construction

Awarding Authority: City of Haverhill, MA and Aggregate Industries - Northeast Region, Inc.

Contract Name: Southern Mound Closure | Contract Project Number: 1 CWSRF-3403

Company Name: E.T.& L. Corp. Haverhill Landfill

Street Address 1: 873 Great Road

Street Address 2: P.O. Box 295

City: Stow	State: Massachusetts	Zip Code: 01720
Telephone Number: (978) 897 - 4353	Fax Number: (978) 897 - 0779	E-mail Address: jlcolosi@etlcorp.com
WWW Address: eltcorp.com	Dunn & Bradstreet Number: 12-579-6958	Federal Employer ID No. 04-3447032
County: Middlesex	Contact Person: Jennie Lee Colosi, P.E., President	

What geographic area does your firm service?

- [ ] Metropolitan Boston
- [ ] Southeastern Mass
- [ ] Western Mass
- [ ] North of Boston
- [X] Massachusetts (Entire State)
- [X] Rhode Island
- [X] New Hampshire
- [X] Connecticut
- [X] Vermont
- [ ] New Jersey
- [ ] New York
- [X] Connecticut

Primary SIC Code 237310 | **Secondary SIC Code**

Date company was founded 1998

Gross Annual Sales

- [ ] $0 - $49,999
- [ ] $50,000 - $99,999
- [ ] $100,000 - $ $499,999
- [ ] $500,000 - $999,999
- [ ] $1,000,000 - $2,499,999
- [ ] $2,500,000 - $4,999,999
- [ ] $5,000,000 - $10,000,000
- [X] Over $10,000,000

Number of Employees

- [ ] 1- 10 employees
- [ ] 10 – 20 employees
- [ ] 20 – 30 employees
- [ ] 30 – 50 employees
- [X] OVER 50 employees

Bonding Capacity

- [ ] $0 - $49,999
- [ ] $50,000 - $99,999
- [ ] $100,000 - $ $499,999
- [ ] $500,000 - $999,999
- [ ] $1,000,000 - $2,499,999
- [ ] $2,500,000 - $4,999,999
- [ ] $5,000,000 - $10,000,000
- [X] Over $10,000,000

Business Structure

- [X] Profit
- [ ] Non-Profit
- [X] S Corporation
- [ ] C Corporation
- [ ] Sole Proprietor
- [ ] Partnership
- [ ] Joint Ventures
- [ ] LLC

Are you a minority-owned firm?	[ ] Yes	[X] No
Are you a women-owned firm?	[X] Yes	[ ] No
Are you certified by the State Office of Minority and Women Business Assistance (SOMWBA)?	[X] Yes	[ ] No
If you are SOMWBA certified are you certified as an? [ ] MBE	[X] WBE	[ ] DBE
Are you certified by Division of Capital Assets Management and Maintenance formerly know as DCPO?	[ ] Yes	[X] No
Are you pre-qualified with the Massachusetts Highway Department?	[X] Yes	[ ] No

Commonwealth of Massachusetts
Vendor Information Form - Construction (Page 2)

Largest State Contract:

☐ $0 - $49,999	☐ $500,000 - $999,999	☐ $5,000,000 - $10,000,000
☐ $50,000 - $99,999	☐ $1,000,000 - $2,499,999	☒ Over $10,000,000
☐ $100,000 - $ $499,999	☐ $2,500,000 - $4,999,999	

Contracting Agency for Largest State Contract: Massachusetts Department of Transportation

Company Comments: (Include a brief description of the goods and/or services your company provides.

E.T.& L. Corp. is a 65 year old heavy construction company, specializing in road and bridge construction, landfill expansions and closures, and site development. The projects that we construct are in the range from $500,000 to $36,000,000. in size and are performed for both private and public owners.

E.T.& L. Corp. has a project management team which includes three Professional Engineers and one Professional Land Surveyor, seasoned and experienced superintendents, a union work force, and a large fleet of equipment, all ready to take on challenging projects. Our fleet of equipment includes automated graded control dozers and graders utilizing the latest GPS software. We also utilize state-of-the-art GPS survey software and instruments for site layout and grade control.

Name of President or CEO	Date:
Jennie Lee Colosi, P.E., President	March 9, 2011
Telephone Number: 978-897-4353	
Name of Individual Completing the Form	Date:
Susan Y. Kelleher	March 9, 2011
Telephone Number: 978-897-4353	

CITY OF HAVERHILL, MASSACHUSETTS AND
AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
OLD GROVELAND ROAD
HAVERHILL, MASSACHUSETTS
CONTRACT NO. 1

PROJECT NO. CWSRF-3403

AGREEMENT

THIS AGREEMENT made as of the 30 day of March in the year 2011 by and among the City of Haverhill, Massachusetts acting by and through its Mayor (the "CITY"), Aggregate Industries – Northeast Region, Inc. ("AGGREGATE," together with the CITY hereinafter called OWNER) and E. T. & L. Corp., with legal address and principal place of business at 873 Great Road, P.O. Box 295 Stow, MA 01775 hereinafter called CONTRACTOR. OWNER and CONTRACTOR in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1. WORK.

1.1 CONTRACTOR shall perform the Work as specified or indicated in the Contract Documents. The Work is as described in SECTION 01010.

ARTICLE 2. ENGINEER.

2.1 The Project has been designed by Camp Dresser & McKee Inc., One Cambridge Place, 50 Hampshire St., Cambridge, MA 02139 who will act as ENGINEER in connection with completion of the Work in accordance with the Contract Documents.

ARTICLE 3. CONTRACT TIME.

3.1 The Contract Time for the Base Bid shall be 595 Calendar Days commencing on the date of execution of the Agreement, to include substantial completion of landfill closure on or before July 1, 2012 and completion of subsequent fall site maintenance by November 15, 2012. If the Bid Alternate(s) are awarded for the delivery of grading and shaping material, the Contract Time shall be 960 Calendar Days commencing on the date of execution of this Agreement, to include substantial completion of landfill closure on or before July 1, 2013 and completion of fall site maintenance by November 15, 2013.

3.2 CONTRACTOR agrees that the Work shall be prosecuted regularly, diligently and uninterruptedly and at such rate of progress as will insure full completion thereof within the Contract Time stated above. It is expressly understood and agreed, by and between CONTRACTOR and OWNER that the Contract Time is reasonable for the completion of the Work, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.

ARTICLE 4. CONTRACT PRICE.

4.1 OWNER will pay CONTRACTOR for performance of the Work in accordance with the Contract Documents in current funds at the lump sum and unit prices agreed upon in the CONTRACTOR's Bid Form attached to this Agreement. CONTRACTOR acknowledges that the CITY and AGGREGATE are not jointly and severally liable for amounts due CONTRACTOR, and that AGGREGATE and the CITY

shall be each liable for one half of amounts due CONTRACTOR for the performance of the Work completed in accordance with the Contract Document.

4.2 As per MassDEP's Policy Memorandum No. 10 - the agreed upon DIRECT LABOR MARKUP (percentage) for Change Orders on this project shall be ___ percent.

ARTICLE 5. APPLICATIONS FOR PAYMENT

5.1 CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the Standard General Conditions of Contract as supplemented by the Supplementary Conditions which shall be collectively referred to herein as the "General Conditions." Applications for Payment will be processed by ENGINEER as provided in the General Conditions.

ARTICLE 6. PROGRESS AND FINAL PAYMENTS

6.1 The CITY and AGGREGATE will each make progress payments on account of its one half share of the Contract Price on the basis of CONTRACTOR's Applications for Payment as recommended by ENGINEER, monthly during construction as provided below. All progress payments will be on the basis of the progress of the Work measured by the schedule of values provided for in Paragraph 14.01 of the General Conditions.

6.2 The CITY and AGGREGATE will make progress and final payments as provided in Article 14 of the General Conditions and in accordance with the applicable Massachusetts General Law.

ARTICLE 7. LIQUIDATED DAMAGES

7.1 OWNER and CONTRACTOR recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss if the Work is not completed within the Contract Time specified in Article 3 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. They also recognize the delays, expense and difficulties involved in proving, in a legal or arbitration proceeding, the actual loss suffered by OWNER if the Work is not completed on time. Accordingly, instead of requiring any such proof OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay OWNER $3,500 per day ($1750 to each of the CITY and AGGREGATE) for each calendar day of delay until the Work is complete.

7.2 Provided, that CONTRACTOR shall not be charged with liquidated damages or any excess cost when the delay in completion of the Work is for reasons included in Paragraph 12.03 of the General Conditions.

7.3 Provided, further, that CONTRACTOR shall, furnish OWNER the required notification of such delays in accordance with Paragraph 12.02 of the General Conditions.

ARTICLE 8. ASSURANCE

8.1 CONTRACTOR has familiarized himself with the nature and extent of the Contract Documents, Work, locality, and with all local conditions and Federal, State and local laws, ordinances, rules and regulations that in any manner may affect cost, progress or performance of the Work.

8.2 CONTRACTOR has studied carefully all reports of investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting cost, progress or performance of the Work which were relied upon by ENGINEER in the preparation of the Drawings and Specifications and which have been identified in Article 4 of the General Conditions.

8.3 CONTRACTOR has made or caused to be made examinations, investigations and tests and studies of such reports and related data as CONTRACTOR deems necessary for the performance of the Work at the Contract Price within the Contract Time and in accordance with the other terms and conditions of the Contract Documents; and no additional examinations, investigations, tests, reports or similar data are or will be required for such purposes.

8.4 CONTRACTOR has correlated the results of all such observations, examinations, investigations, tests, reports and data with the terms and conditions of the Contract Documents.

8.5 CONTRACTOR has given ENGINEER written notice of any conflict, error or discrepancy that CONTRACTOR has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR.

8.6 CONTRACTOR agrees that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the Work.

ARTICLE 9. CONTRACT DOCUMENTS.

9.1 The Contract Documents which comprise the Contract between OWNER and CONTRACTOR are attached hereto and made a part hereof and consist of the following:

9.1.1 Invitation To Bid.

9.1.2 Instructions To Bidders.

9.1.3 Bid Form.

9.1.4 This Agreement.

9.1.5 Performance Bond, EJCDC Document C-610, 2007 edition, Payment Bond, EJCDC Document C-615(A), 2008 edition, and other required Bonds, including but not limited to the Supplemental Performance Bond for work of Add Alternate No. 1.

9.1.6 General Conditions, EJCDC Document No. C-700, 2007 edition.

9.1.7 Supplementary Conditions Parts I and II.

9.1.8 Specifications (as listed in Table of Contents).

9.1.9 Drawings, numbered 0522-75128 through 0522-75145, inclusive and dated October 2010, revised February 2011.

9.1.10 Addenda numbers 1 to 4, inclusive.

9.1.11 Any modification, including Change Orders, duly delivered after execution of Agreement.

ARTICLE 10. MISCELLANEOUS

10.1 Terms used in this Agreement which are defined in Article 1 of the General Conditions shall have the meanings assigned in the General Conditions.

10.2 Neither OWNER nor CONTRACTOR shall, without the prior written consent of the other, assign or sublet in whole or in part any interest under any of the Contract Documents; and, specifically but without

limitation, CONTRACTOR shall not assign any monies due or to become due without the prior written consent of OWNER. In case CONTRACTOR assigns all or any part of any monies due or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any monies due or to become due to CONTRACTOR shall be subject to prior claims of all persons, firms and corporations for services rendered or materials supplied for the performance of the Work called for in this Contract.

10.3 OWNER and CONTRACTOR each binds himself, his partners, successors, assigns and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

10.4 The Contract Documents constitute the entire agreement between OWNER and CONTRACTOR and may only be altered, amended or repealed by a Modification.

ARTICLE 11. MASSACHUSETTS EQUAL OPPORTUNITY REQUIREMENTS

11.1 The fair share construction goals for minority business enterprise (MBE) and women's business enterprise (WBE) participation for this contract is a minimum of five point three zero (5.30) percent MBE participation and four point four zero percent (4.40%) WBE participation, applicable to the total dollar amount paid for the construction contract. The CONTRACTOR shall take all affirmative steps necessary to achieve this goal, and shall provide reports documenting the portion of contract and subcontract dollars paid to minority and women- owned businesses, and its efforts to achieve the goals, with each invoice submitted or at such greater intervals as specified by the City of Haverhill, Massachusetts. The CONTRACTOR shall require similar reports from its subcontractors.

11.2 The CONTRACTOR shall not discriminate against or exclude any person from participation herein on grounds of race, religion, color, sex, age, or national origin; and that it shall take affirmative actions to insure that applicants are employed, and that employees are treated during their employment, without regard to race, religion, color, sex, age, handicapped status, or national origin.

11.3 The CONTRACTOR shall provide with the executed copy(ies) of this Agreement a completed "CONTRACTOR's CERTIFICATION" which will be part of the resulting Contract. A copy of the Certification Form is appended to this Agreement. The CONTRACTOR understands that CONTRACTOR will not be eligible for award of Contract unless "CONTRACTOR's CERTIFICATION" has been submitted.

11.4 The CONTRACTOR shall obtain from any proposed subcontractor, regardless of tier, an executed 'SUBCONTRACTOR's CERTIFICATION" which will be part of the resulting subcontract. A copy of this Certification Form is appended to this Agreement. The CONTRACTOR understands that receipt of the Subcontractor's Certification will be precedent to the award of any subcontract.

11.5 The CONTRACTOR shall not participate in or cooperate with an international boycott, as defined in Section 999(b)(3) and (4) of the Internal Revenue Code of 1986, as amended, or engage in conduct declared to be unlawful by Section 2 of Chapter 151E of the Massachusetts General Laws.

The Contractor agrees that it will fully comply with Subpart C of 2 CFR Part 180 and 2 CFR Part 1532, entitled Responsibilities of Participants Regarding Transactions (Doing Business with Other Persons). The Contractor shall not award any subcontracts or purchase any materials from suppliers that appear on the Excluded Parties List System. The Contractor shall include this requirement in each subcontract and require it to be included in all subcontracts regardless of tier. The Contractor shall maintain reasonable records to demonstrate compliance with these requirements.

IN WITNESS WHEREOF, the parties hereto have signed this Agreement in sextuple. Four copies each have been delivered to OWNER and one copy each to CONTRACTOR and ENGINEER. All portions of the Contract Documents have been signed or identified by OWNER and CONTRACTOR or by ENGINEER on their behalf.

This Agreement shall become effective on 31 March, 2011.

CONTRACTOR: E.T & L. CORP.

(CORPORATE SEAL) BY Kenneth M. Straney, Vice President

Susan Y. Kelleher
Assistant Clerk

Corporate Secretary

Address For Giving Notices:

873 Great Road, P.O. Box 295

Stow, MA 01775

OWNER:

City of Haverhill, Massachusetts

By
James J. Fiorentini, Mayor

Robert DeFusco, City Purchasing Agent

Robert E. Ward, Deputy Director DPW
Waste Water Divisions

Approved as to Form:
William D. Cox, Jr., Esq., City Solicitor

Witness as to Signatures of City of Haverhill

Address For Giving Notices :

City Hall, 4 Summer Street

Haverhill, MA 01830

Aggregate Industries – Northeast Region, Inc.

(CORPORATE SEAL) By _____

Graham Hardwick, President

Address For Giving Notices :

1715 Broadway

Saugus, MA 01906

Pursuant to M.G.L. Chapter 44 Section 31c, I certify that an appropriation has been made in the total amount of this contract.

Date 3-31-11 Signed Patricia J Martel for Charles Benevento Asst

Title Director of Finance/City Auditor

Note: If CONTRACTOR is a corporation, an affidavit giving the principal the right to sign the Agreement must accompany the executed Agreement.

Reference Attachment A – Aggregate Industries letter dated March 28, 2011.

Attachment A

AGGREGATE INDUSTRIES

Aggregate Industries
Management, Inc.
7529 Standish Place, Suite 200
Rockville, MD 20855

Tel: 301-795-1900
Fax: 301-795-1995
www.aggregate-us.com

March 28, 2011

Kenneth M. Straney, Vice President
E. T. & L. Corp.
873 Great Road
Stow, MA 01775

Re: City of Haverhill and Aggregate Industries – Northeast Region, Inc.
Haverhill Landfill - Southern Mound Closure
Contract No. 1, Project No. CWSRF-3403 (the "**Contract**")

Dear Mr. Straney:

With respect to the above-captioned Contract, reference is made to the bid submitted by E. T. & L. Corp. in the amount of $6,998,660.00 (the "**Contract Price**").

Aggregate Industries – Northeast Region, Inc., a Massachusetts corporation ("**Aggregate**"), is responsible for payment of one-half of the Contract Price, i.e., $3,499,330.00, as and when payment is due and otherwise in accordance with the terms and provisions of the Contract.

Please consider this letter as certification to E. T. & L. Corp. that Aggregate has funds available for payment in full of Aggregate's one-half share of the Contract Price.

Sincerely,

Graham Hardwick, President

Attachment A

Aggregate Industries – Northeast Region, Inc.

Secretary's Certificate

The undersigned, Alan Paperny, duly elected and qualified Secretary of **Aggregate Industries – Northeast Region, Inc.**, a Massachusetts corporation (the "**Corporation**"), hereby certifies that a Special Meeting of the Board of Directors of the Corporation was held on March 23, 2011 at which time a quorum was present and acting throughout, and by unanimous vote of the Directors, it was:

VOTED: That the form, terms and provisions of a contract (the "**Contract**") captioned "Contract No. 1, Haverhill Landfill – Southern Mound Closure, Project No. CWSRF-3403" providing for a contract price of $6,998,660 (the "**Contract Price**) to be entered into among the Corporation, the **City of Haverhill, Massachusetts** and **E. T. & L. Corp.**, a Massachusetts corporation, be, and the same is in all respects hereby approved, confirmed and adopted, and the Corporation is authorized to enter into the Contract and to take such other actions and execute and deliver such other documents to be entered into by the Corporation as shall be necessary or appropriate to carry out the terms and provisions of the Contract; and

VOTED: That **Graham Hardwick**, President of the Corporation, be, and he hereby is authorized and directed on behalf of the Corporation to execute and deliver to E. T. & L. Corp., a Certification as to payment by the Corporation of one-half of the Contract Price as and when payment is due and otherwise in accordance with the terms and provisions of the Contract; and

VOTED: That **Graham Hardwick**, President of the Corporation be, and he hereby is authorized and directed to execute and deliver such additional documents and certificates in the name of and on behalf of the Corporation to carry out the Contract heretofore approved, such execution to be conclusive evidence of such approval and of authorization thereof by the Board of Directors.

I do further certify that the above Votes have not been altered, amended or rescinded and remain in full force and effect as of the date hereof.

I do further certify that the Corporation is duly organized, the foregoing Votes are in accordance with the Articles of Incorporation and By Laws of the Corporation and Graham Hardwick holds the office of President of the Corporation.

Dated as of this 28th day of March, 2011.

Alan Paperny, Secretary

MCT/257150.3

Attachment A-1

Contractor's Certification

A Contractor will not be eligible for award of a contract unless such Contractor has submitted the following certification, which is deemed a part of the resulting contract:

CONTRACTOR'S CERTIFICATION

E.T.& L. CORP.
Name of General Contractor

certifies that:

1. It intends to use the following listed construction trades in the work under contract:

   Laborers, Equipment Operators, Teamsters

2. Will comply with the minority workforce ratio and specific affirmative action steps contained herein; and

3. Will obtain from each of its subcontractors and submit to the contracting or administering agency prior to the award of any subcontract under this contract the subcontractor's certification required by these bid conditions.

Signature of Authorized
Representative of Contractor

Kenneth M. Straney
Vice President

Attachment A-2

Subcontractor's Certification

Prior to the award of any subcontract, regardless of tier, the prospective subcontractor must execute and submit to the General Contractor the following certification, which is deemed a part of the resulting subcontract:

SUBCONTRACTOR'S CERTIFICATION

_____

Name of the Subcontractor

certifies that:

1. It intends to use the following listed construction trades in the work under the contract:

   _____

   _____

2. Will comply with the minority workforce ratio and specific affirmative action steps contained herein; and

3. Will obtain from each of its subcontractors prior to the award of any subcontract under this contract the subcontractor's certification required by these bid conditions.

_____

Signature of Authorized
Representative of Subcontractor

EEO-AAO-CCP-Page 81982594.2
EEO-AAO-CCP-Page 8

PERFORMANCE BOND

Bond No. 929523995

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (*Name and Address*):
E.T.&L. Corp.
873 Great Road
Stow, MA 01775

SURETY (*Name, and Address of Principal Place of Business*):
Western Surety Company
100 Newport Avenue Extension
Quincy, MA. 02171

OWNER (*Name and Address*):
City of Haverhill
City Hall, 4 Summer St., Room 100
Haverhill, MA 01830

Aggregate Industries - Northeast Region, Inc.
1715 Broadway
Saugus, MA 01906

CONTRACT

Effective Date of Agreement:
Amount: $6,998,660.00
Description (*Name and Location*): Southern Mound Closure-Haverhill Landfill
Contract No. 1 - Project No. CWSRF-3403
Haverhill, MA.

BOND

Bond Number: 929523995
Date (*Not earlier than Effective Date of Agreement*): 3/31/11
Amount: $6,998,660.00 in the aggregate
Modifications to this Bond Form: None

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL	**SURETY**
E.T.&L. Corp. (Seal)	Western Surety Company (Seal)
Contractor's Name and Corporate Seal	Surety's Name and Corporate Seal
By:	By:
Signature	Signature (Attach Power of Attorney)
Kenneth M. Straney	Richard F. Caruso
Print Name	Print Name
Vice President	Attorney-in-Fact
Title	Title
Attest:	Attest:
Signature Susan Y. Kelleher	Signature Judy Dean
Assistant Clerk	Attorney-in-Fact
Title	Title

Note: Provide execution by additional parties, such as joint venturers, if necessary.

Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner for the performance of the Contract, which is incorporated herein by reference.

1. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 2.1.

2. If there is no Owner Default, Surety's obligation under this Bond shall arise after:
   2.1 Owner has notified Contractor and Surety, at the addresses described in Paragraph 9 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor, and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and
   2.2 Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 2.1; and
   2.3 Owner has agreed to pay the Balance of the Contract Price to:
      1. Surety in accordance with the terms of the Contract; or
      2. Another contractor selected pursuant to Paragraph 3.3 to perform the Contract.

3. When Owner has satisfied the conditions of Paragraph 2, Surety shall promptly, and at Surety's expense, take one of the following actions:

   3.1 Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or
   3.2 Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or
   3.3 Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 5 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or
   3.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:
      1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or
      2. Deny liability in whole or in part and notify Owner citing reasons therefor.

4. If Surety does not proceed as provided in Paragraph 3 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 3.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.

5. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 3.1, 3.2, or 3.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To the limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:

5.1 The responsibilities of Contractor for correction of defective Work and completion of the Contract;
5.2 Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions of or failure to act of Surety under Paragraph 3; and
5.3 Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.

6. Surety shall not be liable to Owner or others for obligations of Contractor that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than Owner or its heirs, executors, administrators, or successors.

7. Surety hereby waives notice of any change, including changes of time, to Contract or to related subcontracts, purchase orders, and other obligations.

8. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located, and shall be instituted within two years after Contractor Default or within two years after Contractor ceased working or within two years after Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

9. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the address shown on the signature page.

10. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

11. Definitions.

11.1 Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other Claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.
11.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.
11.3 Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.
11.4 Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or otherwise comply with the other terms thereof.

FOR INFORMATION ONLY – (*Name, Address and Telephone*)
Surety Agency or Broker: DeSanctis Insurance Agency, Inc.,36 Cummings Park, Woburn, MA. 781-935-8480
Owner's Representative (*Engineer or other party*): Camp,Dresser & McKee Inc.

PAYMENT BOND

Bond No. 929523995

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (*Name and Address*):
E.T.&L. Corp.
873 Great Road
Stow, MA 01775

SURETY (*Name, and Address of Principal Place of Business*): Western Surety Company
100 Newport Avenue Extension
Quincy, MA 02171

OWNER (*Name and Address*):
City of Haverhill, City Hall
4 Summer St., Rm 100, Haverhill, MA 01830

Aggregate Industries - Northeast Region, Inc.
1715 Broadway
Saugus, MA 01906

CONTRACT

Effective Date of Agreement:
Amount: $6,998,660.00
Description (*Name and Location*): Southern Mound Closure -Haverhill Landfill
Contract No. 1 - Project No. CWSRF-3403
Haverhill, MA.

BOND

Bond Number: 929523995
Date (*Not earlier than Effective Date of Agreement*): 3/31/11
Amount: $6,998,660.00 in the aggregate
Modifications to this Bond Form: None

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL	SURETY
E.T.&L. Corp. (Seal)	Western Surety Company (Seal)
Contractor's Name and Corporate Seal	Surety's Name and Corporate Seal
By:	By:
Signature	Signature (Attach Power of Attorney)
Kenneth M. Straney	Richard F. Caruso
Print Name	Print Name
Vice President	Attorney-in-Fact
Title	Title
Attest:	Attest:
Signature Susan Y. Kelleher	Signature Judy Dean
Assistant Clerk	Attorney-in-Fact
Title	Title

Note: Provide execution by additional parties, such as joint venturers, if necessary.

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to Owner, this obligation shall be null and void if Contractor:

2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants, and

2.2 Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.

3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.

4. Surety shall have no obligation to Claimants under this Bond until:

4.1 Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

4.2 Claimants who do not have a direct contract with Contractor:

1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and
2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and
3. Not having been paid within the above 30 days, have sent a written notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.

5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety, that is sufficient compliance.

6. Reserved.

7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.

8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use the funds for the completion of the Work.

9. Surety shall not be liable to Owner, Claimants, or others for obligations of Contractor that are unrelated to the Contract. Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

10. Surety hereby waives notice of any change, including changes of time, to the Contract or to related subcontracts, purchase orders, and other obligations.

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

13. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. Definitions

15.1 Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of Contractor, to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

15.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

15.3 Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract, or to perform and complete or otherwise comply with the other terms thereof.

FOR INFORMATION ONLY – (*Name, Address, and Telephone*)
Surety Agency or Broker: DeSanctis Insurance Agency, Inc., 36 Cummings Park, Woburn, MA.
Owner's Representative (*Engineer or other*): Camp, Dresser & McKee Inc. 781-935-8480

Western Surety Company

POWER OF ATTORNEY APPOINTING INDIVIDUAL ATTORNEY-IN-FACT

Know All Men By These Presents, That WESTERN SURETY COMPANY, a South Dakota corporation, is a duly organized and existing corporation having its principal office in the City of Sioux Falls, and State of South Dakota, and that it does by virtue of the signature and seal herein affixed hereby make, constitute and appoint

Gregory D Juwa, Richard F Caruso, James J Axon, Michael F Carney, Wilder Parks Jr, Michael T Gilbert, Adam W De Sanctis, Christine B Gallagher, Bryan F Juwa, Paul A Patalano, David A Boutiette, Judy Dean, Rebecca Stenquist, Individually

of Woburn, MA, its true and lawful Attorney(s)-in-Fact with full power and authority hereby conferred to sign, seal and execute for and on its behalf bonds, undertakings and other obligatory instruments of similar nature

- In Unlimited Amounts -

and to bind it thereby as fully and to the same extent as if such instruments were signed by a duly authorized officer of the corporation and all the acts of said Attorney, pursuant to the authority hereby given, are hereby ratified and confirmed.

This Power of Attorney is made and executed pursuant to and by authority of the By-Law printed on the reverse hereof, duly adopted, as indicated, by the shareholders of the corporation.

In Witness Whereof, WESTERN SURETY COMPANY has caused these presents to be signed by its Senior Vice President and its corporate seal to be hereto affixed on this 1st day of March, 2011.

WESTERN SURETY COMPANY

Paul T. Bruflat, Senior Vice President

State of South Dakota
County of Minnehaha } ss

On this 1st day of March, 2011, before me personally came Paul T. Bruflat, to me known, who, being by me duly sworn, did depose and say: that he resides in the City of Sioux Falls, State of South Dakota; that he is the Senior Vice President of WESTERN SURETY COMPANY described in and which executed the above instrument; that he knows the seal of said corporation; that the seal affixed to the said instrument is such corporate seal; that it was so affixed pursuant to authority given by the Board of Directors of said corporation and that he signed his name thereto pursuant to like authority, and acknowledges same to be the act and deed of said corporation.

My commission expires

November 30, 2012

D. KRELL
NOTARY PUBLIC
SOUTH DAKOTA

D. Krell, Notary Public

CERTIFICATE

I, L. Nelson, Assistant Secretary of WESTERN SURETY COMPANY do hereby certify that the Power of Attorney hereinabove set forth is still in force, and further certify that the By-Law of the corporation printed on the reverse hereof is still in force. In testimony whereof I have hereunto subscribed my name and affixed the seal of the said corporation this _____ day of _____, _____.

WESTERN SURETY COMPANY

L. Nelson, Assistant Secretary

Form F4280-09-06

Authorizing By-Law

ADOPTED BY THE SHAREHOLDERS OF WESTERN SURETY COMPANY

This Power of Attorney is made and executed pursuant to and by authority of the following By-Law duly adopted by the shareholders of the Company.

Section 7. All bonds, policies, undertakings, Powers of Attorney, or other obligations of the corporation shall be executed in the corporate name of the Company by the President, Secretary, and Assistant Secretary, Treasurer, or any Vice President, or by such other officers as the Board of Directors may authorize. The President, any Vice President, Secretary, any Assistant Secretary, or the Treasurer may appoint Attorneys in Fact or agents who shall have authority to issue bonds, policies, or undertakings in the name of the Company. The corporate seal is not necessary for the validity of any bonds, policies, undertakings, Powers of Attorney or other obligations of the corporation. The signature of any such officer and the corporate seal may be printed by facsimile.

At a regularly called meeting of the Board of Directors of the **E.T.& L. Corp.** held on January 27, 2011, at which a quorum was present, it was VOTED, that **Kenneth M. Straney, Vice President** of this company, be and he hereby is authorized to execute contracts, bonds, bid documents, administration and closeout forms for contracts, certifications and releases in the name and behalf of said company, and affix its corporate seal thereto; and such execution of any contract or obligation in this company's name on its behalf by such **Vice President**, under seal of the company, shall be valid and binding upon this company.

A true copy,

ATTEST: Susan Y. Kelleher

Place of Business: **Stow, MA**

I hereby certify that I am the Assistant Clerk of **E.T.& L. Corp.,** that **Kenneth M. Straney** is the duly elected **Vice President** of said company, and that the above vote has not been amended or rescinded and remains in full force and effect as of this date.

Susan Y. Kelleher

Susan Y. Kelleher Corporate Seal
Assistant Clerk

SUPPLEMENTAL PERFORMANCE BOND
ADD ALTERNATE NO. 1

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (*Name and Address*):
E. T. & L. Corp.
873 Great Road
Stow, MA 01775

SURETY (*Name, and Address of Principal Place of Business*):
Western Surety Company
100 Newport Ave. Ext.
Quincy, MA 02171

OWNER (*Name and Address*):
City of Haverhill
City Hall, Room 100
Haverhill, MA 01830

AND

Aggregate Industries – Northeast Region, Inc.
1715 Broadway
Saugus, MA 01960

CONTRACT
Effective Date of Agreement: 3/31/11
Amount:
Description (*Name and Location*): Southern Mound Closure-Haverhill Landfill Contract No. 1, Project No. CWSRF-3430, Add Alternate No. 1

BOND
Bond Number: **929523996**
Date (*Not earlier than Effective Date of Agreement*): 3/31/11
Amount: $3,850,000.00 in the aggregate
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Supplemental Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

E. T. & L. Corp. (Seal)
Contractor's Name and Corporate Seal

By: _____
Signature

Kenneth M. Straney
Print Name

Vice President
Title

Attest: _____
Signature Susan Kelleher

Assistant Clerk
Title

SURETY

Western Surety Company (Seal)
Surety's Name and Corporate Seal

By: _____
Signature (Attach Power of Attorney)

Richard F. Caruso
Print Name

Attorney-in-Fact
Title

Attest: _____
Signature Judy Dean

Attorney-in-Fact
Title

Note: Provide execution by additional parties, such as joint venturers, if necessary.

Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner for the performance of the Contract, which shall be deemed to include Add Alternate No. 1. The Contract is incorporated herein by reference. This Supplemental Performance Bond relates to that portion of the Work set forth in Add Alternate No. 1 (Grading and Shaping Material) to be performed by Contractor in accordance with the Contract. This Supplemental Performance Bond is in addition to, and not in replacement of, the Performance Bond (Number 929523995) and the Payment Bond (Number 929523995) furnished by Contractor and Surety to Owner with respect to the Contract. In no event shall Surety be obligated under this Supplemental Performance Bond with respect to any portion of the Work other than Add Alternate No.1. of the Contract.

1. If Contractor performs Add Alternate No. 1 of the Contract, Surety and Contractor have no obligation under this Supplemental Bond, except to participate in conferences as provided in Paragraph 2.1.

2. If there is no Owner Default, Surety's obligation under this Supplemental Bond shall arise after:

   2.1 Owner has notified Contractor and Surety, at the addresses described in Paragraph 9 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor, and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and

   2.2 Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 2.1.

3. When Owner has satisfied the conditions of Paragraph 2, Surety shall promptly, and at Surety's expense, take one of the following actions:

   3.1 Arrange for Contractor, with consent of Owner, to perform and complete the Contract, including Add Alternate No. 1; or

   3.2 Undertake to perform and complete the Contract, including Add Alternate No. 1, itself, through its agents or through independent contractors acceptable to Owner; or

   3.3 Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, including Add Alternate No. 1, arrange for a contract to be prepared for execution by Owner and contractor selected with Owner's concurrence, to be secured with performance and payment bonds (including supplemental performance bond) executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 5; or

   3.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:
      1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or
      2. Deny liability in whole or in part and notify Owner citing reasons therefor.

4. If Surety does not proceed as provided in Paragraph 3 with reasonable promptness, Surety shall be deemed to be in default on this Supplemental Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Supplemental Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 3.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.

5. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraphs 3.1, 3.2, or 3.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To the limit of the amount of this Supplemental Bond, Surety is obligated without duplication for:

5.1 The responsibilities of Contractor for correction of defective Work and completion of Add Alternate No. 1; and

5.2 Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions of or failure to act of Surety under Paragraph 3; and

5.3 Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.

6. Surety shall not be liable to Owner or others for obligations of Contractor that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Supplemental Bond to any person or entity other than Owner or its heirs, executors, administrators, or successors.

7. Surety hereby waives notice of any change, including changes of time, to Contract or to related subcontracts, purchase orders, and other obligations.

8. Any proceeding, legal or equitable, under this Supplemental Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located, and shall be instituted within two years after Contractor Default or within two years after Contractor ceased working or within two years after Surety refuses or fails to perform its obligations under this Supplemental Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

9. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the address shown on the signature page.

10. When this Supplemental Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Supplemental Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Supplemental Bond shall be construed as a statutory bond and not as a common law bond.

11. Definitions.

11.1 Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other Claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.

11.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto, including Add Alternate No. 1.

11.3 Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract relating to the portion of the Work set forth in Add Alternate No. 1.

11.4 Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or otherwise comply with the other terms thereof.

FOR INFORMATION ONLY – (*Name, Address and Telephone*) Surety Agency or Broker: DeSanctis Insurance Agency, Inc. 36 Cummings Park, Woburn, MA 01801 (781) 935-8480 Owner's Representative (*Engineer or other party*): CDM One Cambridge Place, Cambridge, MA

Western Surety Company

POWER OF ATTORNEY APPOINTING INDIVIDUAL ATTORNEY-IN-FACT

Know All Men By These Presents, That WESTERN SURETY COMPANY, a South Dakota corporation, is a duly organized and existing corporation having its principal office in the City of Sioux Falls, and State of South Dakota, and that it does by virtue of the signature and seal herein affixed hereby make, constitute and appoint

Gregory D Juwa, Richard F Caruso, James J Axon, Michael F Carney, Wilder Parks Jr, Michael T Gilbert, Adam W De Sanctis, Christine B Gallagher, Bryan F Juwa, Paul A Patalano, David A Boutiette, Judy Dean, Rebecca Stenquist, Individually

of Woburn, MA, its true and lawful Attorney(s)-in-Fact with full power and authority hereby conferred to sign, seal and execute for and on its behalf bonds, undertakings and other obligatory instruments of similar nature

- In Unlimited Amounts -

and to bind it thereby as fully and to the same extent as if such instruments were signed by a duly authorized officer of the corporation and all the acts of said Attorney, pursuant to the authority hereby given, are hereby ratified and confirmed.

This Power of Attorney is made and executed pursuant to and by authority of the By-Law printed on the reverse hereof, duly adopted, as indicated, by the shareholders of the corporation.

In Witness Whereof, WESTERN SURETY COMPANY has caused these presents to be signed by its Senior Vice President and its corporate seal to be hereto affixed on this 1st day of March, 2011.

WESTERN SURETY COMPANY

Paul T. Bruflat, Senior Vice President

State of South Dakota }
County of Minnehaha } ss

On this 1st day of March, 2011, before me personally came Paul T. Bruflat, to me known, who, being by me duly sworn, did depose and say: that he resides in the City of Sioux Falls, State of South Dakota; that he is the Senior Vice President of WESTERN SURETY COMPANY described in and which executed the above instrument; that he knows the seal of said corporation; that the seal affixed to the said instrument is such corporate seal; that it was so affixed pursuant to authority given by the Board of Directors of said corporation and that he signed his name thereto pursuant to like authority, and acknowledges same to be the act and deed of said corporation.

My commission expires

November 30, 2012

D. KRELL
NOTARY PUBLIC
SOUTH DAKOTA

D. Krell, Notary Public

CERTIFICATE

I, L. Nelson, Assistant Secretary of WESTERN SURETY COMPANY do hereby certify that the Power of Attorney hereinabove set forth is still in force, and further certify that the By-Law of the corporation printed on the reverse hereof is still in force. In testimony whereof I have hereunto subscribed my name and affixed the seal of the said corporation this 31 day of MARCH, 2011.

WESTERN SURETY COMPANY

L. Nelson, Assistant Secretary

Form F4280-09-06

Client#: 56353 ETLCORPO

ACORD™ CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY) 03/30/2011

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Starkweather & Shepley PO Box 549 Providence, RI 02901-0549 401 435-3600	CONTACT NAME: Maria Barnowski PHONE (A/C, No, Ext): 401 435-3600 FAX (A/C, No): 401 431-9326 E-MAIL ADDRESS: mbarnowski@starshep.com PRODUCER CUSTOMER ID #: ETLCORPO
INSURED E. T. & L. Corp. PO Box 295 - 873 Great Road Stow, MA 01775	INSURER(S) AFFORDING COVERAGE — NAIC # INSURER A : Travelers Insurance Company — 25674 INSURER B : Associated Industries Mass INSURER C : Zurich American Cos INSURER D : INSURER E : INSURER F :

COVERAGES CERTIFICATE NUMBER: REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	GENERAL LIABILITY			DTCO232M647A	10/01/2010	10/01/2011	EACH OCCURRENCE	$1,000,000
	X COMMERCIAL GENERAL LIABILITY						DAMAGE TO RENTED PREMISES (Ea occurrence)	$500,000
	CLAIMS-MADE X OCCUR						MED EXP (Any one person)	$5,000
	X PD Ded:2,500						PERSONAL & ADV INJURY	$1,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER:						GENERAL AGGREGATE	$2,000,000
	POLICY PRO-JECT LOC						PRODUCTS - COMP/OP AGG	$2,000,000
								$
A	AUTOMOBILE LIABILITY			810263M8187	10/01/2010	10/01/2011	COMBINED SINGLE LIMIT (Ea accident)	$1,000,000
	X ANY AUTO						BODILY INJURY (Per person)	$
	ALL OWNED AUTOS						BODILY INJURY (Per accident)	$
	SCHEDULED AUTOS						PROPERTY DAMAGE (Per accident)	$
	X HIRED AUTOS							$
	X NON-OWNED AUTOS							$
A	X UMBRELLA LIAB X OCCUR			CUP263M8255	10/01/2010	10/01/2011	EACH OCCURRENCE	$8,000,000
	EXCESS LIAB CLAIMS-MADE						AGGREGATE	$8,000,000
	DEDUCTIBLE							$
	RETENTION $ 10,000							$
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y / N			WRZ8005971022011	01/01/2011	01/01/2012	X WC STATU-TORY LIMITS OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? N	N/A					E.L. EACH ACCIDENT	$500,000
	(Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$500,000
							E.L. DISEASE - POLICY LIMIT	$500,000
C	Pollution			USC942633001	04/08/2011	10/01/2011	$10,000,000/$10,000,000	
A	OCP			PRS-5263R027-IND	04/08/2011	12/08/2012	$1,000,000/$1,000,000	

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, If more space is required)

City of Haverhill Massachusetts, Aggregate Industries, Northeast Region, Inc., National Grid USA its subsidiaries and affiliates, and Camp Dresser & McKee, Inc., and their officers, directors, partners, (See Attached Descriptions)

CERTIFICATE HOLDER

City of Haverhill MA
Aggregate Industries
Northeast Region, Inc.
4 Summer Street
Haverhill MA 01830

CANCELLATION 10 Days for Non-Payment

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Maria A. Barnowski

DESCRIPTIONS (Continued from Page 1)

employees and other consultants and subcontractors are included as additional insureds with respect to the insureds Commercial General Liability, Automobile Liability and Umbrella liability Insurance Policies. All insurers waive all rights of subrogation against City of Haverhill Massachusetts, Aggregate Industries, Northeast Region, Inc., National Grid USA its subsidiaries and affiliates, and Camp Dresser & McKee, Inc., and their officers, directors, partners, employees and other consultants and subcontractors. All insurance is primary for all claims covered thereby. Commercial General Liability Insurance included contractual liability coverage

NOTE: UMBRELLA LIABILITY LIMITS APPLY EXCESS TO THE SCHEDULED EMPLOYERS LIABILITY, AUTOMOBILE AND GENERAL LIABILITY LIMITS LISTED

E.T.&L. CORP.

March 24, 2011

Daniel Murphy, Construction Manager
CDM
One Cambridge Place, 50 Hampshire Street
Cambridge, MA 02139

Re: Southern Mound Closure
Haverhill Landfill

The following is the breakdown of of our payroll burden.

Break Down of Payroll Taxes & Insurance

Workers Compensation	7.98%
General Liability	17.60%
Taxes - FICA	7.65%
Taxes - FUTA	0.80%
Taxes - SUTA	4.00%
Health Insurance	0.12%
Total	38.15%

These rates are effective until September 30, 2011.

E.T.& L. Corp.

Kenneth M. Straney
Vice President

KMS/syk

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly by

ACEC
American Council of Engineering Companies

ASCE American Society of Civil Engineers

National Society of Professional Engineers
Professional Engineers in Private Practice

AMERICAN COUNCIL OF ENGINEERING COMPANIES

ASSOCIATED GENERAL CONTRACTORS OF AMERICA

AMERICAN SOCIETY OF CIVIL ENGINEERS

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
A Practice Division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Endorsed by

CONSTRUCTION SPECIFICATIONS INSTITUTE

These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor (EJCDC C-520 or C-525, 2007 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the Narrative Guide to the EJCDC Construction Documents (EJCDC C-001, 2007 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (EJCDC C-800, 2007 Edition).

STANDARD GENERAL CONDITIONS OF THE
CONSTRUCTION CONTRACT

TABLE OF CONTENTS

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*—The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.

3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

5. *Bid*—The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

6. *Bidder*—The individual or entity who submits a Bid directly to Owner.

7. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).

8. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements.

9. *Change Order*—A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

10. *Claim*—A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

11. *Contract*—The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*—Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

13. *Contract Price*—The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).

14. *Contract Times*—The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.

15. *Contractor*—The individual or entity with whom Owner has entered into the Agreement.

16. *Cost of the Work*—See Paragraph 11.01 for definition.

17. *Drawings*—That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be

performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.

18. *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

19. *Engineer*—The individual or entity named as such in the Agreement.

20. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

21. *General Requirements*—Sections of Division 1 of the Specifications.

22. *Hazardous Environmental Condition*—The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto.

23. *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

24. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

25. *Liens*—Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

26. *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award*—The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.

28. *Notice to Proceed*—A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.

29. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.

30. *PCBs*—Polychlorinated biphenyls.

31. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

32. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

33. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.

34. *Project Manual*—The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

35. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

36. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.

37. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work

and which establish the standards by which such portion of the Work will be judged.

38. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.

39. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

40. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.

41. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.

42. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.

43. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.

44. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.

46. *Supplementary Conditions*—That part of the Contract Documents which amends or supplements these General Conditions.

47. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or Subcontractor.

48. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

49. *Unit Price Work*—Work to be paid for on the basis of unit prices.

50. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its

effect, if any, on the Contract Price or Contract Times.

1.02 *Terminology*

A. The words and terms discussed in Paragraph 1.02.B through F are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives:*

1. The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. *Day:*

1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective:*

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

a. does not conform to the Contract Documents; or

b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide:*

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. When "furnish," "install," "perform," or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, "provide" is implied.

F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional

insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 *Starting the Work*

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.07 *Initial Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a

workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.

C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

A. Standards, Specifications, Codes, Laws, and Regulations

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies:*

1. *Contractor's Review of Contract Documents Before Starting Work*: Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.

2. *Contractor's Review of Contract Documents During Performance of Work*: If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation , (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies:*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

   a. the provisions of any standard, specification, manual, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); or

   b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:

   1. A Field Order;

   2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 6.17.D.3); or

   3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier shall not:

   1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions; or

   2. reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.

C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to

use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

A. *Reports and Drawings:* The Supplementary Conditions identify:

1. those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site; and

2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed either:

1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *Engineer's Review*: After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. *Possible Price and Times Adjustments:*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

   a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and

   b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:

   a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

   b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or

   c. Contractor failed to give the written notice as required by Paragraph 4.03.A.

3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

   1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data provided by others; and

   2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

      a. reviewing and checking all such information and data;

      b. locating all Underground Facilities shown or indicated in the Contract Documents;

      c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and

      d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated:*

   1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the

extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 *Hazardous Environmental Condition at Site*

A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.

D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action,

if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.

E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.

F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.

G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 – BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.

B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by

an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.

C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

A. Contractor shall deliver to Owner, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.

B. Owner shall deliver to Contractor, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.

C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.

D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.

E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 *Contractor's Insurance*

A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;

2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;

3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;

4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:

   a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or

   b. by any other person for any other reason;

5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and

6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;

4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);

5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and

6. include completed operations coverage:

   a. Such insurance shall remain in effect for two years after final payment.

   b. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance*

A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;

2. be written on a Builder's Risk "all-risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required by the Supplementary Conditions.

3. include expenses incurred in the repair or replacement of any insured property

(including but not limited to fees and charges of engineers and architects);

4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;

5. allow for partial utilization of the Work by Owner;

6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.

B. Owner shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee.

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.

D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 *Waiver of Rights*

A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or loss payees thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.

B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

6.02 *Labor; Working Hours*

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be

submitted to Engineer for review under the circumstances described below.

1. *"Or-Equal" Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

    a. in the exercise of reasonable judgment Engineer determines that:

        1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

        2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole; and

        3) it has a proven record of performance and availability of responsive service.

    b. Contractor certifies that, if approved and incorporated into the Work:

        1) there will be no increase in cost to the Owner or increase in Contract Times; and

        2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. *Substitute Items:*

    a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.

    b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.

    c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.

    d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

        1) shall certify that the proposed substitute item will:

            a) perform adequately the functions and achieve the results called for by the general design,

            b) be similar in substance to that specified, and

            c) be suited to the same use as that specified;

        2) will state:

            a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time,

            b) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and

c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;

3) will identify:

a) all variations of the proposed substitute item from that specified, and

b) available engineering, sales, maintenance, repair, and replacement services; and

4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.

B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.

C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.

D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

E. *Engineer's Cost Reimbursement:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

F. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement,

shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity; nor

2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.

E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.

F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses,

and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 *Taxes*

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas:*

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.

D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or

entity directly or indirectly employed by any of them).

F. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 *Emergencies*

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. *Shop Drawings:*

   a. Submit number of copies specified in the General Requirements.

   b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples:*

   a. Submit number of Samples specified in the Specifications.

   b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Submittal Procedures:*

1. Before submitting each Shop Drawing or Sample, Contractor shall have:

   a. reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

   b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

   c. determined and verified the suitability of all materials offered with respect to the

indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. *Engineer's Review:*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. *Resubmittal Procedures:*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 *Continuing the Work*

A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on representation of Contractor's warranty and guarantee.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other

individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;

6. any inspection, test, or approval by others; or

7. any correction of defective Work by Owner.

6.20 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .

B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.

B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or

certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

A. Owner may perform other work related to the Project at the Site with Owner's employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to Contractor prior to starting any such other work; and

2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.

B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;

2. the specific matters to be covered by such authority and responsibility will be itemized; and

3. the extent of such authority and responsibilities will be provided.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.

B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's wrongful actions or inactions.

C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 *Replacement of Engineer*

A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

A. Owner's duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

8.06 *Insurance*

A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents.

8.12 *Compliance with Safety Program*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed pursuant to Paragraph 6.13.D.

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents.

9.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.

B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a

delegation of professional design services, if any, see Paragraph 6.21.

C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.

D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.

B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.

C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.

D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

9.10 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.D.

10.03 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:

1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;

2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 *Claims*

A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.

B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional

or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

C. *Engineer's Action*: Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:

1. deny the Claim in whole or in part;

2. approve the Claim; or

3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.

D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.

E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.

F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from

subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

   a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

   b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

   c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

   d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.

   e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

   f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

   g. The cost of utilities, fuel, and sanitary facilities at the Site.

   h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, express and courier services, and similar petty cash items in connection with the Work.

   i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

   1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for

general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A.

C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 *Allowances*

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances:*

1. Contractor agrees that:

a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance:*

1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

2. there is no corresponding adjustment with respect to any other item of Work; and

3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

C. *Contractor's Fee:* The Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.

D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 *Notice of Defects*

A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. Defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

13.03 *Tests and Inspections*

A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in Paragraph 13.04.C; and

3. as otherwise specifically provided in the Contract Documents.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation.

F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.

B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.

D. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop

the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 *Correction or Removal of Defective Work*

A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or

2. correct such defective Work; or

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and for the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to

Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct, or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

A. *Applications for Payments:*

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to

protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. *Review of Applications:*

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

   a. the Work has progressed to the point indicated;

   b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and any other qualifications stated in the recommendation); and

   c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

   a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or

   b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

   a. to supervise, direct, or control the Work, or

   b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

   c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

   d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or

   e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the

representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or

d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. *Payment Becomes Due:*

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. *Reduction in Payment:*

1. Owner may refuse to make payment of the full amount recommended by Engineer because:

a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;

b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

c. there are other items entitling Owner to a set-off against the amount recommended; or

d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.

2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor remedies the reasons for such action.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1 and subject to interest as provided in the Agreement.

14.03 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to

make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the tentative list.

14.05 *Partial Utilization*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D for that part of the Work.

2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

A. *Application for Payment:*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

   a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;

   b. consent of the surety, if any, to final payment;

   c. a list of all Claims against Owner that Contractor believes are unsettled; and

   d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. *Engineer's Review of Application and Acceptance:*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Payment Becomes Due:*

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.

14.08 *Final Completion Delayed*

A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and

accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);

2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;

3. Contractor's repeated disregard of the authority of Engineer; or

4. Contractor's violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:

1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);

2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and

3. complete the Work as Owner may deem expedient.

C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.

E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.

15.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 – DISPUTE RESOLUTION

16.01 *Methods and Procedures*

A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.

C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or

2. agrees with the other party to submit the Claim to another dispute resolution process; or

3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 – MISCELLANEOUS

17.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

SUPPLEMENTARY CONDITIONS

TABLE OF CONTENTS

SUPPLEMENTARY CONDITIONS

PART I - AMENDMENTS TO GENERAL CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract (EJCDC Document No. C-700, 2007 edition) and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

SC-1.01.A.3

Insert the following second sentence in paragraph 1.01.A.3 of the General Conditions:

> An Application for Payment shall include two separate applications for payment, each for one-half of the requested payment. One shall be directed to the City and one shall be directed to Aggregate.

SC-1.01.A.9

Delete the word "Owner" and replace with the following:

> the City and Aggregate, as Owner

SC-1.01.A.42

Delete paragraph 1.01.A.42 of the General Conditions in its entirety and replace with the following:

> 42. Specifications - Sections included under Division 1 through Division 16 of the Project Manual.

SC-1.01.A.44

Insert the following at the beginning of the definition before the words "The time at….."

> The Work required by the Contract has been completed except for work having a Contract Price of less than one per cent of the then adjusted total contract price, or

ARTICLE 2 - PRELIMINARY MATTERS

SC-2.01.B

Delete paragraph 2.01.B of the General Conditions in its entirety and replace with the following:

> B. Before any Work at the Site is started, Contractor shall deliver to Owner, with copies to Engineer and each additional insured identified in Article 5 of the Supplementary Conditions, certificates of insurance (and other evidence requested by Owner) which Contractor is required to purchase and maintain in accordance with the requirements of Article 5.

SC-2.03.A

Delete paragraph 2.03.A of the General Conditions in its entirety and replace with the following:

A. The Contract Time will commence on the date of execution of the Agreement.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

SC-3.01.C

Add the following new paragraph 3.01.D immediately after Paragraph 3.01.C of the General Conditions which is to read as follows:

D. Each and every provision of law and clause required by law to be inserted in these Contract Documents shall be deemed to be inserted herein, and they shall be read and enforced as though it were included herein, and if through mistake or otherwise, any such provision is not inserted, or if not correctly inserted, then upon the application of either party, the Contract Documents shall forthwith be physically amended to make such insertion.

ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

SC 4.01.A

Add the following new paragraph immediately after paragraph 4.01.A of the General Conditions which is to read as follows:

1. If all lands and rights of way are not obtained as herein contemplated before construction begins, Contractor shall begin the Work upon such land and rights of way as Owner has previously acquired.

SC-4.02.A.1

Delete paragraph 4.02.A.1 of the General Conditions, in its entirety and replace with the following: follows:

1. Those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Contract Documents. Engineer has relied upon the data obtained from subsurface investigations made at the Site in the form of test pits. Such data is in the form of test pit logs which are included in the Appendix to the Project Manual. The locations of the test pits are indicated on the Drawings. Such logs and samples are not part of the Contract Documents; and

SC 4.02.A.2

Add the following new paragraph immediately after paragraph 4.02.A.2 of the General Conditions which is to read as follows:

a. In the preparation of Drawings and Specifications, the Engineer has relied upon the following reports and tests of subsurface physical conditions at the Site. Copies of these reports are included in the appendix to the Project Manual. Such reports are not part of the Contract Documents.

SC-4.03.C.3

Add the following new paragraph 4.03.D immediately after paragraph 4.03.C.3 of the General Conditions which is to read as follows:

D. Adjustments resulting from subsurface or latent physical conditions will be in accordance with Massachusetts General Law Chapter 30, Section 39N included in PART II of the Supplementary Conditions.

SC-4.05.A

Add the following new paragraph 4.05.B immediately after paragraph 4.05.A of the General Conditions which is to read as follows:

B. Engineer may check the lines, elevations, reference marks, batter boards, etc., set by Contractor, and Contractor shall correct any errors disclosed by such check. Such a check shall not be considered as approval of Contractor's work and shall not relieve Contractor of the responsibility for accurate construction of the entire Work. Contractor shall furnish personnel to assist Engineer in checking lines and grades.

ARTICLE 5 - BONDS AND INSURANCE

SC-5.01.A

Delete the third sentence in paragraph 5.01.A of the General Conditions and replace with the following:

Contractor shall also furnish Efficiency Guarantee Bonds in accordance with Article entitled MANUFACTURER'S EXPERIENCE in the Instructions to Bidders and executed on forms approved by the Owner.

SC-5.03.B

Add 2 new paragraphs immediately after paragraph 5.03.B of the General Conditions which are to read as follows:

C. Contractor shall provide evidence of its insurance coverage on the ACORD certificate of insurance form and shall include the following statement in its entirety in the section of the form entitled "Description of Operations/Locations/Vehicles/Special Items."

The City, Aggregate, and Camp Dresser & McKee Inc., and their officers, directors, partners, employees and other consultants and subcontractors are named as additional insureds with respect to the insured's Commercial General Liability and Automobile Liability Insurance Policies. All insurers waive all rights of subrogation against the City, Aggregate, and Camp Dresser & McKee Inc., their officers, directors, partners, employees and other consultants and subcontractors. All insurance is primary for all claims covered thereby. Commercial General Liability Insurance includes contractual liability coverage.

SC-5.04.A

The limits of liability for the insurance required by paragraph 5.04.A of the General Conditions shall provide coverage for not less than the following amounts or greater where required by law:

5.04.A.1 and 5.04.A.2 Workers' Compensation

(1) Worker's Compensation	in accordance with M.G.L. c.149, Sect. 34A.	
(2) Employer's Liability	$1,000,000	

5.04.A.3, 5.04.A.4, and 5.04.A.5 Commercial General Liability including Premise/Operations; Explosion, Collapse and Underground Property Damage; Products/Completed Operations, Broad Form Contractual, Independent Contractors; Broad Form Property Damage; and Personal Injury liabilities:

(1) Bodily Injury:	$1,000,000	Each Occurrence
	$1,000,000	Annual Aggregate
(2) Property Damage:	$1,000,000	Each Occurrence
	$1,000,000	Annual Aggregate
(3) Personal Injury:	$1,000,000	Annual Aggregate

5.04.A.6 Comprehensive Automobile Liability including all owned (private and others), hired and non-owned vehicles:

(1) Bodily Injury	$1,000,000	Each Person
	$1,000,000	Each Accident
(2) Property Damage	$1,000,000	Each Occurrence

SC 5.04.B.1

Delete paragraph 5.04.B.1 of the General Conditions in its entirety and replace with the following:

1. The insurance required by paragraph 5.04.A.3 through 5.04.A.6 inclusive will provide primary coverage for all claims covered thereby. With respect to insurance required by Paragraph 5.04.A.6 include as additional insured Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds and include coverage for the respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of all such additional insureds

SC-5.04.B.6

Add two new paragraphs immediately after paragraph 5.04.B.6.b of the General Conditions which is to read as follows:

7. Contractor may purchase and maintain excess liability insurance in the umbrella form in order to satisfy the minimum amounts required for the insurance to be purchased and maintained in accordance with paragraph 5.04. Evidence of such excess liability insurance shall be delivered to Owner in accordance with paragraph 2.01.B in the form of a certificate indicating the policy numbers and minimum coverage amounts of all underlying insurance. The umbrella liability insurance shall have a combined single limit of not less than $5,000,000.00.

8. All polices required by this paragraph 5.04 shall contain provisions to the effect that the insurer(s) waive all right of subrogation against the Owner, Engineer and their officers, directors, partners, employees and other consultants and subcontractors of each and any of them.

SC-5.05.A

Delete paragraph 5.05.A of the General Conditions in its entirety and replace with the following:

A. Contractor shall purchase and maintain a separate Owner's Protective Liability policy, issued to Owner at the expense of Contractor, including Owner and Engineer as named insured. This insurance shall provide coverage for not less than the following amounts:

5.05.A.1	Bodily Injury	$1,000,000	Each Occurrence
5.05.A.2	Property Damage	$1,000,000	Each Occurrence
		$1,000,000	Annual Aggregate

SC-5.05.A

Add the following new paragraph 5.05.B immediately after paragraph 5.05.A.2 of the General Conditions which is to read as follows:

B. All polices required by this paragraph 5.05 shall contain provisions to the effect that the insurer(s) waive all rights of subrogation against the Owner, Engineer and their officers, directors, partners, employees and other consultants and subcontractors of each and any of them.

SC-5.06.A

Delete paragraphs 5.06.A and A1 thru A7 of the General Conditions in their entirety.

SC-5.06.B

Delete paragraph 5.06.B of the General Conditions in its entirety.

SC-5.06.C

Delete Paragraph 5.06.C of the General Conditions in its entirety.

SC-5.06.D

Delete paragraph 5.06.D of the General Conditions in its entirety.

SC-5.06.E

Delete paragraph 5.06.E of the General Conditions in its entirety.

SC-5.07.A

Delete paragraph 5.07.A of the General Conditions in its entirety and replace with the following.

A. All insurance policies provided by the Contractor shall contain provisions to the effect that the insurer waives all rights of subrogation against any of the insured, loss payee, (and the

officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them) Owner and the Engineer.

SC-5.08.A

Delete paragraph 5.08.A of the General Conditions in its entirety.

SC-5.08.B

Delete paragraph 5.08.B of the General Conditions in its entirety.

SC-5.09.A

Delete paragraph 5.09.A of the General Conditions in its entirety and replace with the following:

A. If Owner has any objection to the coverage afforded by or other provisions of the insurance required to be purchased and maintained by Contractor in accordance with this Article 5 on the basis of its not complying with the Contract Documents, Owner will notify Contractor in writing thereof within ten days of the date of delivery of such certificates to Owner in accordance with paragraph 2.01. Contractor will provide such additional information in respect of insurance provided by Contractor as Owner may reasonably request.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

SC-6.02.B

Add the following new paragraphs immediately after paragraph 6.02.B of the General Conditions which are to read as follows:

C. This Agreement is subject to the applicable provisions of the Contract Work Hours and Safety Standards Act, Public Law 87-581, 87th Congress. No Contractor or Subcontractor contracting for any part of the Work shall require or permit any laborer or mechanic to be employed on the Work in excess of forty hours in any work week unless such laborer or mechanic receives compensation at a rate not less than one and one-half times that person's basic rate of pay for all hours worked in excess of forty hours in such work week.

D. Contractor shall employ only competent persons to do the work and whenever Owner shall notify Contractor, in writing, that any person on the Work appears to be incompetent, disorderly, or otherwise unsatisfactory, such person shall be removed from the Project and shall not again be employed on it except with the consent of Owner.

E. Contractor and Subcontractors shall, insofar as practicable, give preference in the hiring of workers for the Project to qualified local residents with first preference being given to citizens of the United States who have served in the armed forces of the United States and have been honorably discharged therefrom or released from active duty therein.

F. Contractor and all Subcontractors shall pay to all laborers and mechanics employed for the construction covered by this Contract the minimum rates of pay as determined by the Secretary of Labor in accordance with the Act of March 3, 1931, as amended, known as the Davis-Bacon Act (40 U.S.C. 276a through 276a-7). Furthermore, Contractor and Subcontractors shall adhere to the stipulations and provisions published by the Secretary of Health, Education, and Welfare in "Labor Standards (Federal Water Pollution Control Act)." The Wage Rate

Schedule as prepared by the Secretary of Labor and the "Labor Standards" are part of this Contract and are included in PART II of these Supplementary Conditions.

G. Except as may be otherwise required by law, all claims and disputes pertaining to the classification of labor employed on the project under this Contract shall be decided by the governing body having jurisdiction.

H. Contractor and all Subcontractors shall comply with the Regulations of the Secretary of Labor made pursuant to the Anti-Kickback Act of June 30, 1940 (40 U.S.C. 276c) and all amendments or modifications thereto. Contractor and all Subcontractors shall furnish Owner with weekly Statements of Compliance. In case of Subcontracts, Contractor shall cause appropriate provision to be inserted in all subcontracts for the Work which Contractor may let to ensure compliance with said Anti-Kickback Act by all Subcontractors subject thereto, and Contractor shall be responsible for the submission of all Statements of Compliance required of Subcontractors by said Anti-Kickback Act except as the Secretary of Labor may specifically provide for reasonable limitations, variations, and exemptions from the requirements thereof. These Regulations are part of this Contract and are included in PART II of these Supplementary Conditions.

I. Contractor and all subcontractors shall comply with the Massachusetts Prevailing Wage law as contained in M.G.L. chapter 149 sections 26-27 which are included in Part II of these Supplementary Conditions.

SC-6.06.A

Delete Paragraphs 6.06.A and 6.06.B of the General Conditions in their entirety and replace with the following:

A. Contractor shall not employ any Subcontractor, Supplier or other person or organization, (including those who are to furnish the principal items of materials or equipment), whether initially or as a substitute, against whom Owner may have reasonable objection. Acceptance of any Subcontractor, other person or organization by Owner shall not constitute a waiver of any right of Owner to reject defective Work. Contractor shall not be required to employ any Subcontractor, other person or organization against whom Contractor has reasonable objection.

B. Intentionally Omitted.

SC-6.06.C

Add the following new sentence at the end of paragraph 6.06.C of the General Conditions to read as follows:

Contractor shall make payments to Subcontractors in accordance with Massachusetts General Law Chapter 30, Section 39F which is included in PART II of these Supplementary Conditions.

SC-6.06.E

Add the following new sentence at the end of paragraph 6.06.E of the General Conditions to read as follows:

Owner or Engineer may furnish to any such Subcontractor, Supplier or other person or organization, to the extent practicable, information about amounts paid on their behalf to Contractor in accordance with Contractor's Applications for Payment.

SC-6.07.B

Delete paragraph 6.07B of the General Conditions in its entirety.

SC-6.08.A

Delete the first and second sentences of Paragraph 6.08.A of the General Conditions in their entirety and replace with the following:

Contractor shall comply with the guidelines established in the Division of Municipal Services (DMS) Construction Grants Policy Memorandum No. CG-2 (Permits) included in Part II of the Supplementary Conditions.

SC-6.10.A

Add the following new sentences at the end of paragraph 6.10.A of the General Conditions to read as follows:

The materials and supplies to be used in the Work of this Contract are exempt from the Sales and Use Tax of the Commonwealth of Massachusetts. Contractor shall obtain the proper certificates, maintain the necessary records and otherwise comply with the requirements of Chapter 14 of the Acts of 1966 and any amendments thereto.

SC-6.16.A

Delete the last sentence in paragraph 6.16.A of the General Conditions in its entirety and replace with the following:

If Engineer determines that the incident giving rise to the emergency action was not the responsibility of the Contractor and that a change in the Contract Document is required because of the action taken by the Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

SC-6.17.D.1

Add the following new sentence at the end of paragraph 6.17.D.1 of the General Conditions to read as follows:

Approval of Shop Drawings for equipment requiring Efficiency Guarantee Bonds will be withheld until the receipt of such Bonds.

SC-6.19.A

Add the following new paragraph immediately after paragraph 6.19.A of the General Conditions which is to read as follow:

B. The Contractor guarantees that the Work and Services to be performed under the Contract, and all workmanship, materials and equipment performed, furnished, used or installed

in the construction of the same shall be free from defects and flaws, and shall be performed and furnished in strict accordance with the Drawings, Specifications, and other Contract Documents, that the strength of all parts of all manufactured equipment shall be adequate and as specified and that the performance test requirements of the Contract shall be fulfilled. This guarantee shall be for a period of one year from and after the date of completion and acceptance of the Work as stated in the final estimate. If part of the Work is accepted in accordance with that subsection of this AGREEMENT titled "Partial Acceptance," the guarantee for that part of the Work shall be for a period of one year from the date fixed for such acceptance.

1. If at any time within the said period of guarantee any part of the Work requires repairing, correction or replacement, the Owner may notify the Contractor in writing to make the required repairs, correction or replacements. If the Contractor neglects to commence making such repairs, corrections or replacements to the satisfaction of the Owner within seven (7) days from the date of receipt of such notice, or having commenced fails to prosecute such Work with diligence, the Owner may employ other persons to make said repairs, correction or replacements, and charge the costs, including compensation for additional professional services, to the Contractor.

2. The Contractor's guarantee under this clause, 6.19.B, is in addition to the Contractor's express or implied warranties under this Agreement and State law and in no way diminish any other rights that the Owner may have against the Contractor.

SC-16.19C and 16.19.D

Renumber 6.19.B and 6.19.C of the General Conditions to read 6.19.C and 6.19.D.

SC-6.19.D

Add the following new paragraph immediately after paragraph 6.19.D of the General Conditions which is to read as follows:

E. Manufacturer's Guaranty/Warranty

1. The Contractor shall obtain the following guaranty/warranty from the manufacturer of all major pieces of equipment furnished and installed on this Project. Such guaranty/warranty shall be for the benefit of Owner and be furnished in writing by the manufacturer. The Contractor's and manufacturer's obligations under this provision are in addition to other express or implied warranties under the Contract Documents and under the law and in no way diminish any other right that the Owner may have against the Contractor or manufacturer for faulty material, equipment or work. The warranty period shall not be interpreted as a limitation on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.

2. The manufacturer warrants and guarantees for a period of one year from the date of Substantial Completion, or such longer period that may be specified in the Contract Documents, that all materials and equipment furnished and installed shall be free from flaws, defects in material and workmanship and shall be in conformance with the Contract Documents.

SC-6.20.A

Delete paragraph 6.20.A of the General Conditions in its entirety and replace with the following:

A. To the fullest extent permitted by Laws and Regulations, Contractor shall defend, indemnify and hold harmless Owner, Engineer and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses and damages (including but not limited to all fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost or loss or damage:

1. is attributable to bodily injury, sickness, disease or death or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom; and

2. is caused in whole or in part by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly of indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable, regardless of whether or not caused in part by any negligence or omission of an individual or entity indemnified hereunder or whether liability is imposed upon such indemnified party by Laws and Regulations regardless of the negligence of any such indemnified party unless caused by the sole negligence of a party indemnified hereunder. If through the acts of neglect on the part of Contractor, any other contractor or any Subcontractor shall suffer loss or damage on the Work, Contractor shall settle with such other contractor or Subcontractor by agreement or arbitration if such other contractor or Subcontractor will so settle. If such other contractor or Subcontractor shall assert any claim against Owner and/or Engineer, or the officers, directors, members, partners, employees, agents, consultants and subcontractors of each on account of any damage alleged to have been sustained, Owner shall notify Contractor, who shall defend, indemnify and save harmless Owner, Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each against any such claims.

SC-6.20.C

Delete paragraphs 6.20.C, C.1 and C.2 of the General Conditions in their entirety.

SC-6.21.E

Delete paragraph 6.21.E of the General Conditions in its entirety and replace with the following:

E. Contractor shall not be responsible for the adequacy of the performance criteria or design criteria contained in the Contract Documents.

SC-6.21.E

Add the following new paragraph immediately after paragraph 6.21.E of the General Conditions which is to read as follows:

SC-6.22 Definitions; Contract Provisions; Management and Financial Statements; Enforcement

A. Contractor shall comply with all applicable provisions of Chapter 30, Section 39R of the Massachusetts General Laws regarding Contractor's records which is included in Part II of the Supplementary Conditions.

ARTICLE 8. OWNER'S RESPONSIBILITIES

SC-8.04.A

Delete the word "Owner" and replace with the following:

The City and Aggregate

SC-8.06

Delete paragraph 8.06 of the General Conditions in its entirety.

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

SC-9.03.A

Add the following new paragraph immediately after paragraph 9.03.A of the General Conditions which is to read as follows:

B. Engineer will furnish a Resident Project Representative and assistants to assist Engineer in observing the performance of the Work. The duties and responsibilities of the Resident Project Representative will be as enumerated in a document entitled "Duties, Responsibilities and Limitations of the Authority of Resident Project Representative" and will be made available to Contractor at the start of the Work.

ARTICLE 11 - COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

SC-11.01.A.1

Delete the second sentence in paragraph 11.01A.1 of the General Conditions in its entirety and replace with the following:

Such employees shall include foremen at the Site.

SC-11.01.A.1

Add the following new paragraph immediately after paragraph 11.01.A.1 of the General Conditions which is to read as follows:

a. Contractor shall establish, in the Agreement, the Direct Labor Cost percentage. This percentage, where approved by Owner, will be used in the determination of the Direct Labor Cost listed in the Change Order Form included in Part II of the Supplementary Conditions. The Direct Labor Costs are defined to include social security contributions, unemployment, excise and payroll taxes, workers' and workmen's compensation, health and retirement benefits, sick leave, vacation and holiday pay, and cost of premiums for all additional insurance required because of changes in the Work.

SC-11.02.A

Delete paragraphs 11.02.A thru D. of the General Conditions in their entirety.

SC-11.03.D

Delete paragraph 11.03.D of the General Conditions in its entirety and replace with the following:

D. The unit price of an item of Unit Price Work shall be subject to re-evaluation and adjustment under the following conditions:

1. if the total cost of a particular item of Unit Price Work amounts to 5 percent or more of the Contract Price and the variation in the quantity of that particular item of Unit Price Work performed by Contractor differs by more than 15 percent from the estimated quantity of such item indicated in the Agreement; and

2. if there is no corresponding adjustment with respect to any other item of Work; and

3. if Contractor believes that Contractor has incurred additional expense as a result thereof; or if Owner believes that the quantity variation entitles Owner to an adjustment in the unit price, either Owner or Contractor may make a claim for an adjustment in the Unit Price for that quantity by which the actual quantity exceeds 115 percent of the estimated quantity in accordance with Article 10.05 if the parties are unable to agree as to the effect of any such variations in the quantity of Unit Price Work performed.

ARTICLE 12 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIME

SC-12.01.C.2.b

In the second line of paragraph 12.01.C.2.b, before the semicolon add the following words "based on subcontractor's Cost of the Work";

Delete "five percent" in paragraph 12.01C.2.b of the General Conditions and replace with "seven and one-half percent."

Delete "15 percent" in the seventh line of paragraph 12.01.C.2.c, of the General Conditions and replace with "twenty percent" and delete "five percent" in the tenth line and replace with "seven and one-half percent."

ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

SC-13.05.A

Add the following new paragraph immediately after paragraph 13.05.A of the General Conditions to read as follows:

B. If Owner stops Work under Paragraph 13.05.A, Contractor shall not be entitled to any extension of Contract Time or increase in Contract Price.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

SC-14.02.A.3

Add the following new paragraph immediately after paragraph 14.02.A.3 of the General Conditions which is to read as follows:

4. Contractor shall furnish evidence that payment received on the basis of materials and equipment not incorporated and suitably stored, has in fact been paid to the respective supplier(s) within sixty days of payment by Owner. Failure to provide such evidence of payment may result in the withdrawal of previous approval(s) and removal of the cost of related materials and equipment from the next submitted Application for Payment.

SC-14.02.B.1

Delete paragraph 14.02.B.1 of the General Conditions in its entirety and replace with the following:

1. Progress Payments will be made in accordance with Massachusetts General Law Chapter 30, Section 39G, which is included in PART II of these Supplementary Conditions.

SC-14.02.C.1

Delete paragraph 14.02.C.1 of the General Conditions in its entirety and replace with the following:

1. Ten days after presentation of the Application for Payment to the City and Aggregate with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due, one-half of the amount recommended will be paid by the City and one-half of the amount recommended will be paid by Aggregate.

SC-14.02.D.1

Delete paragraph 14.02.D.1 and 14.02.D.1.a through 14.02.D.1.d of the General Conditions in its entirety and replace with the following:

1. The City or Aggregate may refuse to make payment of their one-half share of the amount recommended by Engineer because:

a. claims have been made against the City and/or Aggregate in account of Contractor's performance or furnishing of the Work;

b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to the City and/or Aggregate, as applicable, to secure the satisfaction and discharge of such Liens;

c. there are other items entitling the City and/or Aggregate to a set-off against the amount recommended;

d. The City and/or Aggregate has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.

SC-14.02.D.2

Delete paragraph 14.02.D.2 of the General Conditions in its entirety and replace with the following:

> If the City or Aggregate refuses to make payment of such party's one-half share of the amount recommended by Engineer, such party will give immediate written notice (with a copy to Engineer and the other Owner party) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. The City or Aggregate, as applicable, shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to between such party and Contractor, when Contractor remedies the reasons for such action.

SC-14.02.D.3

Delete the word "Owner's" and replace with the following:

> the City or Aggregate's

SC-14.03.A

Add the following new paragraphs immediately after paragraph 14.03.A of the General Conditions which are to read as follows:

> B. No materials or supplies for the Work shall be purchased by Contractor or Subcontractor subject to any chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller. Contractor warrants that Contractor has good title to all materials and supplies used by Contractor in the Work, free from all liens, claims or encumbrances.
>
> C. Contractor shall defend, indemnify and save Owner and Engineer harmless from all claims growing out of the lawful demands of Subcontractors, laborers, workmen, mechanics, materialmen, and furnishers of machinery and parts thereof, equipment, power tools, and all supplies, including commissary, incurred in the furtherance of the performance of this Contract. Contractor shall at Owner's request, furnish satisfactory evidence that all obligations of the nature hereinabove designated have been paid, discharged, or waived. If Contractor fails to do so, then Owner may, after having served written notice on the said Contractor either pay unpaid bills, of which Owner has written notice, direct, or withhold from the Contractor's unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to Contractor shall be resumed, in accordance with the terms of this Contract, but in no event shall the provisions of this sentence be construed to impose any obligations upon Owner to either Contractor or Contractor's Surety. In paying any unpaid bills of the Contractor, Owner shall be deemed the agent of Contractor and any payment so made by Owner shall be considered as payment made under the Contract by Owner to Contractor and Owner shall not be liable to Contractor for any such payment made in good faith.

SC-14.07.A.2.c

Delete the word "Owner" and replace with the following:

> the City and/or Aggregate

SC-14.07.B.1

Delete paragraph 14.07.B.1 of the General Conditions in its entirety and replace with the following:

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation - all as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will indicate in writing Engineer's recommendation of payment and present the Application to Owner for payment. Thereupon Engineer will give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of paragraph 14.09. Otherwise, Engineer will return the Application to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application. If the Application and accompanying documentation are appropriate as to form and substance, Owner shall in accordance with the applicable Massachusetts General Law, pay Contractor the amount recommended by Engineer.

SC-14.07.C.1

Delete paragraph 14.07.C.1 of the General Conditions in its entirety and replace with the following:

Thirty days after presentation of the Application for Payment and accompanying documentation to the City and Aggregate, the amount recommended by the Engineer will become due and one-half will be paid by the City to Contractor and one-half will be paid by Aggregate to Contractor, less any sum the City and/or Aggregate is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages.

Add the following new paragraph 14.07.D immediately after paragraph 14.07.C.1 of the General Conditions which is to read as follows:

D. Final payment will be reduced by the amount of excessive costs of plant inspection of pipe. Excessive costs are defined as the inspection costs incurred by Owner for that amount of pipe which exceeds 125 percent of the aggregate length of each type installed.

SC-14.09.A.2

Add the following new paragraph 14.10 immediately after paragraph 14.09.A.2 of the General Conditions which is to read as follows:

Notwithstanding anything to the contrary in the Contract Documents, Contractor acknowledges and agrees that the City and Aggregate are not jointly and severally liable for payment of the Contract Price or any progress or final payment. Each of the City and Aggregate is only responsible and liable for payment of fifty percent of the Contract Price or any progress or final payment. In the event either the City or Aggregate fail to make any payment due under the Contract Documents, Contractor shall only have a claim against such non-paying Owner party and shall have no claim against the paying Owner party for such nonpayment.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

SC-15.01.A

Delete paragraph 15.01.A of the General Conditions in its entirety and replace with the following:

A. Owner may order, at any time and without cause, suspension of the Work in accordance with Massachusetts General Law Chapter 30, Section 39O, which is included in Part II of the Supplementary Conditions.

SC-15.02.A.4

Add the following new paragraph immediately after paragraph 15.02.A.4 of the General Conditions which is to read as follows:

5. If Contractor abandons the Work, or sublets this Contract or any part thereof, without the previous written consent of Owner, or if the Contract or any claim thereunder shall be assigned by Contractor otherwise than as herein specified;

SC-15.04.A

Delete paragraph 15.04.A of the General Conditions in its entirety.

SC-15.04.A

Delete paragraph 15.04.B of the General Conditions in its entirety.

ARTICLE 16 - DISPUTE RESOLUTION

SC-16.01.A

Delete paragraph 16.01.A of the General Conditions in its entirety and replace with the following:

Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 when such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of this Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract.

SC-16.01.C.3

Add a new paragraph immediately after paragraph 16.01.C.3 of the General Conditions which is to read as follows:

D. Contractor shall carry on the Work and maintain the progress schedule during the dispute resolution proceedings, unless otherwise agreed by Contractor and Owner in writing.

ARTICLE 17 - MISCELLANEOUS

SC-17.06

Add the following new paragraphs immediately after paragraph 17.06 of the General Conditions which are to read as follows:

17.07 Addresses

A. Both the address given in the Bid Form upon which this Agreement is founded, and Contractor's office at or near the Site are hereby designated as places to either of which notices, letters, and other communications to Contractor shall be certified, mailed, or delivered. The delivering at the above named place, or depositing in a postpaid wrapper directed to the first-named place, in any post office box regularly maintained by the post office department, of any notice, letter or other communication to Contractor shall be deemed sufficient service thereof upon Contractor; and the date of said service shall be the date of such delivery or mailing. The first-named address may be changed at any time by an instrument in writing, executed and acknowledged by Contractor, and delivered to Owner and Engineer. Nothing herein contained shall be deemed to preclude or render inoperative the service of any notice, letter, or other communication upon Contractor personally.

17.08 Wage Rates

A. The requirements and provisions of all applicable laws and any amendments thereof or additions thereto as to the employment of labor, and to the schedule of minimum wage rates established in compliance with laws shall be a part of these Contract Documents. Copies of the wage schedules are included in PART II of these Supplementary Conditions. If, after the Notice of Award, it becomes necessary to employ any person in a trade or occupation not classified in the wage determinations, such person shall be paid at not less than such rates as shall be determined by the officials administrating the laws mentioned above. Such approved minimum rate shall be retroactive to the time of the initial employment of such person in such trade or occupation. Contractor shall notify Owner of Contractor's intention to employ persons in trades or occupations not classified in sufficient time for Owner to obtain approved rates for such trades or occupations.

B. The schedules of wages referred to above are minimum rates only, and Owner will not consider any claims for additional compensation made by Contractor because of payment by Contractor of any wage rate in excess of the applicable rate contained in these Contract Documents. All disputes between Contractor and employees of Contractor in regard to the payment of wages in excess of these specified in the schedules shall be resolved by Contractor.

C. The said schedules of wages shall continue to be the minimum rates to be paid during the life of this Agreement and a legible copy of said schedules shall be kept posted in a conspicuous place at the Site.

D. Both Federal and State schedules of minimum wage rates are included in PART II of these Supplementary Conditions. Where rates differ, the higher rates shall apply as a minimum for that trade.

PART II - FEDERAL AND STATE GOVERNMENT PROVISIONS

Federal and State Government Provisions included herein, have been selected from those to which specific references have been made elsewhere in the Contract Documents. Each and every other provision of law or clause required by law to be inserted in this Contract shall be deemed to be also inserted herein in accordance with paragraph 3.01.D of the Supplementary Conditions.

1.0 FEDERAL GOVERNMENT PROVISIONS

1.1 Federal Wage Rates

2.0. COMMONWEALTH OF MASSACHUSETTS PROVISIONS

2.1. Owner and Contractor agree that the following Commonwealth of Massachusetts Provisions apply to the work to be performed under this Contract and that these provisions supersede any conflicting provisions of this Contract.

2.2. Applicable provisions of Massachusetts General Laws and Regulations and/or the United States Code and Code of Federal Regulations govern this Contract and any provision in violation of the foregoing shall be deemed null, void and of no effect. Where conflict between Code of Federal Regulations and State Laws and Regulations exist, the more stringent requirement shall apply.

2.3. Special Provisions for Minority/Women Business Enterprises - The Department of Environmental Protection, Division of Municipal Services.

2.4. Commonwealth of Massachusetts Modified Supplemental Equal Employment Opportunity, Anti-Discrimination and Affirmative Action Program.

2.5. Commonwealth of Massachusetts Supplemental Equal Employment Opportunity, Anti-Discrimination and Affirmative Action Program - Contract Compliance Procedure.

2.6. Massachusetts General Laws

2.6.1 Chapter 30, Section 39F (3 Pages)

2.6.2 Chapter 30, Section 39G (3 Pages)

2.6.3 Chapter 30, Section 39I (1 Page)

2.6.4 Chapter 30, Section 39J (1 Page)

2.6.5 Chapter 30, Section 39L (1 Page)

2.6.6 Chapter 30, Section 39M (3 Pages)

2.6.7 Chapter 30, Section 39N (1 Page)

2.6.8 Chapter 30, Section 39O (1 Page)

2.6.9 Chapter 30, Section 39P (1 Page)

2.6.10 Chapter 30, Section 39Q (2 Pages)

2.6.11 Chapter 30, Section 39R (3 Pages)

2.6.12 Chapter 30, Section 39S (1 Page)

2.6.13 Chapter 82, Sections 40 and 40A through 40E (7 Pages)

2.6.14 Chapter 82A, Section 1 (1 Page)

2.6.15 Chapter 149, Section 34 (1 Page)

2.6.16 Chapter 149, Section 44J (2 Pages)

2.7. State Wage Rates

2.8. Diesel Retrofit Requirements

2.9. Massachusetts Construction Grants Policy Memoranda (Currently 16 Memoranda).

2.10. Department of Environmental Protection Policy for Review of Sewer Line/Water Supply Protection.

Federal Wage Rates to be Inserted Here

CONSTRUCTION BID SPECIFICATIONS
SPECIAL PROVISIONS FOR MINORITY/WOMEN BUSINESS ENTERPRISES
THE DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF MUNICIPAL SERVICES

I. In this contract, the percentage of business activity to be performed by minority/women business enterprise(s) shall not be less than the following percentages of the total contract price or the percentage submitted by the contractor in the Schedule of Participation, whichever is greater:

Minority Contractors 5.30%* Women Contractors 4.40%*.

*Note: The above referenced Federal Fair Share M/WBE goals apply for calendar year 2005, but are subject to periodic review by DEP and EPA and may change in subsequent calendar years.

II. DEFINITIONS

For the purpose of these provisions, the following terms are defined as follows:

A. Agency - The Department of Environmental Protection

B. Bidder - Any individual, partnership, joint venture, corporation, or firm submitting a price, directly or through an authorized representative, for the purpose of performing construction or construction related activities under a Contract.

C. Certificate of Work-Start Up - A letter to be signed by a principal contractor prior to performance of work by Minority and Women Business Enterprises under a Contract. (See attached Form EEO-DEP-290).

D. Compliance Unit - A subdivision of the Agency's Affirmative Action Office designated to ensure compliance under these provisions.

E. Contract Compliance Officer - The person(s) designated by the Agency to assist and make recommendations with respect to compliance with the provisions of this document.

F. Contractors - Any business that contracts or subcontracts for construction, demolition, renovation, survey, or maintenance work in the various classifications customarily used in work and that is acting in this capacity under the subject contract.

G. Construction Related Services - Those services performed at the work site ancillary to, and/or in support of, the construction work, such as hauling, trucking, equipment operation, surveying or other technical services, etc. For the purposes hereof, supply and delivery of materials (e.g. pre-cast concrete elements) to the site by a supplier who has manufactured those goods, or substantially altered them before re-sales shall be considered as "construction related services".

H. Construction Work - The activities at the work site, or labor and use of materials in the performance of constructing, reconstructing, erecting, demolishing, altering, installing, disassembling, excavating, etc, all or part of the work required by the Contract Documents.

I. Equipment Rental Firm - A firm that owns equipment and assumes actual and contractual responsibility for renting said equipment to perform a useful function of the work of the contract consistent with normal industry practice.

J. Grantee - An agency, person or political subdivision which has been awarded or received financial assistance by the Trust or the Agency.

K. Joint Venture - An agreement between SOMWBA certified M/WBE and a non-minority or non-WBE controlled enterprise.

1. A pairing of companies will be considered a MBE or WBE joint venture if the SOMWBA certified M/WBE which is part of the relationship has more than 51% of the profits that are derived from that project.

2. A joint venture between a certified M/WBE subcontractor and a non M/WBE subcontractor, in which the M/WBE for that proportion of the joint venture's contract equal to the M/WBE participation in the joint venture.

3. Whenever a general bid is filed by a joint venture with a certified M/WBE participant in the joint venture that does not exercise more than 51% control over management and profits, that joint venture shall be entitled to credit as a M/WBE for that portion of the joint venture's contract equal to the M/WBE participation in the joint venture. Minority As deemed by SOMWBA.

L. Letter of Intent – Certified document signed by the principal(s) of the Minority or Women Business Enterprise with respect to the work to be performed under contract.

M. Local Government Unit – A City, Town, or municipal district which applies for a loan under the Water Pollution Abatement Trust Program.

N. Material Supplier – A vendor certified by SOMWBA as a M/WBE in sales to supply industry from an established place of business or source of supply, and that vendor.

1. Manufactures goods from raw materials, or substantially utilizes them in the work, or substantially alters them before resale, entitling the general contractor to M/WBE credit for 100% of the purchase order.

2. Provides and maintains a storage facility for materials utilized in the work, entitling the general contractor to M/WBE credit for 10% of the purchase order.

O. M/WBE Activity Documentation – Contractor utilization of Minority and Women Business Enterprises will be documented on a monthly basis by review of the Payment Requisitions submitted by the Local Government Unit through their consultant on the Form-2000.

P. Minority and Women Business Enterprise (M/WBE) – Any business concern certified by the SOMWBA as a bona-fide M/WBE. A bona-fide M/WBE is a business whose minority group/women ownership interests are real, which have at least 51% ownership and control over management and operation.

Q. Percent of Total Price – Is the percentage to be paid to the M/WBE, work they perform, as compared to the total bid price.

R. SOMWBA – The State Office of Minority and Women Business Assistance.

S. Total Contract Price – The total amount of compensation to be paid for all materials, work or services rendered in the performance of the contract.

T. Trust – The Water Pollution Abatement Trust established by M.G.L. c.29.

III. REQUIREMENTS FOR CONTRACT AWARD

A. As a part of the contract bid documents, the contractor shall submit a schedule with accompanying letters of intent on the appropriate forms (See forms EEO-DEP-190 and EEO-DEP-191). The letter of intent shall include, among other things, a reasonable description of the work the M/WBE is proposing to perform and the prices the M/WBE proposes to charge for the work.

A letter of intent shall be jointly signed by the M/WBE and the primary contractor who proposes to use them in the performance of the Contract. The schedule shall list the M/WBEs with whom the contractor intends to subcontract and state the total price to be paid to each M/WBE as taken from each letter of intent submitted under this subsection.

B. As part of the bid proposal, the bidder shall submit a Schedule of Participation on the forms attached and shall list those M/WBEs the contractor intends to use in fulfilling the contract obligations, the nature of the work to be performed by each M/WBE subcontractor and the total price they are to be paid.

1. A listing of bona-fide services such as a professional, technical, consultant or managerial services, assistance in the procurement of essential personnel, facilities, equipment, materials, or supplies required for performance of the contract, and reasonable fees or commissions charged.

2. A listing of haulers, truckers, or delivery services, not the contractors, including reasonable fees for delivery of said materials or supplies to be included on the project.

C. As a part of the contract bid documents, the contractor shall submit the SOMWBA "Minority and Women Certification" as prepared by each M/WBE.

IV. REQUIREMENTS FOR MODIFICATION OR WAIVERS.

The bidder shall make every possible effort to meet the minimum requirements of M/WBE participation. If the percentage goals of M/WBE participation submitted by the bidder on its Schedule of Participation (EEO-DEP-190) does not meet the minimum requirements, the bid shall be rejected and found not to be eligible for award of the contract, unless the bidder is granted a waiver pursuant to this section.

In the event that a bidder is unable to meet the minimum M/WBE percentage goals, the bidder may submit a Request for Waiver (EEO-DEP-490). The Agency in conjunction with the project manager, Affirmative Action Compliance Unit, will make an assessment of the bidder's application for a waiver.

Within five (5) working days following bid opening, the bidder must submit by registered mail to the Agency detailed information as specified below to establish that they have made a good faith effort to comply with the percentage goals specified in Part I. In addition, the bidder must show that such efforts were undertaken well in advance of the time set for opening of bids to allow adequate response. If the information and documentation demonstrates that despite such efforts the bidder was/is unable to meet the M/WBE participation requirements, a waiver request may be submitted which provides the following:

A. A detailed record of the effort made to contact and negotiate with minority and/or woman owned businesses, including:

1. names, addresses and telephone numbers of all such companies contacted;

2. copies of written notices(s) which were sent to M/WBE potential subcontractors, prior to bid opening;

3. a detailed statement as to why each subcontractor contacted (i) was not willing to do the job or (ii) was not qualified to perform the work as solicited; and

4. in the case(s) where a negotiated price could not be reached the bidder should detail what efforts were made to reach an agreement on a competitive price;

5. copies of advertisements, dated not less than ten (10) days prior to bid opening, as appearing in general publications, trade-oriented publications, trade-oriented publications, and applicable minority/ women-focused media detailing the opportunities for participation.

B. The Agency may require the bidder to produce such additional information as it deems appropriate.

C. No later than fifteen (15) days after submission of all required information and documentation, a decision as to whether a waiver will be granted will be made in writing to the bidder. If the waiver request is denied, the facts upon which a denial is based will be set forth in writing. A bidder who is dissatisfied with the decision may appeal that decision.

D. If it is determined that one or more of the M/WBE contractors submitted by the bidder on form EEO-DEP-190 is not SOMWBA certified or certified by the Local Government Unit in accordance with the provisions Executive order 237, the bidder shall have 10 working days, following notification, to either find a certified M/WBE contractor to perform work equal to or greater than that of the uncertified contractor or to submit a waiver request pursuant to this section.

V. MINORITY BUSINESS ENTERPRISES/WOMEN BUSINESS ENTERPRISES PARTICIPATION

A. Reporting Requirements

1. The contractor's utilization of Minority and Women Business Enterprises will be documented based upon submittal of the Local Government Unit's monthly Payment Requisitions as reported on Form-2000. The Form-2000 form will show all minority and women businesses performing work on the project regardless of any billing activity for that month. For auditing and accounting purposes, the General Contractor periodically may be required to submit copies of canceled checks verifying that payments have been made to the M/WBE as listed on the schedule. The General Contractor may also be required to submit current schedules on utilization

of all M/WBE to indicate when their services will commence and be billed for.

2. The contractor is required to submit a completed Certificate of Work Start Up by Minority/Women Business Enterprise within ten (10) days of work start-up for each minority/women business identified in the "Schedule of Participation of MBEs and WBEs" or working on the contract activity. The form must be signed by both the Contractor and the M/WBE prior to submittal to the Project Engineer and the Compliance Coordinator (See Attached Form EEO-DEP-290).

3. The contractor shall not perform any work designated for the named M/WBE on the Schedule submitted under Part I hereof, with it's own organization or subcontractor(s) of any other contractor, without the prior written approval of the Agency.

4. During the life of the Contract, the Contractor's fulfillment of the percentage requirements in Part I shall be determined with reference to the Contract price as follows:

   A. If the price in the Contract executed exceeds the base bid price (e.g., because an alternate was selected or because unit prices were used in awarding the Contract), the Contractor shall submit for approval by the Agency a revised Schedule of Participation by MBEs and WBEs satisfying the percentage requirements and such other information concerning additional M/WBE participation as may be requested by the Agency.

   B. If the Contract price increases after execution due to change orders or other adjustments, the Agency may require the Contractor to subcontract additional work or to purchase additional goods and services from Minority and Women Business Enterprises up to the percentages stated in Part I.

VI. COMPLIANCE

A. If the Schedule or any of the Letters of Intent are materially incomplete, the Local Government Unit shall rescind its vote of award, treat the bid informal as to substance and reject the bid. If the bid is incomplete in any other respect than the Schedule the Local Government Unit with the approval of the Agency may waive the informalities upon satisfactory completion of the required information by the Contractor and the M/WBE as applicable.

B. If the Local Government Unit finds that the percentage of M/WBE participation submitted by the contractor on its Schedule does not meet the percentage requirement in Part I, it shall rescind its vote of award and find such contractor not to be eligible for award of the contract.

C. The Contractor shall not perform with its own organization, or subcontract to any other primary or subcontractor any work designated for the named M/WBE's on the schedule submitted by the prime contractor under Part III without the approval the Agency.

D. A Contractor's compliance with the percentage requirement in Part I shall continue to be determined by reference to the required percentage of the total contract price as stated in Section I even though the total of actual contract payments may be greater or less than the bid price.

E. If the general contractor for reasons beyond its control cannot comply with Part III in accordance with the Schedule submitted under Part III, Section B, the contractor must submit to the Compliance Unit as soon as they are aware of the deficiency, the reason for its inability to comply. Proposed revisions to the Schedule stating how the contractor intends to meet its obligations under these conditions must be submitted within ten working days of notification.

F. Any change or substitution of the officers or stockholders in a M/WBE organization that reduces the ownership or control to under 51% by minority person(s)/Woman or less than the requisite percentage, shall be grounds for immediate rescission of the M/WBE status. Contractor's compliance with this Special Provision obligation will be considered terminated immediately upon notification that the M/WBE designation has been rescinded, and the Contractor shall proceed by notifying SOMWBA and the Compliance Unit as stated above in subsection (C).

G. If a M/WBE listed by the general bidder in its Schedule of M/WBE contractors fails to obtain a performance or payment bond requested by the general bidder, said failure shall not entitle the bidder to avoid the requirements of Part III (A). After a general bidder has been awarded the contract, he shall not change the M/WBE listed in its Schedule at the time of the award or make any other such substitutions without the written approval of the Agency.

H. The contractor and the M/WBE's shall comply with all reporting requirements of the Compliance Unit to demonstrate ongoing compliance with the Schedule of Participation and Letters of Intent.

VII. EQUAL EMPLOYMENT OPPORTUNITY FOR THE HANDICAPPED

The contractor shall comply with the provisions of Executive Order No. 143 entitled "Equal Employment Opportunity for the Handicapped" which is herein incorporated by reference and made a part of this contract. In connection with the performance of work under this contract, the contractor, sub-contractors and suppliers of goods and services must give written notice of their commitments under this Article to any Labor Union, association or brotherhood with which they have a collective bargaining contract or other

agreement. A copy of such notice must be furnished to the Grantee at the time of signing of the contract.

VIII. SANCTIONS

A. If the contractor does not comply with the terms of these Special Provisions, the Awarding Authority may (1) suspend any payment for the work that should have been performed by a M/WBE pursuant to the schedule, or (2) require specific performance of the contractor's obligation by requiring the contractor to subcontract with a M/WBE for any contract or specialty item at the contract price established for that item in the proposal submitted by the Contractor.

B. To the extent that the contractor has not complied with the terms of these Special Provisions, the Awarding Authority may retain in connection with Estimates and Payments an amount determined by multiplying the bid price of this contract by the percentage in Section I, less the amount paid to M/WBE's for work performed under the contract and any payments already suspended under VIII A.

C. In addition, or as an alternative, to the remedies under VIII-A and B, the Awarding Authority may suspend, terminate or cancel this contract, in whole or in part, or may call upon the contractor's surety to perform all terms and conditions in the contract, unless the contractor is able to demonstrate his compliance with the terms of these Special Provisions, and further deny to the contractor, the right to participate in any future contracts awarded by the Awarding Authority for a period of up to three years.

D. In any proceeding involving the imposition of sanctions by the Awarding Authority, no sanctions shall be imposed if the Awarding Authority finds that the contractor has taken every possible measure to comply with these Special Provisions or that some other justifiable reason exists for waiving these Special Provisions in whole or in part.

E. The contract shall provide such information as is necessary in the judgement of the Awarding Authority to ascertain its compliance with the terms of these Special Provisions.

IX. HEARINGS AND APPEALS

A. No sanctions under Section VIII shall be imposed by the Awarding Authority except in an adjudicatory proceeding under Chapter 30A of the General Laws.

B. A contractor shall have the right to request suspension of any sanctions imposed under Section VIII upon demonstrating that he is in compliance with these Special Provisions.

APPROVED BY THE EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS ("EOEA"):

MINORITY AND WOMEN BUSINESS ENTERPRISE PARTICIPATION
MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF MUNICIPAL SERVICES

SCHEDULE OF PARTICIPATION FOR SRF CONSTRUCTION

Project Title: _____ **Project Location:** _____

Minority Business Enterprise Participation in the SRF Loan Work

Name & Address of MBE	Nature of Participation	Dollar Value of Participation
1.		
2.		
3.		
	Total MBE Commitment:	**$**
Percentage MBE Participation = (Total MBE Commitment) / (Bid Price) =		**%**

Women Business Enterprise Participation in the SRF Loan Work

Name & Address of WBE	Nature of Participation	Dollar Value of Participation
1.		
2.		
3.		
	Total WBE Commitment:	**$**
Percentage WBE Participation = (Total WBE Commitment) / (Bid Price) =		**%**

The Bidder agrees to furnish implementation reports as required by the Awarding Authority to indicate the M/WBE(s) which it has used or intends to use. Breach of this commitment constitutes a breach of the contract.

Name of General Bidder: _____

Date: _____ By: _____
Signature

NOTE: Participation of a Minority-owned or Women-owned enterprise may be counted in only their certified category; the same dollar participation cannot be used in computing the percentage of Minority participation and again of Women participation.

LETTER OF INTENT FOR SRF CONSTRUCTION

This form is to be completed by the MBE and WBE and must be submitted by the Bidder as part of the bid. A separate form must be completed for each MBE and WBE involved in the project.

Project Title: _____ Project Location: _____

TO: _____
(Name of Bidder)

FROM: _____
(Please Indicate Status [ ] MBE or [ ] WBE)

° I/we intend to perform work in connection with the above project as (check one):

[ ] An individual
[ ] A corporation
[ ] Other (explain): _____
[ ] A partnership
[ ] A joint venture with: _____

° It is understood that if you are awarded the contract, you intend to enter into an agreement to perform the activity described below for the prices indicated.

MBE/WBE PARTICIPATION

Description of Activity	Date of Project Commencement	$ Amount	% Bid Price
		$	%

° The undersigned certify that they will enter into a formal agreement upon execution of the contract for the above referenced project.

BIDDER	**MBE/WBE**
(Authorized Original Signature) Date ADDRESS:	(Authorized Original Signature) Date ADDRESS:
TELEPHONE #:	TELEPHONE #:
FEIN:	FEIN:

ORIGINALS:

- **Compliance Mgr. City/Town Project Location**
- **DEP Program Manager for DEP's AAO Director**

*** Attach a copy of current (within 2 years) SOMWBA Certification**

If it is determined that one or more of the MBE/WBE subcontractors as submitted by the Bidder on this form is not SOMWBA certified or certified by the Local Government Unit in accordance with the provisions of Executive Order 237, the Bidder shall have an opportunity, following notification, to either find a certified MBE/WBE subcontractor to perform work equal to or greater than that of the uncertified subcontractor or to submit a waiver request.

CERTIFICATE OF WORK START-UP FOR SRF CONSTRUCTION

This form is to be submitted by the General Contractor to the DEP AAO Director via DEP Program Manager within 10 days after commencing work by the MBE or WBE. A separate form must be filed for each MBE/WBE involved in the project. Be sure to indicate whether this form is being filed in accordance with the original or a revised schedule of participation.

Contract #: _____ Date: _____ SRF #: _____

Contract Title: _____ Project Location: _____

General Contractor: _____

Subcontractor: _____

(Please indicate [ ] MBE or [ ] WBE)

DESCRIPTION OF MBE/WBE WORK (LETTER OF INTENT)

Description of Activity and Total Participation*

MBE/WBE Work to Commence on: _____ MBE/WBE Amount: $ _____

[ ] ORIGINAL Schedule OR [ ] REVISED Schedule, DATED: _____

If the work start up date or description of activity are different from that listed on the Letter of Intent or Contract, please explain: (if more space is needed continue on back of sheet)

I hereby certify that all work listed in the Contract/Letter of Intent (or approved changes thereto as explained above) will/have commence(d) on _____ And that the above amount of these services is the true amount.

GENERAL CONTRACTOR	SUBCONTRACTOR
(Authorized Original Signature) Date	(Authorized Original Signature) Date
ADDRESS:	ADDRESS:
TELEPHONE #:	TELEPHONE #:
FEIN:	FEIN:

*** Attach a copy of the Letters of Intent and the Signed Contract.**

REQUEST FOR WAIVER FOR SRF CONSTRUCTION

Upon exhausting all known sources and making every possible effort to meet the minimum requirements for MBE/WBE participation, the Bidder may seek relief from these requirements by filing this form (completed) NO LATER THAN FIVE (5) working days following bid opening. Failure to comply with this process shall be cause to reject the bid thereby rendering the Bidder not eligible for award of the contract.

General Information

Project Title: _____ Project Location: _____

Bid Opening (time/date) _____

Bidder: _____

Mailing Address: _____

Contact Person: _____ Telephone No. ( ) _____ Ext. _____

Minimum Requirements

The Bidder must show that good faith efforts were undertaken to comply with the percentage goals as specified. The firm seeking relief must show that such efforts were taken appropriately in advance of the time set for opening bid proposals to allow adequate time for response(s) by submitting the following:

A. A detailed record of the effort made to contact and negotiate with minority and/or woman owned businesses, including:

1. names, addresses, telephone numbers and contact dates of all such companies contacted;

2. copies of dated written notice(s) which were sent to MBE/WBE potential subcontractors prior to application deadlines;

3. copies of dated advertisements as appearing in general publications, trade-oriented publications, and applicable minority/women-focused media detailing the opportunities for participation;

4. a detailed statement as to why each subcontractor contacted (i) was not willing to do the job or (ii) was not qualified to perform the work as solicited; and

5. in the case(s) where a negotiated price could not be reached the bidder should detail what efforts were made to reach an agreement on a competitive price.

B. The Agency may require the Bidder to produce such additional information as it deems appropriate and may obtain whatever other information it deems necessary to reach a conclusion from any source.

C. No later than fifteen (15) days after receipt of all necessary information and documentation, a decision will be made in writing to the bidder. If the waiver request is denied, the facts upon which a denial is based will be set forth. A Bidder who is dissatisfied with the decision may then appeal that decision to the EOEA.

Special Note

If it is determined that one or more of the MBE/WBE subcontractors as submitted by the Bidder on form EEO-DEP-190C is not SOMWBA certified or certified by the Local Government Unit in accordance with the provisions of Executive Order 237, the Bidder shall have 10 working days, following notification, to either find a certified MBE/WBE subcontractor to perform work equal to or greater than that of the uncertified or submit a waiver request.

CERTIFICATION

The undersigned herewith certifies that the above information and appropriate attachments are true and accurate to the best of my knowledge and that I have been authorized to act on behalf of the Bidder in this matter.

_____ _____

(authorized original signature) DATE

MAILING INSTRUCTIONS: (CERTIFIED MAIL)

TO: DEP-DMS PROGRAM MANAGER
ONE WINTER STREET – 5TH FLOOR
BOSTON, MA 02108-4747

CC: DEP - CRU DIRECTOR
ONE WINTER STREET - 4TH FLOOR
BOSTON, MA 02108-4747

MINORITY AND WOMEN BUSINESS ENTERPRISE PARTICIPATION
MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF MUNICIPAL SERVICES

CONTRACT COMPLETION VERIFICATION FOR SRF CONSTRUCTION

Within 30 days of submission by the General Contractor of the FINAL PAY ESTIMATE, verification of all MBE/WBE participation in the contract must be submitted by the Owner to the Department of Environmental Protection.

This form must be completed (original signatures only) and forwarded to the DEP AAO Director, 4th Floor, One Winter Street, Boston, MA 02108 with one (1) copy to the DEP Program Manager.

****

OWNER

Name of Owner

Contract Name/Number

Authorized Representative (Type Name & Title)

Authorized Representative (Signature)

Date

****

GENERAL CONTRACTOR

Company Name

(FEIN)

Telephone No.

Contract Name/Number

Street

Contract Acceptance Date

City/Town

Zip

$ Contract Amount

(Type Name and Title)

Signature

Date

****

[MBE] [WBE] SUBCONTRACTOR (Circle One)

Company Name

(FEIN)

$ Subcontract Amount

1st Payment Date

Street

$ Total Received

Last Payment Date

City/Town

Zip

Telephone No.

(Type Name and Title)

Signature

Date

Use separate copies of this form for each MBE/WBE contractor

March, 2000

EEO-DEP-590C

Commonwealth of Massachusetts
Vendor Information Form – SRF Construction

Awarding Authority:

Contract Name: | Contract Project Number:

Company Name:

Street Address 1:

Street Address 2:

City: | State: | Zip Code:

Telephone Number: ( ) - | Fax Number: ( ) - | E-mail Address:

WWW Address: | Dunn & Bradstreet Number: | Federal Employer ID No.

County: | Contact Person:

What geographic area does your firm service?

- ☐ Metropolitan Boston
- ☐ Southeastern Mass
- ☐ Western Mass
- ☐ North of Boston
- ☐ Massachusetts (Entire State)
- ☐ Rhode Island
- ☐ New Hampshire
- ☐ Connecticut
- ☐ Vermont
- ☐ New Jersey
- ☐ New York
- ☐ Connecticut

Primary SIC Code | **Secondary SIC Code**

Date company was founded

Gross Annual Sales

- ☐ $0 - $49,999
- ☐ $50,000 - $99,999
- ☐ $100,000 - $ $499,999
- ☐ $500,000 - $999,999
- ☐ $1,000,000 - $2,499,999
- ☐ $2,500,000 - $4,999,999
- ☐ $5,000,000 - $10,000,000
- ☐ Over $10,000,000

Number of Employees

- ☐ 1- 10 employees
- ☐ 10 – 20 employees
- ☐ 20 – 30 employees
- ☐ 30 – 50 employees
- ☐ OVER 50 employees

Bonding Capacity

- ☐ $0 - $49,999
- ☐ $50,000 - $99,999
- ☐ $100,000 - $ $499,999
- ☐ $500,000 - $999,999
- ☐ $1,000,000 - $2,499,999
- ☐ $2,500,000 - $4,999,999
- ☐ $5,000,000 - $10,000,000
- ☐ Over $10,000,000

Business Structure

- ☐ Profit
- ☐ Non-Profit
- ☐ S Corporation
- ☐ C Corporation
- ☐ Sole Proprietor
- ☐ Partnership
- ☐ Joint Ventures
- ☐ LLC

Are you a minority-owned firm?	☐ Yes	☐ No
Are you a women-owned firm?	☐ Yes	☐ No
Are you certified by the State Office of Minority and Women Business Assistance (SOMWBA)?	☐ Yes	☐ No
If you are SOMWBA certified are you certified as an? ☐ MBE	☐ WBE	☐ DBE
Are you certified by Division of Capital Assets Management and Maintenance formerly know as DCPO?	☐ Yes	☐ No
Are you pre-qualified with the Massachusetts Highway Department?	☐ Yes	☐ No

Revised 09/11/00

Commonwealth of Massachusetts

Vendor Information Form - SRF Construction (Page 2)

Largest State Contract:

- ☐ $0 - $49,999
- ☐ $50,000 - $99,999
- ☐ $100,000 - $ $499,999
- ☐ $500,000 - $999,999
- ☐ $1,000,000 - $2,499,999
- ☐ $2,500,000 - $4,999,999
- ☐ $5,000,000 - $10,000,000
- ☐ Over $10,000,000

Contracting Agency for Largest State Contract:

Company Comments: (Include a brief description of the goods and/or services your company provides.

Name of President or CEO	Date:
Telephone Number:	
Name of Individual Completing the Form	Date:
Telephone Number:	

(For use in Division of Municipal Services Loan-Assisted Projects)

THE COMMONWEALTH OF MASSACHUSETTS
MODIFIED
SUPPLEMENTAL EQUAL EMPLOYMENT OPPORTUNITY
ANTI-DISCRIMINATION AND AFFIRMATIVE ACTION PROGRAM

I. For purposes of this contract, "minority" refers to Asian-American, Blacks, Spanish Surnamed Americans, North American Indians, and Cape Verdeans. "Commission" refers to the Massachusetts Commission Against Discrimination.

II. During the performance of this contract, the Contractor and all of (his) Sub-contractors (hereinafter collectively referred to as the Contractor), for himself, his assignees, and successors in interest, agree as follows:

1. In connection with the performance of work under this contract, the Contractor shall not discriminate against any employee or applicant for employment because of race, color, religious creed, national origin, age or sex. The aforesaid provision shall include, but not be limited to, the following: employment upgrading, demotion, or transfer: recruitment advertising; recruitment layoff; termination; rates of pay or other forms of compensation; conditions or privileges of employment; and selection for apprenticeship. The Contractor shall post hereafter in conspicuous places, available for employees and applicants for employment, notices to be provided by the Commission setting forth the provisions of the Fair Employment Practices Law of the Commonwealth (M.G.L. Chapter 151B).

2. In connection with the performance of work under this contract, the Contractor, shall undertake in good faith affirmative action measures designed to eliminate any discriminatory barriers in the terms and conditions of employment on the grounds of race, color, religious creed, national origin, age or sex, and to eliminate and remedy any effects of such discrimination in the past. Such affirmative action shall entail positive and aggressive measures to ensure equal opportunity in the areas of hiring, upgrading, demotion or transfer, recruitment, layoff or termination, rate of compensation, and in-service or apprenticeship training programs. This affirmative action shall include all action required to guarantee equal employment opportunity for all persons, regardless of race, color, religious creed, national origin, age, or sex. A purpose of this provision is to ensure to the fullest extent possible an adequate supply of skilled tradesmen for this and future Commonwealth public construction projects

III. 1. As part of his obligation of remedial action under the foregoing section, the Contractor shall maintain on this project a not less than 5 percent ratio of minority employee man hours to total man hours in each job category including but not limited to bricklayers, carpenters, cement masons, electricians, ironworkers, operating engineers, and those "classes of work" enumerated in Section 44C of Chapter 149 of the Massachusetts General Laws.

2. In the hiring of minority journeymen, apprentices, trainees and advanced trainees, the Contractor shall rely on referrals from a multi-employer affirmative action program approved by the Commission, traditional referral methods utilized by the construction industry, and referrals from agencies, not more than three in number at any one time, designated by the Liaison Committee or the Commission.

IV. 1. At the discretion of the Commission there may be established for the life of this contract a body to be known as the Liaison Committee. The Liaison Committee shall be composed of one representative each from the agency or agencies administering this project, hereinafter called the administering agency, the Commission and such other representatives as may be designated by the Commission in conjunction with the administering agency.

2 The Contractor (or his agent, if any, designated by him as the on-site equal employment opportunity officer) shall recognize the Liaison Committee as an affirmative action body, and shall establish a continuing working relationship with the Liaison Committee, consulting with the Liaison Committee on all matters related to minority recruitment, referral, employment and training.

3. The Contractor shall prepare projected manning tables on a quarterly basis. These shall be broken down into projections, by week, or workers required in each trade. Copies shall be furnished one week in advance of the commencement of the period covered, and also when updated, to the Commission and Liaison Committee.

4. Records of employment referral orders, prepared by the Contractor, shall be mad available to the Commission and to the Liaison Committee on request.

5. The Contractor shall prepare weekly reports in a form approved by the Commission of hours worked in each trade by each employee, identified as minority or non-minority. Copies of these shall be provided at the end of each such week to the Commission and to the Liaison Committee.

V. If the Contractor shall use any subcontractor on any work performed under this contract, he shall take affirmative action to negotiate with qualified minority subcontractors. This affirmative action shall cover both pre-bid and post-bid periods. It shall include notification to the Office of Minority Business Assistance (within the Executive Office of Communities and Development) or its designee, while bids are in preparation, of all products, work or services for which the Contractor intends to negotiate bids.

VI. In the employment of journeymen, apprentices, trainees and advanced trainees, the Contractor shall give preference, first, to citizens of the Commonwealth who have served in the armed forces of the United States in time of war and have been honorably discharged therefrom or released from active duty therein, and who are qualified to perform the work to which the employment relates, and, secondly, to citizens of the Commonwealth generally, and, if such cannot be obtained in sufficient numbers, then to citizens of the United States.

VII. A designee of the Commission and a designee of the Liaison Committee shall each have right of access to the construction site.

VIII. Compliance with Requirements

The Contractor shall comply with the provisions of Executive Order No. 74, as amended by Executive Order No. 116 dated May 1, 1975, and of Chapter 151B as amended, of the Massachusetts General Laws, both of which are herein incorporated by reference and made a part of this contract.

IX. Non-Discrimination

The Contractor, in the performance of all work after award, and prior to completion of the contract work, will not discriminate on grounds of race, color, religious creed, national origin, age or sex in employment practices, in the selection or retention of subcontractors, or in the procurement of materials and rentals of equipment.

X. Solicitations for Sub-Contracts, and for the Procurement of Materials and Equipment

In all solicitations either by competitive bidding or negotiation made by the Contractor either for work to be performed under a subcontract or for the procurement of materials or equipment, each potential subcontractor or supplier shall be notified in writing by the Contractor of the Contractor's obligations under this contract relative top non-discrimination and affirmative action.

XI. Bidders Certification Requirement

1. The following certification statement will be inserted in the bid document just above the bidder's signature:

"The Bidder hereby certifies he shall comply with the minority manpower ratio and specific action steps contained in the supplemental Equal-Employment Opportunity Anti-Discrimination and Affirmative Action Plan (Supplemental EEO) attached hereto, including compliance with the minority contractor compliance specified therein. The contractor receiving the award of the contract shall be required to obtain from each of its subcontractors and submit to the contracting agency prior to the performance of any work under said contract a certification by said subcontractor, regardless of tier, that it will comply with the minority manpower ratio and specific affirmative action steps contained in the Supplemental EEO."

XII. Contractor's Certification

The Contractor's certification form must be signed by all successful low bidder(s) prior to award by the contracting agency. (See attachment).

XIII. Compliance-Information, Reports and Sanctions

1. The Contractor will provide all information and reports required by the contracting agency or the Commission on instructions issued by either of them and will permit access to its facilities and any books, records, accounts and other sources of information which may be determined by the Commission to affect the employment of personnel. This provision shall apply only to information pertinent to the Commonwealth's supplementary affirmative action contract requirements. Where information required is in the exclusive possession of another who fails or refuses to furnish this information, the Contractor shall so certify to the contracting agency or the Commission as appropriate and shall set forth what efforts he has made to obtain the information. For the purpose of this Article XIII, the Commission's designated agent is the contracting agency.

2. Whenever the contracting agency, the Commission, or the Liaison Committee believes the General Contractor or any Subcontractor may not be operating in compliance with the terms of this Section, the Commission directly, or through its designated agent, shall conduct an appropriate investigation, and may confer with the parties, to determine if such Contractor is operating in compliance with the terms of this Section. If the Commission or its agent finds the General Contractor or any subcontractor not in compliance, it shall make a preliminary report on non-compliance, and notify such Contractor in writing of such steps as will in the judgment of the Commission or its agent bring such Contractor into compliance. In the event that such Contractor fails or refuses to fully perform such steps, the Commission shall make a final report of non-compliance, and recommend to the contracting agency the imposition of one or more of the sanctions listed below. If, however, the Commission believes the General Contractor or any Subcontractor has taken or is taking every possible measure to achieve compliance, it shall not make a final report of non-compliance. Within fourteen days of the receipt of the recommendations of the Commission, the contracting agency shall move to impose one or more of the following sanctions, as it may deem appropriate to attain full and effective enforcement.

   a. The recovery by the contracting agency from the General Contractor of 1/100 of 1% of the contract award price or $1000 whichever sum is greater, in the nature of liquidated damages or, if a Sub- contractor is in non-compliance, the recovery by the contracting agency from the General Contractor, to be assessed by the General Contractor as a back charge against the Subcontractor, of 1/10 of 1% of the subcontract price, or $400 whichever sum is greater, in the nature of liquidated damages, for each week that such party fails or refuses to comply;

   b. The suspension of any payment or part thereof due under the contract until such time as the General Contractor or any Subcontractor is able to demonstrate his compliance with the terms of the contract;

c. The termination, or cancellation, of the contract, in whole or in part, unless the General Contractor or any Subcontractor is able to demonstrate within a specified time his compliance with the terms of the contract;

d. The denial to the General Contractor or any Subcontractor of the right to participate in any future contracts awarded by the contracting agency for a period of up to three years.

3. If at any time after the imposition of one or more of the above sanctions a Contractor is able to demonstrate that he is in compliance with this Section, he may request the contracting agency, in consultation with the Commission, to suspend the sanctions conditionally, pending a final determination by the Commission as to whether the Contractor is in compliance. Upon final determination of the Commission, the contracting agency, based on the recommendation of the Commission, shall either lift the sanctions or reimpose them.

4. Sanctions enumerated under Sections XI-2 shall not be imposed by the contracting agency except after an adjudicatory proceeding, as that term is used M.G.L. c. 30A, has been conducted. No investigation by the Commission or its agent shall be initiated without prior notice to the Contractor.

XIV. Severability

The provisions of this section are severable, and if any of these provisions shall be held unconstitutional by any court of competent jurisdiction, the decision of such court shall not affect or impair any of the remaining provisions.

STATE AND STATE ASSISTED CONTRACTS WITHIN THE COMMONWEALTH OF MASSACHUSETTS

The following percentages shall apply:		No Less Than
Boston:	Impact Area (Jamaica Plain (part), Mattapan, South Cove, Chinatown, Bay Village, Roxbury, Dorchester, South End)	30%
	Others	10%
Cambridge		12%
New Bedford		18%
Springfield		10%
All other cities and towns		5%

12-2-75

A. Contractors' Certification

A contractor will not be eligible for award of a contract unless such contractor has submitted the following certification, which is deemed a part of the resulting contract:

CONTRACTOR'S CERTIFICATION

_____ certifies that:
Contractor

1. it tends to use the following listed construction trades in the work under the contract _____ ; and

2. will comply with the minority manpower ratio and specific affirmative action steps contained herein; and

3. will obtain from each of its subcontractors and submit to the contracting agency prior to the award of any subcontract under this contract and subcontractor certification required by these bid conditions.

_____
(Signature of authorized representative of contractor)

B. Subcontractors' Certification

Prior to the award of any subcontract, regardless of tier, the prospective subcontractor must execute and submit to the Prime Contractor the following certification, which will be deemed a part of the resulting subcontract:

SUBCONTRACTORS' CERTIFICATION

_____ certifies that:
Subcontractor

1. It tends to use the following listed construction trades in the work under the subcontract _____ ; and

2. will comply with the minority manpower ratio and specific affirmative action steps contained herein; and

3. will obtain from each of the subcontractors prior to the award of any subcontract under this subcontract the subcontractor certification required by these bid conditions.

_____
(Signature of authorized representative of subcontractor)

In order to ensure that the said subcontractors' certification becomes a part of all subcontracts under the prime contract, no subcontract shall be executed until an authorized representative of the contracting agency administering this project has determined, in writing, that the said certification has been incorporated in such subcontract, regardless of tier. Any subcontract executed without such written approval shall be void.

THE COMMONWEALTH OF MASSACHUSETTS
SUPPLEMENTAL EQUAL EMPLOYMENT OPPORTUNITY, ANTI-DISCRIMINATION AND AFFIRMATIVE ACTION PROGRAM

CONTRACT COMPLIANCE PROCEDURE

Pursuant to Section XI of the Commonwealth of Massachusetts Supplemental Equal Employment Opportunity, Anti-Discrimination and Affirmative Action Program for construction contracts, the administering and/or the contracting agency's Contract Compliance Officer or the Affirmative Action Staff is the designated agent of the Massachusetts Commission Against Discrimination (MCAD). The responsibilities of the Contract Compliance Officer (MCAD agent) are to conduct compliance monitoring and enforcement of the program requirements.

To ensure that the minority workforce utilization goals on all construction contracts in excess of $50,000. as well as minority/women business enterprise (M/WBE) goals are enforced effectively, the following procedures will be followed commencing with the initial contract specifications preparation and continuing throughout the life of the contract on all projects:

1. Contract Specifications
2. Bid Advertisement
3. Pre-Bid Conference
4. Pre-Construction Conference
5. Reporting System
6. Monitoring System
7. Identifying and Reporting of Non-Compliance
8. Non-Compliance Procedures
9. Recommendation and Sanction

1. CONTRACT SPECIFICATION

At the initial stage of contract specification preparation, the Contract Compliance Officer of the contracting agency must ensure the incorporation of the proper EEO/AA provisions in the general conditions of the contract.

2. BID ADVERTISEMENT

The Contract Compliance Officer will review all Bid advertisements before the notice is published to ensure that reference to the EEO/AA requirements is included.

3. PRE-BID CONFERENCE

At the Pre-bid Conference, the Contract Compliance Officer will inform potential bidders of the EEO/AA requirements of the contract. These include, but are not limited to the following:

a. Adhering to minority workforce utilization and M/WBE participation goals for the contract.

b. Informing potential bidders that the requirements are for the life of the contract.

c. Informing potential bidders that the Sub-Contractors are obligated to comply with the same requirements and it is the responsibility of the Prime Contractor to ensure that Sub-Contractors comply with the contract provisions.

d. Informing potential bidders of the required documents and forms that they must sign and submit with their bids, i.e., Bidder's Certification: Schedules of M/WBE Participation: M/WBE Letter of Intent: etc..

e. Making information and/or resources available for M/WBE: i.e., State Office of Minority/Women Business Assistance (SOMWBA): New England Minority Supplier Development Council, Small Business Development Corporation (SBDC); and any other information that will assist the Prime Contractor in attaining the stated goals for M/WBE compliance.

f. Making available minority workforce referral agencies such as Community agencies, etc..

g. Question and answer period.

4. PRE-CONSTRUCTION CONFERENCE

At the Pre-Construction Conference, the Contract Compliance Officer will discuss the specific EEO/AA requirements with the Prime and Sub-Contractors. The Contract Compliance Officer will also:

a. Distribute all necessary documents and reporting forms as required under the contract provisions.

b. Review EEO/AA requirements and goals in detail.

c. Explain the contractor's obligations to comply with the EEO/AA requirements and goals.

d. Emphasize the EEO/AA provisions in Sections III and Section XIV of the Modified Supplemental Equal Employment Opportunity, Anti-Discrimination and Affirmative Action Program.

e. Provide information such as resources of minority workforce and M/WBE referrals to assist the contractor in achieving compliance with the contract obligations.

f. Review the necessary reporting forms, i.e. Contractor's Quarterly Projected Workforce Table (Form CAD 85-1), Contractor's Weekly Workforce Utilization Report (Form CAD 85), Contractor Certification (Attachment A-1 for Prime Contractor, (Attachment A-2 for Sub-Contractor), etc..

g. Secure the name and title of the EEO/AA Officer and Project Manager from the contractor with a letter signed by the Chief Executive Officer of the Contractor.

5. REPORTING SYSTEM

To ensure the proper compliance of the contractor's obligations in the utilization of his/her workforce, the following reporting system will be implemented:

a. Contractors must submit the Contractor's Quarterly Projected Workforce Table (CAD 85-1) prior to the commencement of work and no later than five (5) working days prior to the start of each new quarter to the Contract Compliance Officer.

b. Contractors must submit the Contractor's Weekly Workforce Utilization Report (CAD 85) to the Contract Compliance Officer no later than the following Tuesday of each week.

c. The Prime Contractor is responsible for the submission of all reports from all of his/her sub-contractors.

d. The Contracting/Administering Agency's Contract Compliance Officer must prepare the Agency's Monthly Contract Compliance Report (CAD75) for Minority Workforce Utilization and M/WBE Contract Activities Report and send them to MCAD no later than the 15th of the month following the end of each quarter.

6. MONITORING SYSTEM

In order for the Contract Compliance Officer to effectively implement and enforce the EEO/AA requirements, the following mechanism will be utilized:

a. Review of the weekly utilization reports submitted by the contractors.

b. Verify the date on the weekly reports, by conducting on-site monitoring.

(1) On-site monitoring will be conducted either on a weekly or daily basis according to specific projects.

(2) When conducting on-site monitoring, the Contract Compliance Officer will initially meet with the contractor's on-site supervisor to obtain the necessary data.

(3) The Contract Compliance Officer will conduct a visual head count of all the workers on-site used by each contractor, identifying the minority workers for each trade. If needed, an interview of each worker may be conducted to verify the information submitted by the contractor.

7. IDENTIFYING AND REPORTING OF NON-COMPLIANCE

When the contractor's Weekly Workforce Utilization Reports indicate that the contractor is in a condition of non-compliance and it is then verified by the Contract Compliance Officer's actual on-site visit, the procedures are as follows:

a. The Contract Compliance Officer will notify and meet with the contractor to remedy their conditions of non-compliance in and attempt to bring the contractor into compliance. All activities with the contractor must be documented.

b. If the Contract Compliance Officer is unable to bring the contractor into compliance, then the Contract Compliance Officer shall send a preliminary notification of apparent non-compliance, citing specific sections of the contract EEO/AA provisions to the Prime Contractor and/or the Sub-Contractor via Registered Mail, detailing the necessary remedies and granting a time-frame of (14) days for the contractor to come into compliance.

c. If the contractor remains in non-compliance, then the Contract Compliance Officer shall notify the MCAD and issue a second notice of apparent non-compliance, informing the contractor that a formal non-compliance investigation will be conducted. This will include a request for specific records and documentation that the contractor must submit within the specific compliance time frame of 14 days.

8. NON-COMPLIANCE PROCEDURES

a. Upon the completion of the investigation, if it is found that the contractor is still in a condition of non-compliance, then a final notice of apparent non-compliance will be issued, informing the contractor that a formal complaint of non-compliance will be filed at MCAD.

b. When a non-compliance complaint is filed at MCAD, the complaint must include all documentation, such as reports; on-site reviews; correspondences; minutes of meeting and a copy of the contract.

c. MCAD will conduct a conciliation conference in an attempt to bring the contractor into compliance. If the conference is unsuccessful, the MCAD will conduct an adjudicatory hearing pursuant to M.G.L. Chapter 30A and 804 CMR 9.00.

d. The adjudicatory hearing will provide an opportunity for the contractor to present proof of his/her efforts to comply with the EEO/AA requirements. If the contractor can document that he/she has exhausted every possible measure to achieve compliance, then the contractor would be found in compliance with the EEO/AA contract obligations. If the contractor is unable to document every possible measure taken, then the contractor can be found in non-compliance. A final report of non-compliance will then be issued.

9. RECOMMENDATIONS OF SANCTIONS

At the adjudicatory hearing, if the contractor is found to be in non-compliance with the EEO/AA requirements, MCAD will make a final report of non-compliance. Once MCAD issues a final finding of non-compliance. MCAD will recommend that the administering contracting agency impose on the contractor one or more of the sanctions outlined in the Commonwealth of Massachusetts Modified Supplemental Equal Employment Opportunity, Anti-Discrimination and Affirmative Action Program Section XIV within fourteen (14) days.

NOTE: (1) Non-compliance investigation will NOT be conducted without prior notice to the contractor.
(2) Sanctions will NOT be imposed without providing an adjudicatory hearing (Due Process) to the Contractor.

Attachment A-1

Contractor's Certification

A contractor will not be eligible for award of a contract unless such contractor has submitted the following certification, which is deemed a part of the resulting contract:

CONTRACTOR'S CERTIFICATION

_____

Name of the General Contractor

certifies that:

1. It intends to use the following listed construction trades in the work under contract:

   _____

   _____

2. Will comply with the minority workforce ratio and specific affirmative action steps contained herein: and

3. Will obtain from each of its subcontractors and submit to the contracting or administering agency prior to the award of any subcontract under this contract the subcontractor's certification required by these bid conditions.

_____

Signature of Authorized
Representative or Contractor

Attachment A-2

Subcontractor's Certification

Prior to the award of any subcontract, regardless of tier, the prospective subcontractor must execute and submit to the General Contractor the following certification, which will be deemed a part of the resulting subcontract:

SUBCONTRACTOR'S CERTIFICATION

_____

Name of the Subcontractor

certifies that:

1. It intends to use the following construction trades in the work under the contract:

   _____

   _____

2. Will comply with the minority workforce ratio and specific affirmative action steps herein; and

3. Will obtain from each of its subcontractors prior to the award of any subcontract under this contract the subcontractor's certification required by these bid conditions.

_____

Signature of Authorized
Representative of Subcontractor

Attachment B

Bidder's Certification

The undersigned bidder hereby certifies he/she will comply with the minority workforce percentage ratio and specific affirmative action steps contained in the EEO/AA provisions of this Contract. Including compliance with the Minority/Woman Business Enterprise as required under these contract provisions. The contractor receiving the award of the contract shall be required to obtain from each of its subcontractors a copy of the bidder's certification and submit it to the contracting agency prior to the award of such subcontract, regardless of tier, that it will comply with the minority workforce ratio and specific affirmative action steps contained in these EEO/AA contract provisions.

_____

Signature of Bidder

_____

Name of Firm

_____

Title

_____

Date

COMMONWEALTH OF MASSACHUSETTS
CONTRACTOR'S WEEKLY WORKFORCE UTILIZATION REPORT

PROJECT NAME: *New Housing* CONTRACT # *C-581-A* CONTRACT VALUE: *$5,900,000* MINORITY HIRING GOAL: *10%*

NAME & ADDRESS OF GENERAL CONTRACTOR: *Prime Contractor Inc, 1 Boston St., Boston, MA 02111.* TEL. NO.: *617-467-0000*

NAME & ADDRESS OF CONTRACTOR FILING REPORT: A *Sub-Contractor Inc., 100 Mass St., Boston, MA 02222* TEL. NO.: *617-469-1111*

WEEK ENDING: *March 6, 1987* REPORT # *3* DATE WORK BEGAN *2/16/87* CHECK HERE IF THIS IS A FINAL REPORT

DATE WORK COMPLETED _____ REPORT BY: *John Smith* TITLE: *EEO* REPORTING DATE: *March 9, 1987*

JOB CATEGORY	NO. EMP.	WEEKLY TOTAL WORKHOURS	NO. MIN.	WEEKLY TOTAL MIN. HOURS	MIN %	TOTAL WORKFORCE UTILIZATION SINCE CONTRACT BEGAN			REMARKS
						WORKHOURS TO DATE	MIN. HOURS TO DATE	MIN % TO DATE	
Foreman	*1*	*40*	*0*			*120*	*0*		
Carpenter	*4*	*160*	*1*	*40*	*25%*	*400*	*60*	*15%*	
Labor	*10*	*400*	*1*	*40*	*10%*	*1000*	*120*	*12%*	
TOTAL	*15*	*600*	*2*	*80*	*13.3%*	*1620*	*180*	*11%*	

FORM: CAD 85

COMMONWEALTH OF MASSACHUSETTS
CONTRACTOR'S WEEKLY WORKFORCE UTILIZATION REPORT

PROJECT NAME: _____ CONTRACT NO.: _____ CONTRACT VALUE: $ _____ MINORITY HIRING GOAL: _____

NAME & ADDRESS OF GENERAL CONTRACTOR: _____ TEL. NO.: _____

NAME & ADDRESS OF CONTRACTOR FILING REPORT: _____ TEL. NO.: _____

WEEK ENDING: _____ REPORT NO: _____ DATE WORK BEGAN: _____ CHECK HERE IF THIS IS A FINAL REPORT: ☐

DATE WORK COMPLETED: _____ REPORT BY: _____ TITLE: _____ REPORTING DATE: _____

JOB CATEGORY	NO. EMP.	WEEKLY TOTAL WORKHOURS	NO. MIN.	WEEKLY TOTAL MIN. HOURS	MIN. %	TOTAL WORKFORCE UTILIZATION SINCE CONTRACT BEGAN			REMARKS
						WORK HOURS TO DATE	MIN. HOURS TO DATE	MIN. % TO DATE	

FORM: CAD 85

COMMONWEALTH OF MASSACHUSETTS
CONTRACTORS QUARTERLY PROJECTED WORKFORCE TABLE

NAME OF CONTRACTOR: A Sub-Contractor Inc.

ADDRESS: 1 Boston St., Boston, MA 02111

CONTRACTING AGENCY: MCAA PROJECT NAME: New Housing

CONTRACT DOLLAR VALUE: $5,900,000 CONTRACT NO.: C-581-1

TRADES UTILIZED: Foreman, Carpenter, Laborer

ESTIMATE TOTAL HOURS TO COMPLETE WORK: 5900 Hours

QUARTER BEGIN: January 1, 1987 END: March 31, 1987

PREPARED BY: John Smith, EEO DATE: Dec. 20, 1986

NOTE: ***A revised table must be submitted if there are any changes of projections.***

WEEK ENDING	TRADES	PROJECTED TOTAL WORKHOURS	PROJECTED MIN. HOURS	REMARKS
2/13/87	NO WORK			
2/20/87	*Foreman*	*40*	*0*	
2/27/87	*Labor*	*80*	*4 0*	
3/6/87	*Foreman*	*40*	*0*	
	Carpenter	*120*	*40*	
	Labor	*200*	*40*	
3/13/87	NO WORK			
3/20/87	*Carpenter*	*80*	*0*	
3/27/87	*Labor*	*200*	*40*	

FORM: CAD 85-1

COMMONWEALTH OF MASSACHUSETTS
CONTRACTORS QUARTERLY PROJECTED WORKFORCE TABLE

NAME OF CONTRACTOR: _____

ADDRESS: _____

CONTRACTING AGENCY: _____ PROJECT NAME: _____

CONTRACT DOLLAR VALUE: _____ CONTRACT NO.: _____

TRADES UTILIZED: _____

ESTIMATE TOTAL HOURS TO COMPLETE WORK _____

QUARTER BEGIN: _____ END: _____

PREPARED BY: _____ DATE: _____

NOTE: ***A revised table must be submitted if there are any changes of projections.***

WEEK ENDING	TRADES	PROJECTED TOTAL WORKHOURS	PROJECTED MIN. HOURS	REMARKS

FORM: CAD 85-1

COMMONWEALTH OF MASSACHUSETTS
QUARTERLY CONTRACT COMPLIANCE REPORT

CONTRACTING AGENCY	REPORT PERIOD	REPORTING DATE	REPORTING AGENT, TITLE

DATE OF AWARD	PROJECT NAME	CONTRACT NO.	CONTRACT $	CONTRACTOR NAME	WORK HOURS	MIN. HRS.	MIN. %	REMARKS

FORM: CAD 75

The General Laws of Massachusetts

Go To:
Next Section
Previous Section
Chapter Table of Contents
MGL Search Page
General Court Home
Mass.gov

PART I. ADMINISTRATION OF THE GOVERNMENT

TITLE III. LAWS RELATING TO STATE OFFICERS

CHAPTER 30. GENERAL PROVISIONS RELATIVE TO STATE DEPARTMENTS, COMMISSIONS, OFFICERS AND EMPLOYEES

Chapter 30: Section 39F. Construction contracts; assignment and subrogation; subcontractor defined; enforcement of claim for direct payment; deposit, reduction of disputed amounts

Section 39F. (1) Every contract awarded pursuant to sections forty-four A to L, inclusive, of chapter one hundred and forty-nine shall contain the following subparagraphs (a) through (i) and every contract awarded pursuant to section thirty-nine M of chapter thirty shall contain the following subparagraphs (a) through (h) and in each case those subparagraphs shall be binding between the general contractor and each subcontractor.

(a) Forthwith after the general contractor receives payment on account of a periodic estimate, the general contractor shall pay to each subcontractor the amount paid for the labor performed and the materials furnished by that subcontractor, less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the subcontractor by the general contractor.

(b) Not later than the sixty-fifth day after each subcontractor substantially completes his work in accordance with the plans and specifications, the entire balance due under the subcontract less amounts retained by the awarding authority as the estimated cost of completing the incomplete and unsatisfactory items of work, shall be due the subcontractor; and the awarding authority shall pay that amount to the general contractor. The general contractor shall forthwith pay to the subcontractor the full amount received from the awarding authority less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the subcontractor by the general contractor.

(c) Each payment made by the awarding authority to the general contractor pursuant to subparagraphs (a) and (b) of this paragraph for the labor performed and the materials furnished by a subcontractor shall be made to the general contractor for the account of that subcontractor; and the awarding authority shall take reasonable steps to compel the general contractor to make each such payment to each such subcontractor. If the awarding authority has received a demand for direct payment from a subcontractor for any amount which has already been included in a payment to the general contractor or which is to be included in a payment to the general contractor for payment to the subcontractor as provided in subparagraphs (a) and (b), the awarding authority shall act upon the demand as provided in this section.

(d) If, within seventy days after the subcontractor has substantially completed the subcontract work, the subcontractor has not received from the general contractor the balance due under the subcontract including any amount due for extra labor and materials furnished to the general contractor, less any amount retained by the awarding authority as the estimated cost of completing the incomplete and unsatisfactory items of work, the subcontractor may demand direct payment of that balance from the awarding authority. The demand shall be by a sworn statement delivered to or sent by certified mail to the awarding authority, and a copy shall be delivered to or sent by certified mail to the general contractor at the same time. The demand shall contain a detailed breakdown of the balance due under the

subcontract and also a statement of the status of completion of the subcontract work. Any demand made after substantial completion of the subcontract work shall be valid even if delivered or mailed prior to the seventieth day after the subcontractor has substantially completed the subcontract work. Within ten days after the subcontractor has delivered or so mailed the demand to the awarding authority and delivered or so mailed a copy to the general contractor, the general contractor may reply to the demand. The reply shall be by a sworn statement delivered to or sent by certified mail to the awarding authority and a copy shall be delivered to or sent by certified mail to the subcontractor at the same time. The reply shall contain a detailed breakdown of the balance due under the subcontract including any amount due for extra labor and materials furnished to the general contractor and of the amount due for each claim made by the general contractor against the subcontractor.

(e) Within fifteen days after receipt of the demand by the awarding authority, but in no event prior to the seventieth day after substantial completion of the subcontract work, the awarding authority shall make direct payment to the subcontractor of the balance due under the subcontract including any amount due for extra labor and materials furnished to the general contractor, less any amount (i) retained by the awarding authority as the estimated cost of completing the incomplete or unsatisfactory items of work, (ii) specified in any court proceedings barring such payment, or (iii) disputed by the general contractor in the sworn reply; provided, that the awarding authority shall not deduct from a direct payment any amount as provided in part (iii) if the reply is not sworn to, or for which the sworn reply does not contain the detailed breakdown required by subparagraph (d). The awarding authority shall make further direct payments to the subcontractor forthwith after the removal of the basis for deductions from direct payments made as provided in parts (i) and (ii) of this subparagraph.

(f) The awarding authority shall forthwith deposit the amount deducted from a direct payment as provided in part (iii) of subparagraph (e) in an interest-bearing joint account in the names of the general contractor and the subcontractor in a bank in Massachusetts selected by the awarding authority or agreed upon by the general contractor and the subcontractor and shall notify the general contractor and the subcontractor of the date of the deposit and the bank receiving the deposit. The bank shall pay the amount in the account, including accrued interest, as provided in an agreement between the general contractor and the subcontractor or as determined by decree of a court of competent jurisdiction.

(g) All direct payments and all deductions from demands for direct payments deposited in an interest-bearing account or accounts in a bank pursuant to subparagraph (f) shall be made out of amounts payable to the general contractor at the time of receipt of a demand for direct payment from a subcontractor and out of amounts which later become payable to the general contractor and in the order of receipt of such demands from subcontractors. All direct payments shall discharge the obligation of the awarding authority to the general contractor to the extent of such payment.

(h) The awarding authority shall deduct from payments to a general contractor amounts which, together with the deposits in interest-bearing accounts pursuant to subparagraph (f), are sufficient to satisfy all unpaid balances of demands for direct payment received from subcontractors. All such amounts shall be earmarked for such direct payments, and the subcontractors shall have a right in such deductions prior to any claims against such amounts by creditors of the general contractor.

(i) If the subcontractor does not receive payment as provided in subparagraph (a) or if the general contractor does not submit a periodic estimate for the value of the labor or materials performed or furnished by the subcontractor and the subcontractor does not receive payment for same when due less the deductions provided for in subparagraph (a), the subcontractor may demand direct payment by following the procedure in subparagraph (d) and the general contractor may file a sworn reply as provided in that same subparagraph. A demand made after the first day of the month following that for which the subcontractor performed or furnished the labor and materials for which the subcontractor seeks payment shall be valid even if delivered or mailed prior to the time payment was due on a periodic

estimate from the general contractor. Thereafter the awarding authority shall proceed as provided in subparagraph (e), (f), (g) and (h).

(2) Any assignment by a subcontractor of the rights under this section to a surety company furnishing a bond under the provisions of section twenty-nine of chapter one hundred forty-nine shall be invalid. The assignment and subrogation rights of the surety to amounts included in a demand for direct payment which are in the possession of the awarding authority or which are on deposit pursuant to subparagraph (f) of paragraph (1) shall be subordinate to the rights of all subcontractors who are entitled to be paid under this section and who have not been paid in full.

(3) "Subcontractor" as used in this section (i) for contracts awarded as provided in sections forty-four A to forty-four H, inclusive, of chapter one hundred forty-nine shall mean a person who files a sub-bid and receives a subcontract as a result of that filed sub-bid or who is approved by the awarding authority in writing as a person performing labor or both performing labor and furnishing materials pursuant to a contract with the general contractor, (ii) for contracts awarded as provided in paragraph (a) of section thirty-nine M of chapter thirty shall mean a person approved by the awarding authority in writing as a person performing labor or both performing labor and furnishing materials pursuant to a contract with the general contractor, and (iii) for contracts with the commonwealth not awarded as provided in forty-four A to forty-four H, inclusive, of chapter one hundred forty-nine shall also mean a person contracting with the general contractor to supply materials used or employed in a public works project for a price in excess of five thousand dollars.

(4) A general contractor or a subcontractor shall enforce a claim to any portion of the amount of a demand for direct payment deposited as provided in subparagraph (f) of paragraph 1 by a petition in equity in the superior court against the other and the bank shall not be a necessary party. A subcontractor shall enforce a claim for direct payment or a right to require a deposit as provided in subparagraph (f) of paragraph 1 by a petition in equity in the superior court against the awarding authority and the general contractor shall not be a necessary party. Upon motion of any party the court shall advance for speedy trial any petition filed as provided in this paragraph. Sections fifty-nine and fifty-nine B of chapter two hundred thirty-one shall apply to such petitions. The court shall enter an interlocutory decree upon which execution shall issue for any part of a claim found due pursuant to sections fifty-nine and fifty-nine B and, upon motion of any party, shall advance for speedy trial the petition to collect the remainder of the claim. Any party aggrieved by such interlocutory decree shall have the right to appeal therefrom as from a final decree. The court shall not consolidate for trial the petition of any subcontractor with the petition of one or more subcontractors or the same general contract unless the court finds that a substantial portion of the evidence of the same events during the course of construction (other than the fact that the claims sought to be consolidated arise under the same general contract) is applicable to the petitions sought to be consolidated and that such consolidation will prevent unnecessary duplication of evidence. A decree in any such proceeding shall not include interest on the disputed amount deposited in excess of the interest earned for the period of any such deposit. No person except a subcontractor filing a demand for direct payment for which no funds due the general contractor are available for direct payment shall have a right to file a petition in court of equity against the awarding authority claiming a demand for direct payment is premature and such subcontractor must file the petition before the awarding authority has made a direct payment to the subcontractor and has made a deposit of the disputed portion as provided in part (iii) of subparagraph (e) and in subparagraph (f) of paragraph (1).

(5) In any petition to collect any claim for which a subcontractor has filed a demand for direct payment the court shall, upon motion of the general contractor, reduce by the amount of any deposit of a disputed amount by the awarding authority as provided in part (iii) of subparagraph (e) and in subparagraph (f) of paragraph (1) any amount held under a trustee writ or pursuant to a restraining order or injunction.

The General Laws of Massachusetts

Search the Laws

Go To:
Next Section
Previous Section
Chapter Table of Contents
MGL Search Page
General Court Home
Mass.gov

PART I. ADMINISTRATION OF THE GOVERNMENT

TITLE III. LAWS RELATING TO STATE OFFICERS

CHAPTER 30. GENERAL PROVISIONS RELATIVE TO STATE DEPARTMENTS, COMMISSIONS, OFFICERS AND EMPLOYEES

Chapter 30: Section 39G. Completion of public works; semi-final and final estimates; payments; extra work; disputed items

Section 39G. Upon substantial completion of the work required by a contract with the commonwealth, or any agency or political subdivision thereof, for the construction, reconstruction, alteration, remodeling, repair or improvement of public ways, including bridges and other highway structures, sewers and, water mains, airports and other public works, the contractor shall present in writing to the awarding authority its certification that the work has been substantially completed. Within twenty-one days thereafter, the awarding authority shall present to the contractor either a written declaration that the work has been substantially completed or an itemized list of incomplete or unsatisfactory work items required by the contract sufficient to demonstrate that the work has not been substantially completed. The awarding authority may include with such list a notice setting forth a reasonable time, which shall not in any event be prior to the contract completion date, within which the contractor must achieve substantial completion of the work. In the event that the awarding authority fails to respond, by presentation of a written declaration or itemized list as aforesaid, to the contractor's certification within the twenty-one day period, the contractor's certification shall take effect as the awarding authority's declaration that the work has been substantially completed.

Within sixty-five days after the effective date of a declaration of a substantial completion, the awarding authority shall prepare and forthwith send to the contractor for acceptance a substantial completion estimate for the quantity and price of the work done and all but one per cent retainage on that work, including the quantity, price and all but one per cent retainage for the undisputed part of each work item and extra work item in dispute but excluding the disputed part thereof, less the estimated cost of completing all incomplete and unsatisfactory work items and less the total periodic payments made to date for the work. The awarding authority also shall deduct from the substantial completion estimate an amount equal to the sum of all demands for direct payment filed by subcontractors and not yet paid to subcontractors or deposited in joint accounts pursuant to section thirty-nine F, but no contract subject to said section thirty-nine F shall contain any other provision authorizing the awarding authority to deduct any amount by virtue of claims asserted against the contract by subcontractors, material suppliers or others.

If the awarding authority fails to prepare and send to the contractor any substantial completion estimate required by this section on or before the date herein above set forth, the awarding authority shall pay to the contractor interest on the amount which would have been due to the contractor pursuant to such substantial completion estimate at the rate of three percentage points above the rediscount rate then charged by the Federal Reserve Bank of Boston from such date to the date on which the awarding authority sends that substantial completion estimate to the contractor for acceptance or to the date of payment therefor, whichever occurs first. The awarding authority shall include the amount of such interest in the substantial completion estimate.

Within fifteen days after the effective date of the declaration of substantial completion, the awarding authority shall send to the contractor by certified mail, return receipt requested, a complete list of all incomplete or unsatisfactory work items, and, unless delayed by causes beyond his control, the contractor shall complete all such work items within forty-five days after the receipt of such list or before the then contract completion date, whichever is later. If the contractor fails to complete such work within such time, the awarding authority may, subsequent to seven days' written notice to the contractor by certified mail, return receipt requested, terminate the contract and complete the incomplete or unsatisfactory work items and charge the cost of same to the contractor.

Within thirty days after receipt by the awarding authority of a notice from the contractor stating that all of the work required by the contract has been completed, the awarding authority shall prepare and forthwith send to the contractor for acceptance a final estimate for the quantity and price of the work done and all retainage on that work less all payments made to date, unless the awarding authority's inspection shows that work items required by the contract remain incomplete or unsatisfactory, or that documentation required by the contract has not been completed. If the awarding authority fails to prepare and send to the contractor the final estimate within thirty days after receipt of notice of completion, the awarding authority shall pay to the contractor interest on the amount which would have been due to the contractor pursuant to such final estimate at the rate hereinabove provided from the thirtieth day after such completion until the date on which the awarding authority sends the final estimate to the contractor for acceptance or the date of payment therefor, whichever occurs first, provided that the awarding authority's inspection shows that no work items required by the contract remain incomplete or unsatisfactory. Interest shall not be paid hereunder on amounts for which interest is required to be paid in connection with the substantial completion estimate as hereinabove provided. The awarding authority shall include the amount of the interest required to be paid hereunder in the final estimate.

The awarding authority shall pay the amount due pursuant to any substantial completion or final estimate within thirty-five days after receipt of written acceptance for such estimate from the contractor and shall pay interest on the amount due pursuant to such estimate at the rate hereinabove provided from that thirty-fifth day to the date of payment. Within 15 days, 30 days in the case of the commonwealth, after receipt from the contractor, at the place designated by the awarding authority, if such place is so designated, of a periodic estimate requesting payment of the amount due for the preceding periodic estimate period, the awarding authority shall make a periodic payment to the contractor for the work performed during the preceding periodic estimate period and for the materials not incorporated in the work but delivered and suitably stored at the site, or at some location agreed upon in writing, to which the contractor has title or to which a subcontractor has title and has authorized the contractor to transfer title to the awarding authority, upon certification by the contractor that he is the lawful owner and that the materials are free from all encumbrances. The awarding authority shall include with each such payment interest on the amount due pursuant to such periodic estimate at the rate herein above provided from the due date. In the case of periodic payments, the contracting authority may deduct from its payment a retention based on its estimate of the fair value of its claims against the contractor, a retention for direct payments to subcontractors based on demands for same in accordance with the provisions of section thirty-nine F, and a retention to secure satisfactory performance of the contractual work not exceeding five per cent of the approved amount of any periodic payment, and the same right to retention shall apply to bonded subcontractors entitled to direct payment under section thirty-nine F of chapter thirty; provided, that a five per cent value of all items that are planted in the ground shall be deducted from the periodic payments until final acceptance.

No periodic, substantial completion or final estimate or acceptance or payment thereof shall bar a contractor from reserving all rights to dispute the quantity and amount of, or the failure of the awarding authority to approve a quantity and amount of, all or part of any work item or extra work item.

Substantial completion, for the purposes of this section, shall mean either that the work required by the contract has been completed except for work having a contract price of less than one per cent of the then adjusted total contract price, or substantially all of the work has been completed and opened to public use except for minor incomplete or unsatisfactory work items that do not materially impair the usefulness of the work required by the contract.

The General Laws of Massachusetts

Go To:
Next Section
Previous Section
Chapter Table of Contents
MGL Search Page
General Court Home
Mass.gov

PART I. ADMINISTRATION OF THE GOVERNMENT

TITLE III. LAWS RELATING TO STATE OFFICERS

CHAPTER 30. GENERAL PROVISIONS RELATIVE TO STATE DEPARTMENTS, COMMISSIONS, OFFICERS AND EMPLOYEES

Chapter 30: Section 39I. Deviations from plans and specifications

Section 39I. Every contractor having a contract for the construction, alteration, maintenance, repair or demolition of, or addition to, any public building or public works for the commonwealth, or of any political subdivision thereof, shall perform all the work required by such contract in conformity with the plans and specifications contained therein. No wilful and substantial deviation from said plans and specifications shall be made unless authorized in writing by the awarding authority or by the engineer or architect in charge of the work who is duly authorized by the awarding authority to approve such deviations. In order to avoid delays in the prosecution of the work required by such contract such deviation from the plans or specifications may be authorized by a written order of the awarding authority or such engineer or architect so authorized to approve such deviation. Within thirty days thereafter, such written order shall be confirmed by a certificate of the awarding authority stating: (1) If such deviation involves any substitution or elimination of materials, fixtures or equipment, the reasons why such materials, fixtures or equipment were included in the first instance and the reasons for substitution or elimination, and, if the deviation is of any other nature, the reasons for such deviation, giving justification therefor; (2) that the specified deviation does not materially injure the project as a whole; (3) that either the work substituted for the work specified is of the same cost and quality, or that an equitable adjustment has been agreed upon between the contracting agency and the contractor and the amount in dollars of said adjustment; and (4) that the deviation is in the best interest of the contracting authority.

Such certificate shall be signed under the penalties of perjury and shall be a permanent part of the file record of the work contracted for.

Whoever violates any provision of this section wilfully and with intent to defraud shall be punished by a fine of not more than five thousand dollars or by imprisonment for not more than six months, or both.

The General Laws of Massachusetts

Search the Laws

Go To:
Next Section
Previous Section
Chapter Table of Contents
MGL Search Page
General Court Home
Mass.gov

PART I. ADMINISTRATION OF THE GOVERNMENT

TITLE III. LAWS RELATING TO STATE OFFICERS

CHAPTER 30. GENERAL PROVISIONS RELATIVE TO STATE DEPARTMENTS, COMMISSIONS, OFFICERS AND EMPLOYEES

Chapter 30: Section 39J. Public construction contracts; effect of decisions of contracting body or administrative board

Section 39J. Notwithstanding any contrary provision of any contract for the construction, reconstruction, alteration, remodeling, repair or demolition of any public building or public works by the commonwealth, or by any county, city, town, district, board, commission or other public body, when the amount of the contract is more than five thousand dollars in the case of the commonwealth and more than two thousand dollars in the case of any county, city, town, district, board, commission or other public body, a decision, by the contracting body or by any administrative board, official or agency, or by any architect or engineer, on a dispute, whether of fact or of law, arising under said contract shall not be final or conclusive if such decision is made in bad faith, fraudulently, capriciously, or arbitrarily is unsupported by substantial evidence, or is based upon error of law.

The General Laws of Massachusetts

Search the Laws

Go To:
Next Section
Previous Section
Chapter Table of Contents
MGL Search Page
General Court Home
Mass.gov

PART I. ADMINISTRATION OF THE GOVERNMENT

TITLE III. LAWS RELATING TO STATE OFFICERS

CHAPTER 30. GENERAL PROVISIONS RELATIVE TO STATE DEPARTMENTS, COMMISSIONS, OFFICERS AND EMPLOYEES

Chapter 30: Section 39L. Public construction work by foreign corporations; restrictions and reports

Section 39L. The commonwealth and every county, city, town, district, board, commission or other public body which, as the awarding authority, requests proposals, bids or sub-bids for any work in the construction, reconstruction, alteration, remodeling, repair or demolition of any public building or other public works (1) shall not enter into a contract for the work with, and shall not approve as a subcontractor furnishing labor and materials for a part of the work, a foreign corporation which has not filed with the awarding authority a certificate of the state secretary stating that the corporation has complied with requirements of section 15.03 of subdivision A of Part 15 of chapter 156D and the date of compliance, and further has filed all annual reports required by section 16.22 of subdivision B of Part 16 of said chapter 156D, and (2) shall report to the state secretary and to the department of corporations and taxation any foreign corporation performing work under such contract or subcontract, and any person, other than a corporation, performing work under such contract or subcontract, and residing or having a principal place of business outside the commonwealth.

The General Laws of Massachusetts

Search the Laws

Go To:
Next Section
Previous Section
Chapter Table of Contents
MGL Search Page
General Court Home
Mass.gov

PART I. ADMINISTRATION OF THE GOVERNMENT

TITLE III. LAWS RELATING TO STATE OFFICERS

CHAPTER 30. GENERAL PROVISIONS RELATIVE TO STATE DEPARTMENTS, COMMISSIONS, OFFICERS AND EMPLOYEES

Chapter 30: Section 39M. Contracts for construction and materials; manner of awarding

Section 39M. (a) Every contract for the construction, reconstruction, alteration, remodeling or repair of any public work, or for the purchase of any material, as hereinafter defined, by the commonwealth, or political subdivision thereof, or by any county, city, town, district, or housing authority, and estimated by the awarding authority to cost more than ten thousand dollars, and every contract for the construction, reconstruction, installation, demolition, maintenance or repair of any building by a public agency, as defined by subsection one of section forty-four A of chapter one hundred and forty-nine, estimated to cost more than $25,000 but not more than $100,000, shall be awarded to the lowest responsible and eligible bidder on the basis of competitive bids publicly opened and read by such awarding authority forthwith upon expiration of the time for the filing thereof; provided, however, that such awarding authority may reject any and all bids, if it is in the public interest to do so. Every bid for such contract shall be accompanied by a bid deposit in the form of a bid bond, or cash, or a certified check on, or a treasurer's or cashier's check issued by, a responsible bank or trust company, payable to the awarding authority. The amount of such bid deposit shall be five per cent of the value of the bid. Any person submitting a bid under this section shall, on such bid, certify as follows:

The undersigned certifies under penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this paragraph the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity.

_____
(Name of person signing bid)

_____
(Company)

This paragraph shall not apply to the award of any contract subject to the provisions of sections forty-four A to forty-four J, inclusive, of chapter one hundred and forty-nine and every such contract shall continue to be awarded as provided therein. In cases of extreme emergency caused by enemy attack, sabotage or other such hostile actions or resulting from an imminent security threat explosion, fire, flood, earthquake, hurricane, tornado or other such catastrophe, an awarding authority may, without competitive bids and notwithstanding any general or specific law, award contracts otherwise subject to this paragraph to perform work and to purchase or rent materials and equipment, all as may be necessary for temporary repair and restoration to service of any and all public work in order to preserve the health and safety of persons or property; provided, that this exception shall not apply to any permanent reconstruction, alteration, remodeling or repair of any public work.

(b) Specifications for such contracts, and specifications for contracts awarded pursuant to the provisions of said sections forty-four A to forty-four L of said chapter one hundred and forty-nine, shall be written to provide for full competition for each item of material to be furnished under the contract; except, however, that said specifications may be otherwise written for sound reasons in the public interest stated in writing

in the public records of the awarding authority or promptly given in writing by the awarding authority to anyone making a written request therefor, in either instance such writing to be prepared after reasonable investigation. Every such contract shall provide that an item equal to that named or described in the said specifications may be furnished; and an item shall be considered equal to the item so named or described if, in the opinion of the awarding authority: (1) it is at least equal in quality, durability, appearance, strength and design, (2) it will perform at least equally the function imposed by the general design for the public work being contracted for or the material being purchased, and (3) it conforms substantially, even with deviations, to the detailed requirements for the item in the said specifications. For each item of material the specifications shall provide for either a minimum of three named brands of material or a description of material which can be met by a minimum of three manufacturers or producers, and for the equal of any one of said name or described materials.

[Paragraph (c) effective until August 8, 2008. For text effective August 8, 2008, see below.]

(c) The term "lowest responsible and eligible bidder" shall mean the bidder: (1) whose bid is the lowest of those bidders possessing the skill, ability and integrity necessary for the faithful performance of the work; (2) who shall certify, that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed in the work; (3) who shall certify that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; (4) who, where the provisions of section 8B of chapter 29 apply, shall have been determined to be qualified thereunder; and (5) who obtains within 10 days of the notification of contract award the security by bond required under section 29 of chapter 149; provided that for the purposes of this section the term "security by bond" shall mean the bond of a surety company qualified to do business under the laws of the commonwealth and satisfactory to the awarding authority.

[Paragraph (c) as amended by 2008, 303, Sec. 11 effective August 8, 2008. For text effective until August 8, 2008, see above.]

(c) The term "lowest responsible and eligible bidder" shall mean the bidder: (1) whose bid is the lowest of those bidders possessing the skill, ability and integrity necessary for the faithful performance of the work; (2) who shall certify, that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed in the work; (3) who shall certify that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; (4) who, where the provisions of section 8B of chapter 29 apply, shall have been determined to be qualified thereunder; and (5) who obtains within 10 days of the notification of contract award the security by bond required under section 29 of chapter 149; provided that for the purposes of this section the term "security by bond" shall mean the bond of a surety company qualified to do business under the laws of the commonwealth and satisfactory to the awarding authority; provided further, that if there is more than 1 surety company, the surety companies shall be jointly and severally liable.

(d) The provisions of this section shall not apply (1) to the extent that they prevent the approval of such specifications by any contributing federal agency, (2) to materials purchased under specifications of the state department of highways at prices established by the said department pursuant to advertisement and bidding in connection with work to be performed under the provisions of chapter eighty-one or chapter ninety, (3) to any transaction between the commonwealth and any of its political subdivisions or between the commonwealth and any public service corporation, and (4) to any contract of not more than twenty-

five thousand dollars awarded by a governmental body, as defined by section two of chapter thirty B, in accordance with the provisions of section five of said chapter thirty B; and (5) to any contract solely for the purchase of material awarded by a governmental body, as defined by section 2 of chapter 30B, in accordance with section 5 of said chapter 30B.

(e) The word "material" as used in this section shall mean and include any article, assembly, system, or any component part thereof.

The General Laws of Massachusetts

Search the Laws

Go To:
Next Section
Previous Section
Chapter Table of Contents
MGL Search Page
General Court Home
Mass.gov

PART I. ADMINISTRATION OF THE GOVERNMENT

TITLE III. LAWS RELATING TO STATE OFFICERS

CHAPTER 30. GENERAL PROVISIONS RELATIVE TO STATE DEPARTMENTS, COMMISSIONS, OFFICERS AND EMPLOYEES

Chapter 30: Section 39O. Contracts for construction and materials; suspension, delay or interruption due to order of awarding authority; adjustment in contract price; written claim

Section 39O. Every contract subject to the provisions of section thirty-nine M of this chapter or subject to section forty-four A of chapter one hundred forty-nine shall contain the following provisions (a) and (b) in their entirety and, in the event a suspension, delay, interruption or failure to act of the awarding authority increases the cost of performance to any subcontractor, that subcontractor shall have the same rights against the general contractor for payment for an increase in the cost of his performance as provisions (a) and (b) give the general contractor against the awarding authority, but nothing in provisions (a) and (b) shall in any way change, modify or alter any other rights which the general contractor or the subcontractor may have against each other.

(a) The awarding authority may order the general contractor in writing to suspend, delay, or interrupt all or any part of the work for such period of time as it may determine to be appropriate for the convenience of the awarding authority; provided however, that if there is a suspension, delay or interruption for fifteen days or more or due to a failure of the awarding authority to act within the time specified in this contract, the awarding authority shall make an adjustment in the contract price for any increase in the cost of performance of this contract but shall not include any profit to the general contractor on such increase; and provided further, that the awarding authority shall not make any adjustment in the contract price under this provision for any suspension, delay, interruption or failure to act to the extent that such is due to any cause for which this contract provides for an equitable adjustment of the contract price under any other contract provisions.

(b) The general contractor must submit the amount of a claim under provision (a) to the awarding authority in writing as soon as practicable after the end of the suspension, delay, interruption or failure to act and, in any event, not later than the date of final payment under this contract and, except for costs due to a suspension order, the awarding authority shall not approve any costs in the claim incurred more than twenty days before the general contractor notified the awarding authority in writing of the act or failure to act involved in the claim.

The General Laws of Massachusetts

Search the Laws

Go To:
Next Section
Previous Section
Chapter Table of Contents
MGL Search Page
General Court Home
Mass.gov

PART I. ADMINISTRATION OF THE GOVERNMENT

TITLE III. LAWS RELATING TO STATE OFFICERS

CHAPTER 30. GENERAL PROVISIONS RELATIVE TO STATE DEPARTMENTS, COMMISSIONS, OFFICERS AND EMPLOYEES

Chapter 30: Section 39P. Contracts for construction and materials; awarding authority's decisions on interpretation of specifications, etc.; time limit; notice

Section 39P. Every contract subject to section thirty-nine M of this chapter or section forty-four A of chapter one hundred forty-nine which requires the awarding authority, any official, its architect or engineer to make a decision on interpretation of the specifications, approval of equipment, material or any other approval, or progress of the work, shall require that the decision be made promptly and, in any event, no later than thirty days after the written submission for decision; but if such decision requires extended investigation and study, the awarding authority, the official, architect or engineer shall, within thirty days after the receipt of the submission, give the party making the submission written notice of the reasons why the decision cannot be made within the thirty day period and the date by which the decision will be made.

The General Laws of Massachusetts

Search the Laws

Go To:
Next Section
Previous Section
Chapter Table of Contents
MGL Search Page
General Court Home
Mass.gov

PART I. ADMINISTRATION OF THE GOVERNMENT

TITLE III. LAWS RELATING TO STATE OFFICERS

CHAPTER 30. GENERAL PROVISIONS RELATIVE TO STATE DEPARTMENTS, COMMISSIONS, OFFICERS AND EMPLOYEES

Chapter 30: Section 39Q. Contracts for capital facility construction; contents; annual claims report

Section 39Q. (1) Every contract awarded by any state agency as defined by section thirty-nine A of chapter seven for the construction, reconstruction, alteration, remodeling, repair or demolition of any capital facility as defined by the aforesaid section thirty-nine A shall contain the following subparagraphs (a) through (d) in their entirety:

(a) Disputes regarding changes in and interpretations of the terms or scope of the contract and denials of or failures to act upon claims for payment for extra work or materials shall be resolved according to the following procedures, which shall constitute the exclusive method for resolving such disputes. Written notice of the matter in dispute shall be submitted promptly by the claimant to the chief executive official of the state agency which awarded the contract or his designee. No person or business entity having a contract with a state agency shall delay, suspend, or curtail performance under that contract as a result of any dispute subject to this section. Any disputed order, decision or action by the agency or its authorized representative shall be fully performed or complied with pending resolution of the dispute.

(b) Within thirty days of submission of the dispute to the chief executive official of the state agency or his designee, he shall issue a written decision stating the reasons therefor, and shall notify the parties of their right of appeal under this section. If the official or his designee is unable to issue a decision within thirty days, he shall notify the parties to the dispute in writing of the reasons why a decision cannot be issued within thirty days and of the date by which the decision shall issue. Failure to issue a decision within the thirty-day period or within the additional time period specified in such written notice shall be deemed to constitute a denial of the claim and shall authorize resort to the appeal procedure described below. The decision of the chief executive official or his designee shall be final and conclusive unless an appeal is taken as provided below.

(c) Within twenty-one calendar days of the receipt of a written decision or of the failure to issue a decision as stated in the preceding subparagraph, any aggrieved party may file a notice of claim for an adjudicatory hearing with the division of hearing officers or the aggrieved party may file an action directly in a court of competent jurisdiction and shall serve copies thereof upon all other parties in the form and manner prescribed by the rules governing the conduct of adjudicatory proceedings of the division of hearing officers. In the event an aggrieved party exercises his option to file an action directly in court as provided in the previous sentence, the twenty-one day period shall not apply to such filing and the period of filing such action shall be the same period otherwise applicable for filing a civil action in superior court. The appeal shall be referred to a hearing officer experienced in construction law and shall be prosecuted in accordance with the formal rules of procedure for the conduct of adjudicatory hearings of the division of hearing officers, except as provided below. The hearing officer shall issue a final decision as expeditiously as possible, but in no event more than one hundred and twenty calendar

days after conclusion of the adjudicatory hearing, unless the decision is delayed by a request for extension of time for filing post-hearing briefs or other submissions assented to by all parties. Whenever, because an extension of time has been granted, the hearing officer is unable to issue a decision within one hundred and twenty days, he shall notify all parties of the reasons for the delay and the date when the decision will issue. Failure to issue a decision within the one hundred and twenty-day period or within the additional period specified in such written notice shall give the petitioner the right to pursue any legal remedies available to him without further delay.

(d) When the amount in dispute is less than ten thousand dollars, a contractor who is party to the dispute may elect to submit the appeal to a hearing officer experienced in construction law for expedited hearing in accordance with the informal rules of practice and procedure of the division of hearing officers. An expedited hearing under this subparagraph shall be available at the sole option of the contractor. The hearing officer shall issue a decision no later than sixty days following the conclusion of any hearing conducted pursuant to this subparagraph. The hearing officer's decision shall be final and conclusive, and shall not be set aside except in cases of fraud.

(2) The commissioner of administration shall require the division of hearings officers to prepare annually a report concerning the construction contract claims submitted to the division during the preceding twelve months, in such form as the commissioner shall prescribe. The report shall contain, at a minimum, the following information: the number of claims submitted; the names of all parties to each such claim; a brief description of the claim; the date of submission and of disposition of the claim; its disposition, whether by settlement, withdrawal, default or written decision; and the number of claims currently pending. The original of the report shall be submitted to the commissioner of administration by January fifteenth, and a copy shall be filed with the state librarian and shall be a public document.

The General Laws of Massachusetts

Search the Laws

Go To:
Next Section
Previous Section
Chapter Table of Contents
MGL Search Page
General Court Home
Mass.gov

PART I. ADMINISTRATION OF THE GOVERNMENT

TITLE III. LAWS RELATING TO STATE OFFICERS

CHAPTER 30. GENERAL PROVISIONS RELATIVE TO STATE DEPARTMENTS, COMMISSIONS, OFFICERS AND EMPLOYEES

Chapter 30: Section 39R. Definitions; contract provisions; management and financial statements; enforcement

Section 39R. (a) The words defined herein shall have the meaning stated below whenever they appear in this section:

(1) "Contractor" means any person, corporation, partnership, joint venture, sole proprietorship, or other entity awarded a contract pursuant to sections thirty-eight A 1/2 to thirty-eight O, inclusive, of chapter seven and any contract awarded or executed pursuant to section eleven C of chapter twenty-five A, section thirty-nine M of chapter thirty, or sections forty-four A to forty-four H, inclusive, of chapter one hundred and forty-nine, which is for an amount or estimated amount greater than one hundred thousand dollars.

(2) "Contract" means any contract awarded or executed pursuant to sections thirty-eight A 1/2 to thirty-eight O, inclusive, of chapter seven and any contract awarded or executed pursuant to section eleven C of chapter twenty-five A, section thirty-nine M of chapter thirty, or sections forty-four A through forty-four H, inclusive, of chapter one hundred and forty-nine, which is for amount or estimated amount greater than one hundred thousand dollars.

(3) "Records" means books of original entry, accounts, checks, bank statements and all other banking documents, correspondence, memoranda, invoices, computer printouts, tapes, discs, papers and other documents or transcribed information of any type, whether expressed in ordinary or machine language.

(4) "Independent Certified Public Accountant" means a person duly registered in good standing and entitled to practice as a certified public accountant under the laws of the place of his residence or principal office and who is in fact independent. In determining whether an accountant is independent with respect to a particular person, appropriate consideration should be given to all relationships between the accountant and that person or any affiliate thereof. Determination of an accountant's independence shall not be confined to the relationships existing in connection with the filing of reports with the awarding authority.

(5) "Audit", when used in regard to financial statements, means an examination of records by an independent certified public accountant in accordance with generally accepted accounting principles and auditing standards for the purpose of expressing a *certified* opinion thereon, or, in the alternative, a qualified opinion or a declination to express an opinion for stated reasons.

(6) "Accountant's Report", when used in regard to financial statements, means a document in which an independent certified public accountant indicates the scope of the audit which he has made and sets forth his opinion regarding the financial statements taken as a whole with a listing of noted exceptions and

qualifications, or an assertion to the effect that an overall opinion cannot be expressed. When an overall opinion cannot be expressed the reason therefor shall be stated. An accountant's report shall include as a part thereof a signed statement by the responsible corporate officer attesting that management has fully disclosed all material facts to the independent certified public accountant, and that the audited financial statement is a true and complete statement of the financial condition of the contractor.

(7) "Management", when used herein, means the chief executive officers, partners, principals or other person or persons primarily responsible for the financial and operational policies and practices of the contractor.

(8) Accounting terms, unless otherwise defined herein, shall have a meaning in accordance with generally accepted accounting principles and auditing standards.

(b) Subsection (a)(2) hereof notwithstanding, every agreement or contract awarded or executed pursuant to sections thirty-eight A 1/2 to thirty-eight O, inclusive, of chapter seven, or eleven C of chapter twenty-five A, and pursuant to section thirty-nine M of chapter thirty or to section forty-four A through H, inclusive, of chapter one hundred and forty-nine, shall provide that:

(1) The contractor shall make, and keep for at least six years after final payment, books, records, and accounts which in reasonable detail accurately and fairly reflect the transactions and dispositions of the contractor, and

(2) until the expiration of six years after final payment, the office of inspector general, and the commissioner of capital asset management and maintenance shall have the right to examine any books, documents, papers or records of the contractor or of his subcontractors that directly pertain to, and involve transactions relating to, the contractor or his subcontractors, and

(3) if the agreement is a contract as defined herein, the contractor shall describe any change in the method of maintaining records or recording transactions which materially affect any statements filed with the awarding authority, including in his description the date of the change and reasons therefor, and shall accompany said description with a letter from the contractor's independent certified public accountant approving or otherwise commenting on the changes, and

(4) if the agreement is a contract as defined herein, the contractor has filed a statement of management on internal accounting controls as set forth in paragraph (c) below prior to the execution of the contract, and

(5) if the agreement is a contract as defined herein, the contractor has filed prior to the execution of the contracts and will continue to file annually, an audited financial statement for the most recent completed fiscal year as set forth in paragraph (d) below.

(c) Every contractor awarded a contract shall file with the awarding authority a statement of management as to whether the system of internal accounting controls of the contractor and its subsidiaries reasonably assures that:

(1) transactions are executed in accordance with management's general and specific authorization;

(2) transactions are recorded as necessary

i. to permit preparation of financial statements in conformity with generally accepted accounting principles, and

ii. to maintain accountability for assets;

(3) access to assets is permitted only in accordance with management's general or specific authorization; and

(4) the recorded accountability for assets is compared with the existing assets at reasonable intervals and appropriate action was taken with respect to any difference.

Every contractor awarded a contract shall also file with the awarding authority a statement prepared and signed by an independent certified public accountant, stating that he has examined the statement of management on internal accounting controls, and expressing an opinion as to

(1) whether the representations of management in response to this paragraph and paragraph (b) above are consistent with the result of management's evaluation of the system of internal accounting controls; and

(2) whether such representations of management are, in addition, reasonable with respect to transactions and assets in amounts which would be material when measured in relation to the applicant's financial statements.

(d) Every contractor awarded a contract by the commonwealth or by any political subdivision thereof shall annually file with the commissioner of capital asset management and maintenance during the term of the contract a financial statement prepared by an independent certified public accountant on the basis of an audit by such accountant. The final statement filed shall include the date of final payment. All statements shall be accompanied by an accountant's report. Such statements shall be made available to the awarding authority upon request.

(e) The office of inspector general, the commissioner of capital asset management and maintenance and any other awarding authority shall enforce the provisions of this section. The commissioner of capital asset management and maintenance may after providing an opportunity for the inspector general and other interested parties to comment, promulgate pursuant to the provisions of chapter thirty A such rules, regulations and guidelines as are necessary to effectuate the purposes of this section. Such rules, regulations and guidelines may be applicable to all awarding authorities. A contractor's failure to satisfy any of the requirements of this section may be grounds for debarment pursuant to section forty-four C of chapter one hundred and forty-nine.

(f) Records and statements required to be made, kept or filed under the provisions of this section shall not be public records as defined in section seven of chapter four and shall not be open to public inspection; provided, however, that such records and statements shall be made available pursuant to the provisions of clause (2) of paragraph (b).

The General Laws of Massachusetts

Search the Laws

Go To:
Next Section
Previous Section
Chapter Table of Contents
MGL Search Page
General Court Home
Mass.gov

PART I. ADMINISTRATION OF THE GOVERNMENT

TITLE III. LAWS RELATING TO STATE OFFICERS

CHAPTER 30. GENERAL PROVISIONS RELATIVE TO STATE DEPARTMENTS, COMMISSIONS, OFFICERS AND EMPLOYEES

Chapter 30: Section 39S. Contracts for construction; requirements

Section 39S. (a) As used in this section the word "person" shall mean any natural person, joint venture, partnership corporation or other business or legal entity. Any person submitting a bid for, or signing a contract to work on, the construction, reconstruction, alteration, remodeling or repair of any public work by the commonwealth, or political subdivision thereof, or by any county, city, town, district, or housing authority, and estimated by the awarding authority to cost more than $10,000, and any person submitting a bid for, or signing a contract to work on, the construction, reconstruction, installation, demolition, maintenance or repair of any building by a public agency, estimated to cost more than $10,000, shall certify on the bid, or contract, under penalties of perjury, as follows:

(1) that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed in the work; (2) that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and (3) that all employees to be employed in the work subject to this bid have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration.

(b) Any employee found on a worksite subject to this section without documentation of successful completion of a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration shall be subject to immediate removal.

(c) The attorney general, or his designee, shall have the power to enforce this section including the power to institute and prosecute proceedings in the superior court to restrain the award of contracts and the performance of contracts in all cases where, after investigation of the facts, he has made a finding that the award or performance has resulted in violation, directly or indirectly, of subsection (b), and he shall not be required to pay to the clerk of the court an entry fee in connection with the institution of the proceeding.

The General Laws of Massachusetts

Search the Laws

Go To:
Next Section
Previous Section
Chapter Table of Contents
MGL Search Page
General Court Home
Mass.gov

PART I. ADMINISTRATION OF THE GOVERNMENT

TITLE XIV. PUBLIC WAYS AND WORKS

CHAPTER 82. THE LAYING OUT, ALTERATION, RELOCATION AND DISCONTINUANCE OF PUBLIC WAYS, AND SPECIFIC REPAIRS THEREON

FILING OF PETITIONS

Chapter 82: Section 40. Definitions

Section 40. The following words, as used in this section and sections 40A to 40E, inclusive, shall have the following meanings:—

"Company", natural gas pipeline company, petroleum or petroleum products pipeline company, public utility company, cable television company, and municipal utility company or department that supply gas, electricity, telephone, communication or cable television services or private water companies within the city or town where such excavation is to be made.

"Description of excavation location", such description shall include the name of the city or town, street, way, or route number where appropriate, the name of the streets at the nearest intersection to the excavation, the number of the buildings closest to the excavation or any other description, including landmarks, utility pole numbers or other information which will accurately define the location of the excavation.

"Emergency", a condition in which the safety of the public is in imminent danger, such as a threat to life or health or where immediate correction is required to maintain or restore essential public utility service.

"Excavation", an operation for the purpose of movement or removal of earth, rock or the materials in the ground including, but not limited to, digging, blasting, augering, backfilling, test boring, drilling, pile driving, grading, plowing in, hammering, pulling in, jacking in, trenching, tunneling and demolition of structures, excluding excavation by tools manipulated only by human power for gardening purposes and use of blasting for quarrying purposes.

"Excavator", any entity including, but not limited to, a person, partnership, joint venture, trust, corporation, association, public utility, company or state or local government body which performs excavation operations.

"Premark", to delineate the general scope of the excavation or boring on the paved surface of the ground using white paint, or stakes or other suitable white markings on nonpaved surfaces. No premarking shall be acceptable if such marks can reasonably interfere with traffic or pedestrian control or are misleading to the general public. Premarking shall not be required of any continuous excavation that is over 500 feet in length.

"Safety zone", a zone designated on the surface by the use of standard color-coded markings which contains the width of the facilities plus not more than 18 inches on each side.

"Standard color-coded markings", red - electric power lines, cables, conduit or light cables; yellow - gas, oil, street petroleum, or other gaseous materials; orange - communications cables or conduit, alarm or signal lines; blue - water, irrigation and slurry lines; green - sewer and drain lines; white - premark of proposed excavation.

"System", the underground plant damage prevention system as defined in section 76D of chapter 164.

The General Laws of Massachusetts

Search the Laws

Go To:
Next Section
Previous Section
Chapter Table of Contents
MGL Search Page
General Court Home
Mass.gov

PART I. ADMINISTRATION OF THE GOVERNMENT

TITLE XIV. PUBLIC WAYS AND WORKS

CHAPTER 82. THE LAYING OUT, ALTERATION, RELOCATION AND DISCONTINUANCE OF PUBLIC WAYS, AND SPECIFIC REPAIRS THEREON

FILING OF PETITIONS

Chapter 82: Section 40A. Excavations; notice

Section 40A. No excavator installing a new facility or an addition to an existing facility or the relay or repair of an existing facility shall, except in an emergency, make an excavation, in any public or private way, any company right-of-way or easement or any public or privately owned land or way, unless at least 72 hours, exclusive of Saturdays, Sundays and legal holidays but not more than 30 days before the proposed excavation is to be made, such excavator has premarked not more than 500 feet of the proposed excavation and given an initial notice to the system. Such initial notice shall set forth a description of the excavation location in the manner as herein defined. In addition, such initial notice shall indicate whether any such excavation will involve blasting and, if so, the date and the location at which such blasting is to occur.

The notice requirements shall be waived in an emergency as defined herein; provided, however, that before such excavation begins or during a life-threatening emergency, notification shall be given to the system and the initial point of boring or excavation shall be premarked. The excavator shall ensure that the underground facilities of the utilities in the area of such excavation shall not be damaged or jeopardized.

In no event shall any excavation by blasting take place unless notice thereof, either in the initial notice or a subsequent notice accurately specifying the date and location of such blasting shall have been given and received at least 72 hours in advance, except in the case of an unanticipated obstruction requiring blasting when such notice shall be not less than four hours prior to such blasting. If any such notice cannot be given as aforesaid because of an emergency requiring blasting, it shall be given as soon as may be practicable but before any explosives are discharged.

The General Laws of Massachusetts

Go To:
Next Section
Previous Section
Chapter Table of Contents
MGL Search Page
General Court Home
Mass.gov

PART I. ADMINISTRATION OF THE GOVERNMENT

TITLE XIV. PUBLIC WAYS AND WORKS

CHAPTER 82. THE LAYING OUT, ALTERATION, RELOCATION AND DISCONTINUANCE OF PUBLIC WAYS, AND SPECIFIC REPAIRS THEREON

FILING OF PETITIONS

Chapter 82: Section 40B. Designation of location of underground facilities

Section 40B. Within 72 hours, exclusive of Saturdays, Sundays and legal holidays, from the time the initial notice is received by the system or at such time as the company and the excavator agree, such company shall respond to the initial notice or subsequent notice by designating the location of the underground facilities within 15 feet in any direction of the premarking so that the existing facilities are to be found within a safety zone. Such safety zone shall be so designated by the use of standard color-coded markings. The providing of such designation by the company shall constitute prima facie evidence of an exercise of reasonable precaution by the company as required by this section; provided, however, that in the event that the excavator has given notice as aforesaid at a location at which because of the length of excavation the company cannot reasonably designate the entire location of its facilities within such 72 hour period, then such excavator shall identify for the company that portion of the excavation which is to be first made and the company shall designate the location of its facilities in such portion within 72 hours and shall designate the location of its facilities in the remaining portion of the location within a reasonable time thereafter. When an emergency notification has been given to the system, the company shall make every attempt to designate its facilities as promptly as possible.

The General Laws of Massachusetts

Search the Laws

Go To:
Next Section
Previous Section
Chapter Table of Contents
MGL Search Page
General Court Home
Mass.gov

PART I. ADMINISTRATION OF THE GOVERNMENT

TITLE XIV. PUBLIC WAYS AND WORKS

CHAPTER 82. THE LAYING OUT, ALTERATION, RELOCATION AND DISCONTINUANCE OF PUBLIC WAYS, AND SPECIFIC REPAIRS THEREON

FILING OF PETITIONS

Chapter 82: Section 40C. Excavator's responsibility to maintain designation markings; damage caused by excavator

Section 40C. After a company has designated the location of its facilities at the location in accordance with section 40B, the excavator shall be responsible for maintaining the designation markings at such locations, unless such excavator requests remarking at the location due to the obliteration, destruction or other removal of such markings. The company shall then remark such location within 24 hours following receipt of such request.

When excavating in close proximity to the underground facilities of any company when such facilities are to be exposed, non-mechanical means shall be employed, as necessary, to avoid damage in locating such facility and any further excavation shall be performed employing reasonable precautions to avoid damage to any underground facilities including, but not limited to, any substantial weakening of structural or lateral support of such facilities, penetration or destruction of any pipe, main, wire or conduit or the protective coating thereof, or damage to any pipe, main, wire or conduit.

If any damage to such pipe, main, wire or conduit or its protective coating occurs, the company shall be notified immediately by the excavator responsible for causing such damage.

The making of an excavation without providing the notice required by section 40A with respect to any proposed excavation which results in any damage to a pipe, main, wire or conduit, or its protective coating, shall be prima facie evidence in any legal or administrative proceeding that such damage was caused by the negligence of such person.

The General Laws of Massachusetts

Go To:
Next Section
Previous Section
Chapter Table of Contents
MGL Search Page
General Court Home
Mass.gov

PART I. ADMINISTRATION OF THE GOVERNMENT

TITLE XIV. PUBLIC WAYS AND WORKS

CHAPTER 82. THE LAYING OUT, ALTERATION, RELOCATION AND DISCONTINUANCE OF PUBLIC WAYS, AND SPECIFIC REPAIRS THEREON

FILING OF PETITIONS

Chapter 82: Section 40D. Local laws requiring excavation permits; public ways

Section 40D. Nothing in this section shall affect or impair local ordinances or by-laws requiring a permit to be obtained before excavation in a public way or on private property; but notwithstanding any general or special law, ordinance or by-law to the contrary, to the extent that any permit issued under the provisions of the state building code or state fire code requires excavation by an excavator on a public way or on private property, the permit shall not be valid unless the excavator notifies the system as required pursuant to sections 40 and 40A, before the commencement of the excavation, and has complied with the permitting requirements of chapter 82A.

The General Laws of Massachusetts

Search the Laws

Go To:
Next Section
Previous Section
Chapter Table of Contents
MGL Search Page
General Court Home
Mass.gov

PART I. ADMINISTRATION OF THE GOVERNMENT

TITLE XIV. PUBLIC WAYS AND WORKS

CHAPTER 82. THE LAYING OUT, ALTERATION, RELOCATION AND DISCONTINUANCE OF PUBLIC WAYS, AND SPECIFIC REPAIRS THEREON

FILING OF PETITIONS

Chapter 82: Section 40E. Violations of Secs. 40A to 40E; punishment

Section 40E. Any person or company found by the department of telecommunications and energy, after a hearing, to have violated any provision of sections 40A to 40E, inclusive, shall be fined $1,000 for the first offense and not less than $5,000 nor more than $10,000 for any subsequent offense within 12 consecutive months as set forth by the rules of said department; provided, however, that nothing herein shall be construed to require forfeiture of any penal sum by a state or local government body for violation of section 40A or 40C; and provided, further, that nothing herein shall be construed to require the forfeiture of any penal sum by a residential property owner for the failure to premark for an excavation on such person's residential property.

The General Laws of Massachusetts

Search the Laws

Go To:
Next Section
Previous Section
Chapter Table of Contents
MGL Search Page
General Court Home
Mass.gov

PART I. ADMINISTRATION OF THE GOVERNMENT

TITLE XIV. PUBLIC WAYS AND WORKS

CHAPTER 82A. EXCAVATION AND TRENCH SAFETY

Chapter 82A: Section 1. Unattended open trenches; safety hazards; rules and regulations; fines

Section 1. An excavator shall not leave an open trench unattended without first making reasonable effort to eliminate any recognized safety hazard that may exist as a result of leaving the open trench unattended. The commissioner of public safety, in conjunction with the director of labor and workforce development, or his designee, shall promulgate rules and regulations governing all construction related excavations and trench safety. The rules and regulations shall include, but not be limited to, a description of recognized safety hazards that may exist as a result of leaving open trenches or excavations unattended, a description of the procedures required or recommended by the department to eliminate safety hazards which may include covering, barricading or otherwise protecting open trenches from accidental entry, and a penalty structure for each violation of the proposed rules and regulations to be imposed by the department empowered with ensuring compliance with the rules and regulations. This penalty structure shall include the imposition of a fine for each violation of the regulations promulgated pursuant to this section. Any such fines collected by the department of public safety or the department of labor and workforce development shall be available for expenditure, without further appropriation, by those departments in an amount not to exceed $100,000 during each fiscal year for the sole purpose of providing construction safety training for licensed operators of hoisting equipment, police department officials, fire department officials and building officials. Those departments may also charge a reasonable fee to help defray the costs associated with said training. Any monies collected from the imposition of these fines in excess of $100,000 shall be transmitted monthly by those departments to the state treasurer who shall then deposit the excess funds into the General Fund. The department of public safety, in conjunction with the department of labor and workforce development, shall file a report detailing the amount of fines imposed, collected and expended pursuant to this section with the house and senate committees on ways and means and with the joint committee on public safety not later than August 15 of each year. The rules and regulations shall not be effective until the department of public safety has received a formal determination from the United States Secretary of Labor that the proposed rules or regulations do not seek to assume responsibility for development and enforcement therein of occupational safety and health standards relating to any occupational safety or health issue with respect to which a federal standard has already been promulgated under 29 U.S.C. section 667 or until the rules and regulations are approved by the United States Secretary of Labor as a state plan for the development of the standards and their enforcement pursuant to 29 U.S.C. section 667(c).

The General Laws of Massachusetts

Go To:
Next Section
Previous Section
Chapter Table of Contents
MGL Search Page
General Court Home
Mass.gov

PART I. ADMINISTRATION OF THE GOVERNMENT

TITLE XXI. LABOR AND INDUSTRIES

CHAPTER 149. LABOR AND INDUSTRIES

PUBLIC EMPLOYMENT

Chapter 149: Section 34. Public contracts; stipulation as to hours and days of work; void contracts

Section 34. Every contract, except for the purchase of material or supplies, involving the employment of laborers, workmen, mechanics, foremen or inspectors, to which the commonwealth or any county or any town, subject to section thirty, is a party, shall contain a stipulation that no laborer, workman, mechanic, foreman or inspector working within the commonwealth, in the employ of the contractor, sub-contractor or other person doing or contracting to do the whole or a part of the work contemplated by the contract, shall be required or permitted to work more than eight hours in any one day or more than forty-eight hours in any one week, or more than six days in any one week, except in cases of emergency, or, in case any town subject to section thirty-one is a party to such a contract, more than eight hours in any one day, except as aforesaid; provided, that in contracts entered into by the department of highways for the construction or reconstruction of highways there may be inserted in said stipulation a provision that said department, or any contractor or sub-contractor for said department, may employ laborers, workmen, mechanics, foremen and inspectors for more than eight hours in any one day in such construction or reconstruction when, in the opinion of the commissioner of labor and industries, public necessity so requires. Every such contract not containing the aforesaid stipulation shall be null and void.

The General Laws of Massachusetts

PART I. ADMINISTRATION OF THE GOVERNMENT

TITLE XXI. LABOR AND INDUSTRIES

CHAPTER 149. LABOR AND INDUSTRIES

FAIR COMPETITION FOR BIDDERS ON CONSTRUCTION, ETC., OF PUBLIC WORKS

Chapter 149: Section 44J. Invitations to bid; notice; contents; violations; penalty

Section 44J. (1) No public agency or authority of the commonwealth or any political subdivision thereof shall award any contract for which competitive bids are required pursuant to section forty-four A of this chapter or section thirty-nine M of chapter thirty, or for which competitive proposals are required pursuant to subsection (4) of section forty-four E of this chapter or section eleven C of chapter twenty-five A, unless a notice inviting bids or proposals therefor shall have been posted no less than one week prior to the time specified in such notice for the receipt of said bids or proposals in a conspicuous place in or near the offices of the awarding authority, and shall have remained posted until the time so specified, and unless such notice shall also have been published at least once not less than two weeks prior to the time so specified in the central register published by the secretary of state pursuant to section twenty A of chapter nine and in a newspaper of general circulation in the locality of the proposed project. Said notice shall also be published at such other times and in such other newspapers or trade periodicals as the commissioner of capital asset management and maintenance may require, having regard to the locality of the work involved.

(2) Said notice shall specify the time and place where plans and specifications of the proposed work may be had; the time and place of submission of general bids; and the time and place for opening of the general bids. For contracts subject to the provisions of sections forty-four A to H, inclusive, of this chapter, said notice shall also specify the time and place for submission of filed sub-bids, where required pursuant to section forty-four F; and the time and place for opening of said filed sub-bids.

Said notice shall also provide sufficient facts concerning the nature and scope of such project, the type and elements of construction, and such other information as will assist applicants in deciding to bid on such contract.

(3) No contract or preliminary plans and specifications shall be split or divided for the purpose of evading the provisions of this section.

(4) General bids and filed sub-bids for any contract subject to this section shall be in writing and shall be opened in public at the time and place specified in the posted or published notice, and after being so opened shall be open to public inspection.

(5) The provisions of this section shall not apply to any transaction between the commonwealth and any public service corporation.

(6) The provisions of this section may be waived in cases of extreme emergency involving the health and safety of the people and their property, upon the written approval of said commissioner. The written approval shall contain a description of the circumstances and the reasons for the commissioner's determination.

(7) Whoever violates any provision of this section shall be punished by a fine of not more than ten thousand dollars or by imprisonment in the state prison for not more than three years or in a jail or house of correction for not more than two and one-half years, or by both said fine and imprisonment; and in the event of final conviction, said person shall be incapable of holding any office of honor, trust or profit under the commonwealth or under any county, district of municipal agency.

Each and every person who shall cause or conspire to cause any contract or preliminary plans and specifications to be split or divided for the purpose of evading the provisions of this section shall forfeit and pay to the commonwealth, a political subdivision thereof or other awarding authority subject to this section, the sum of not more than five thousand dollars and, in addition, such person or persons shall pay, apportioned among them, double the amount of damages which the commonwealth or political subdivision thereof or other awarding authority may have sustained by reason of the doing of such act, together with the costs of the action.

(8) If an awarding authority rejects all general bids or does not receive any general bids, and advertises for a second opening of general bids with the original filed sub-bids as set forth in subsection (1) of section forty-four E the notice for receipt of such general bids may be published in the central register and elsewhere as required not less than one week prior to the time specified for such second opening of general bids.

[Subsection (9) added by 2008, 303, Sec. 26 effective August 8, 2008.]

(9) No request for proposals or invitation for bids issued under sections 38A 1/2 to 38O, inclusive, of chapter 7, section 11C of chapter 25A, section 39M of chapter 30, this section and sections 44A to 44H, inclusive, shall be advertised if the awarding authority's cost estimate is greater than 1 year old.

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DIVISION OF OCCUPATIONAL SAFETY

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lieutenant Governor

Prevailing Wage Rates

As determined by the Commissioner under the provisions of the Massachusetts General Laws, Chapter 149, Sections 26 to 27H

JOANNE F. GOLDSTEIN
Secretary of Labor and Workforce Development

GEORGE E. NOEL
Director of Labor

HEATHER E. ROWE
Acting Commissioner of
Division of Occupational Safety

Awarding Authority: City of Haverhill, Massachusetts

Contract Number: CWSRF-3403 **City/Town:** HAVERHILL

Description of Work: Capping and closure of the 35-acre Southern Mound of the Haverhill Landfill, including grading and shaping and installation of the final cap, stormwater controls, and landfill gas controls

Job Location: Old Groveland Road Haverhill, MA

Classification	Effective Dates and Total Rates					
onstruction						
(2 AXLE) DRIVER - EQUIPMENT	12/01/2010	$44.430	06/01/2011	$45.180	12/01/2011	$45.840
	06/01/2012	$46.490	12/01/2012	$47.520		
(3 AXLE) DRIVER - EQUIPMENT	12/01/2010	$44.500	06/01/2011	$45.250	12/01/2011	$45.910
	06/01/2012	$46.560	12/01/2012	$47.590		
(4 & 5 AXLE) DRIVER - EQUIPMENT	12/01/2010	$44.620	06/01/2011	$45.370	12/01/2011	$46.030
	06/01/2012	$46.680	12/01/2012	$47.710		
ADS/SUBMERSIBLE PILOT	08/01/2010	$104.640	08/01/2011	$108.760		
AIR TRACK OPERATOR	12/01/2010	$46.500	06/01/2011	$47.500	12/01/2011	$48.750
ASBESTOS REMOVER - PIPE / MECH. EQUIPT.	12/01/2009	$40.250				
ASPHALT RAKER	12/01/2010	$46.000	06/01/2011	$47.000	12/01/2011	$48.250
ASPHALT/CONCRETE/CRUSHER PLANT-ON SITE	12/01/2010	$60.980				
BACKHOE/FRONT-END LOADER	12/01/2010	$60.980				
BARCO-TYPE JUMPING TAMPER	12/01/2010	$46.000	06/01/2011	$47.000	12/01/2011	$48.250
BLOCK PAVER, RAMMER / CURB SETTER	12/01/2010	$46.500	06/01/2011	$47.500	12/01/2011	$48.750
BOILER MAKER	01/01/2010	$55.850				

APPRENTICE: BOILERMAKER - Local 29

Ratio	Step	1	2	3	4	5	6	7	8
1:5	%	65.00	65.00	70.00	75.00	80.00	85.00	90.00	95.00

Apprentice wages shall be no less than the following:

Step 1$42.66/2$42.66/3$44.54/4$46.43/5$48.31/6$50.20/7$52.08/8$53.97

BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING)	02/01/2011	$70.900	03/01/2011	$70.900	08/01/2011	$73.000
	02/01/2012	$73.990				

APPRENTICE: BRICK/PLASTER/CEMENT MASON - Local 3 Lynn

Ratio	Step	1	2	3	4	5
1:5	%	50.00	60.00	70.00	80.00	90.00

Apprentice wages shall be no less than the following:

Step 1$47.80/2$52.42/3$57.04/4$61.66/5$66.28

BULLDOZER/GRADER/SCRAPER	12/01/2010	$60.630				
CAISSON & UNDERPINNING BOTTOM MAN	12/01/2010	$50.250	06/01/2011	$51.250	12/01/2011	$52.500
CAISSON & UNDERPINNING LABORER	12/01/2010	$49.100	06/01/2011	$50.100	12/01/2011	$51.350
CAISSON & UNDERPINNING TOP MAN	12/01/2010	$49.100	06/01/2011	$50.100	12/01/2011	$51.350
CARBIDE CORE DRILL OPERATOR	12/01/2010	$46.000	06/01/2011	$47.000	12/01/2011	$48.250
CARPENTER	09/01/2010	$55.360	03/01/2011	$56.230	09/01/2011	$57.360
	03/01/2012	$58.480				

This wage schedule must be posted at the work site in accordance with M.G.L. c. 149, § 27. Failure of the employer to pay "prevailing wage rates," which are the minimum wage rates listed above, on public works projects is a violation of M.G.L. c. 149, § 27. Employees not receiving such rates should report the violation to the Fair Labor Division of the Office of the Attorney General , 100 Cambridge Street, Boston, MA 02108; Tel: 617-727-3465. Contractors with questions about the wage rates or classifications included on the wage schedules have an affirmative obligation to inquire with DOS at www.mass.gov/dos/pw or at 617-626-6952.

Prevailing Wage Rates

As determined by the Commissioner under the provisions of the Massachusetts General Laws, Chapter 149, Sections 26 to 27H

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lieutenant Governor

JOANNE F. GOLDSTEIN
Secretary of Labor and Workforce Development

GEORGE E. NOEL
Director of Labor

HEATHER E. ROWE
Acting Commissioner of
Division of Occupational Safety

Awarding Authority: City of Haverhill, Massachusetts

Contract Number: CWSRF-3403 **City/Town:** HAVERHILL

Description of Work: Capping and closure of the 35-acre Southern Mound of the Haverhill Landfill, including grading and shaping and installation of the final cap, stormwater controls, and landfill gas controls

Job Location: Old Groveland Road Haverhill, MA

Classification	Effective Dates and Total Rates					
APPRENTICE: CARPENTER - Zone 2 Eastern MA						
Ratio Step 1 2 3 4 5 6 7 8						
1:5 % 50.00 60.00 70.00 75.00 80.00 80.00 90.00 90.00						
Apprentice wages shall be no less than the following:						
Step 1$25.54/2$28.71/3$41.12/4$42.71/5$45.87/6$45.87/7$50.61/8$50.61						
CEMENT MASONRY/PLASTERING	02/01/2011	$69.070	08/01/2011	$70.770	02/01/2012	$71.540
CHAIN SAW OPERATOR	12/01/2010	$46.000	06/01/2011	$47.000	12/01/2011	$48.250
CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES	12/01/2010	$61.980				
COMPRESSOR OPERATOR	12/01/2010	$49.690				
DELEADER (BRIDGE)	01/01/2011	$64.410	07/01/2011	$65.410	01/01/2012	$66.410
	07/01/2012	$67.410	01/01/2013	$68.410		
APPRENTICE: PAINTER Local 35 - BRIDGES/TANKS						
Ratio Step 1 2 3 4 5 6 7 8						
1:1 % 50.00 55.00 60.00 65.00 70.00 75.00 80.00 90.00						
Apprentice wages shall be no less than the following: Steps are 750 hrs.						
Step 1$29.31/2$36.86/3$39.01/4$41.16/5$51.51/6$53.66/7$55.81/8$60.11						
DEMO: ADZEMAN	12/01/2010	$49.100	06/01/2011	$50.100	12/01/2011	$51.350
DEMO: BACKHOE/LOADER/HAMMER OPERATOR	12/01/2010	$50.100	06/01/2011	$51.100	12/01/2011	$52.350
APPRENTICE: LABORER Demo Backhoe/Loader/Hammer Operator						
Ratio Step 1 2 3 4						
1:5 % 60.00 70.00 80.00 90.00						
Apprentice wages shall be no less than the following:						
Step 1$37.48/2$40.64/3$43.79/4$46.95						
DEMO: BURNERS	12/01/2010	$49.850	06/01/2011	$50.850	12/01/2011	$52.100
APPRENTICE: LABORER Demo Burners						
Ratio Step 1 2 3 4						
1:5 % 60.00 70.00 80.00 90.00						
Apprentice Wages shall be no less than the following:						
Step 1$37.33/2$40.46/3$43.59/4$46.72						
DEMO: CONCRETE CUTTER/SAWYER	12/01/2010	$50.100	06/01/2011	$51.100	12/01/2011	$52.350
DEMO: JACKHAMMER OPERATOR	12/01/2010	$49.850	06/01/2011	$50.850	12/01/2011	$52.100
DEMO: WRECKING LABORER	12/01/2010	$49.100	06/01/2011	$50.100	12/01/2011	$51.350
APPRENTICE: LABORER Demo Wrecking Laborer						
Ratio Step 1 2 3 4						
1:5 % 60.00 70.00 80.00 90.00						
Apprentice wages shall be no less than the following:						
Step 1$36.88/2$39.94/3$42.99/4$46.05						
DIRECTIONAL DRILL MACHINE OPERATOR	12/01/2010	$60.630				
DIVER	08/01/2010	$77.440	08/01/2011	$80.190		

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THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DIVISION OF OCCUPATIONAL SAFETY

Prevailing Wage Rates

As determined by the Commissioner under the provisions of the Massachusetts General Laws, Chapter 149, Sections 26 to 27H

Awarding Authority: City of Haverhill, Massachusetts

Contract Number: CWSRF-3403 **City/Town:** HAVERHILL

Description of Work: Capping and closure of the 35-acre Southern Mound of the Haverhill Landfill, including grading and shaping and installation of the final cap, stormwater controls, and landfill gas controls

Job Location: Old Groveland Road Haverhill, MA

Classification	Effective Dates and Total Rates					
DIVER TENDER	08/01/2010	$62.570	08/01/2011	$65.320		
DIVER TENDER (EFFLUENT)	08/01/2010	$82.330	08/01/2011	$86.460		
DIVER/SLURRY (EFFLUENT)	08/01/2010	$104.640	08/01/2011	$108.760		
ELECTRICIAN	09/01/2010	$67.040	03/01/2011	$68.290		
APPRENTICE: ELECTRICIAN - Local 103						
Ratio Step 1 2 3 4 5 6 7 8 9 10						
2:3*** % 40.00 40.00 45.00 45.00 50.00 55.00 60.00 65.00 70.00 75.00						
Apprentice wages shall be no less than the following Steps: App Prior 1/1/03; 30/35/40/45/50/55/65/70/75/80						
1$36.13/2$36.13/3$43.56/4$43.56/5$45.70/6$47.83/7$49.97/8$52.10/9$54.24/10$56.37						
ELEVATOR CONSTRUCTOR	01/01/2011	$66.690	01/01/2012	$68.190		
APPRENTICE: ELEVATOR CONSTRUCTOR - Local 4						
Ratio Step 1 2 3 4 5						
1:1 % 50.00 55.00 65.00 70.00 80.00						
Apprentice rates shall be no less than the following: Steps 1-2 are 6 mos.; Steps 3-5 are 1 year						
Step 1$34.26/2$43.76/3$48.86/4$51.41/5$56.50						
ELEVATOR CONSTRUCTOR HELPER	01/01/2011	$52.830	01/01/2012	$54.330		
FENCE & GUARD RAIL ERECTOR	12/01/2010	$46.000	06/01/2011	$47.000	12/01/2011	$48.250
FIELD ENG. - INST. PERSON (BLDG, SITE, HVY CONST)	11/01/2010	$58.140	05/01/2011	$59.380		
FIELD ENG. - ROD PERSON (BLDG, SITE, HVY CONST)	11/01/2010	$42.200	05/01/2011	$42.930		
FIELD ENG.-CHIEF.OF PARTY (BLDG, SITE, HVY CONST)	11/01/2010	$59.520	05/01/2011	$60.770		
FIRE ALARM INSTALLER	09/01/2010	$67.040	03/01/2011	$68.290		
FIRE ALARM REPAIR / MAINTENANCE	09/01/2010	$55.050	03/01/2011	$56.300		
FIREMAN (ASST. ENGINEER)	12/01/2010	$54.840				
FLAGGER & SIGNALER	12/01/2010	$36.650	06/01/2011	$37.650	12/01/2011	$37.650
FLOORCOVERER	09/01/2010	$60.380	03/01/2011	$61.130	09/01/2011	$62.380
	03/01/2012	$63.630				
APPRENTICE: FLOORCOVERER - Local 2168 Zone I						
Ratio Step 1 2 3 4 5 6 7 8						
1:1 % 50.00 55.00 60.00 65.00 70.00 75.00 80.00 85.00						
Apprentice rates shall be no less than the following: Steps are 750 hrs.						
Step 1$27.91/2$29.72/3$40.18/4$42.00/5$45.70/6$47.52/7$51.22/8$53.04						
FORK LIFT/CHERRY PICKER	12/01/2010	$60.980				
GENERATOR/LIGHTING PLANT/HEATERS	12/01/2010	$49.690				
GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS)	01/01/2011	$53.910	07/01/2011	$54.910	01/01/2012	$55.910
	07/01/2012	$56.910	01/01/2013	$57.910		

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THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DIVISION OF OCCUPATIONAL SAFETY

Prevailing Wage Rates

As determined by the Commissioner under the provisions of the Massachusetts General Laws, Chapter 149, Sections 26 to 27H

DEVAL L. PATRICK
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Secretary of Labor and Workforce Development

GEORGE E. NOEL
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HEATHER E. ROWE
Acting Commissioner of
Division of Occupational Safety

Awarding Authority: City of Haverhill, Massachusetts

Contract Number: CWSRF-3403 **City/Town:** HAVERHILL

Description of Work: Capping and closure of the 35-acre Southern Mound of the Haverhill Landfill, including grading and shaping and installation of the final cap, stormwater controls, and landfill gas controls

Job Location: Old Groveland Road Haverhill, MA

Classification	Effective Dates and Total Rates					
APPRENTICE: GLAZIER - Local 35 Zone 2						
Ratio Step 1 2 3 4 5 6 7 8						
1:1 % 50.00 55.00 60.00 65.00 70.00 75.00 80.00 90.00						
Apprentice wages shall be no less than the following: Steps are 750 hrs.						
Step 1$24.06/2$31.08/3$32.71/4$34.33/5$44.16/6$45.78/7$47.41/8$50.66						
HOISTING ENGINEER/CRANES/GRADALLS	12/01/2010	$60.980				
APPRENTICE: HOIST/PORT. ENG.- Local 4						
Ratio Step 1 2 3 4 5 6 7 8						
1:6 % 55.00 60.00 65.00 70.00 75.00 80.00 85.00 90.00						
Apprentice wages shall be no less than the following:						
Step 1$31.33/2$45.47/3$47.41/4$49.35/5$51.29/6$53.22/7$55.16/8$57.10						
HVAC (DUCTWORK)	02/01/2011	$65.210	08/01/2011	$66.460	02/01/2012	$67.710
	08/01/2012	$68.960	02/01/2013	$70.210		
HVAC (ELECTRICAL CONTROLS)	09/01/2010	$67.040	03/01/2011	$68.290		
HVAC (TESTING AND BALANCING - AIR)	02/01/2011	$65.210	08/01/2011	$66.460	02/01/2012	$67.710
	08/01/2012	$68.960	02/01/2013	$70.210		
HVAC (TESTING AND BALANCING -WATER)	09/01/2010	$64.400				
HVAC MECHANIC	09/01/2010	$64.400				
HYDRAULIC DRILLS	12/01/2010	$46.500	06/01/2011	$47.500	12/01/2011	$48.750
INSULATOR (PIPES & TANKS)	09/01/2010	$61.660				
APPRENTICE: ASBESTOS INSULATOR (Pipes & Tanks) - Local 6 Boston						
Ratio Step 1 2 3 4						
1:4 % 50.00 60.00 70.00 80.00						
Apprentice wages shall be no less than the following: Steps are 1 year						
Step 1$37.34/2$42.20/3$47.07/4$51.93						
IRONWORKER/WELDER	03/16/2010	$56.530				
APPRENTICE: IRONWORKER - Local 7 Lawrence						
Ratio Step 1 2 3 4 5 6						
% 60.00 70.00 75.00 80.00 85.00 90.00						
Apprentice wages shall be no less than the following: Structural 1:6; Ornamental 1:4						
Step 1$44.18/2$47.27/3$48.81/4$50.35/5$51.90/6$53.44						
JACKHAMMER & PAVING BREAKER OPERATOR	12/01/2010	$46.000	06/01/2011	$47.000	12/01/2011	$48.250
LABORER	12/01/2010	$45.750	06/01/2011	$46.750	12/01/2011	$48.000
APPRENTICE: LABORER - Zone 2						
Ratio Step 1 2 3 4						
1:5 % 60.00 70.00 80.00 90.00						
Apprentice wages shall be no less than the following:						
Step 1$34.31/2$37.17/3$40.03/4$42.89						
LABORER: CARPENTER TENDER	12/01/2010	$45.750	06/01/2011	$46.750	12/01/2011	$48.000

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THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DIVISION OF OCCUPATIONAL SAFETY

DEVAL L. PATRICK
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Prevailing Wage Rates

As determined by the Commissioner under the provisions of the Massachusetts General Laws, Chapter 149, Sections 26 to 27H

JOANNE F. GOLDSTEIN
Secretary of Labor and Workforce Development

GEORGE E. NOEL
Director of Labor

HEATHER E. ROWE
Acting Commissioner of
Division of Occupational Safety

Awarding Authority: City of Haverhill, Massachusetts

Contract Number: CWSRF-3403 **City/Town:** HAVERHILL

Description of Work: Capping and closure of the 35-acre Southern Mound of the Haverhill Landfill, including grading and shaping and installation of the final cap, stormwater controls, and landfill gas controls

Job Location: Old Groveland Road Haverhill, MA

Classification	Effective Dates and Total Rates					
LABORER: CEMENT FINISHER TENDER	12/01/2010	$45.750	06/01/2011	$46.750	12/01/2011	$48.000
LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER	12/01/2010	$45.750	06/01/2011	$46.750	12/01/2011	$48.000
LABORER: MASON TENDER	12/01/2010	$46.000	06/01/2011	$47.000	12/01/2011	$48.250
LABORER: MULTI-TRADE TENDER	12/01/2010	$45.750	06/01/2011	$46.750	12/01/2011	$48.000
LABORER: TREE REMOVER	12/01/2010	$45.750	06/01/2011	$46.750	12/01/2011	$48.000
This classification applies to the wholesale removal of standing trees including all associated trimming of branches and limbs, and applies to the removal of branches at locations not on or around utility lines.						
LASER BEAM OPERATOR	12/01/2010	$46.000	06/01/2011	$47.000	12/01/2011	$48.250
MARBLE & TILE FINISHERS	02/01/2011	$59.270	03/01/2011	$59.270	08/01/2011	$60.950
	02/01/2012	$61.740				
APPRENTICE: MARBLE & TILE FINISHER - Local 3 Marble & Tile						
Ratio Step 1 2 3 4 5						
1:3 % 50.00 60.00 70.00 80.00 90.00						
Apprentice wages shall be no less than the following: Steps are 800 hrs.						
Step 1$41.58/2$45.11/3$48.65/4$52.19/5$55.73						
MARBLE MASONS,TILELAYERS & TERRAZZO MECH	02/01/2011	$70.940	03/01/2011	$70.940	08/01/2011	$73.040
	02/01/2012	$74.030				
APPRENTICE: MARBLE-TILE-TERRAZZO MECHANIC - Local 3 Marble & Tile						
Ratio Step 1 2 3 4 5						
1:3 % 50.00 60.00 70.00 80.00 90.00						
Apprentice wages shall be no less than the following:						
Step 1$47.82/2$52.44/3$57.07/4$61.69/5$66.32						
MECH. SWEEPER OPERATOR (NON-CONSTRUCTION)	07/01/2010	$29.590	07/01/2011	$30.290		
MECH. SWEEPER OPERATOR (ON CONST. SITES)	12/01/2010	$60.630				
MECHANICS MAINTENANCE	12/01/2010	$60.630				
MILLWRIGHT (Zone 2)	04/01/2010	$53.990				
APPRENTICE: MILLWRIGHT - Local 1121 Zone 2						
Ratio Step 1 2 3 4 5 6 7 8						
1:5 % 50.00 55.00 60.00 65.00 70.00 75.00 80.00 85.00						
Apprentice wages shall be no less than the following:						
Step 1$25.02/2$26.60/3$36.88/4$38.46/5$41.53/6$43.12/7$46.18/8$47.76						
MORTAR MIXER	12/01/2010	$46.000	06/01/2011	$47.000	12/01/2011	$48.250
OILER (OTHER THAN TRUCK CRANES,GRADALLS)	12/01/2010	$43.170				
OILER (TRUCK CRANES, GRADALLS)	12/01/2010	$46.330				
OTHER POWER DRIVEN EQUIPMENT - CLASS II	12/01/2010	$60.630				
PAINTER (BRIDGES/TANKS)	01/01/2011	$64.410	07/01/2011	$65.410	01/01/2012	$66.410
	07/01/2012	$67.410	01/01/2013	$68.410		

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Prevailing Wage Rates

As determined by the Commissioner under the provisions of the Massachusetts General Laws, Chapter 149, Sections 26 to 27H

Awarding Authority: City of Haverhill, Massachusetts

Contract Number: CWSRF-3403 **City/Town:** HAVERHILL

Description of Work: Capping and closure of the 35-acre Southern Mound of the Haverhill Landfill, including grading and shaping and installation of the final cap, stormwater controls, and landfill gas controls

Job Location: Old Groveland Road Haverhill, MA

Classification	Effective Dates and Total Rates					
APPRENTICE: PAINTER Local 35 - BRIDGES/TANKS						
Ratio 1:1 Step % 1 50.00 2 55.00 3 60.00 4 65.00 5 70.00 6 75.00 7 80.00 8 90.00						
Apprentice wages shall be no less than the following: Steps are 750 hrs.						
Step 1$29.31/2$36.86/3$39.01/4$41.16/5$51.51/6$53.66/7$55.81/8$60.11						
PAINTER (SPRAY OR SANDBLAST, NEW) *	01/01/2011	$55.310	07/01/2011	$56.310	01/01/2012	$57.310
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.	07/01/2012	$58.310	01/01/2013	$59.310		
APPRENTICE: PAINTER Local 35 Zone 2 - Spray/Sandblast - New						
Ratio 1:1 Step % 1 50.00 2 55.00 3 60.00 4 65.00 5 70.00 6 75.00 7 80.00 8 90.00						
Apprentice wages shall be no less than the following:						
Step 1$24.76/2$31.85/3$33.55/4$35.24/5$45.14/6$46.83/7$48.53/8$51.92						
PAINTER (SPRAY OR SANDBLAST, REPAINT)	01/01/2011	$53.370	07/01/2011	$54.370	01/01/2012	$55.370
	07/01/2012	$56.370	01/01/2013	$57.370		
APPRENTICE: PAINTER Local 35 Zone 2 - Spray/Sandblast - Repaint						
Ratio 1:1 Step % 1 50.00 2 55.00 3 60.00 4 65.00 5 70.00 6 75.00 7 80.00 8 90.00						
Apprentice wages shall be no less than the following:						
Step 1$23.79/2$30.78/3$32.38/4$33.98/5$43.78/6$45.38/7$46.98/8$50.17						
PAINTER (TRAFFIC MARKINGS)	12/01/2010	$45.750	06/01/2011	$46.750	12/01/2011	$48.000
PAINTER / TAPER (BRUSH, NEW) *	01/01/2011	$53.910	07/01/2011	$54.910	01/01/2012	$55.910
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.	07/01/2012	$56.910	01/01/2013	$57.910		
APPRENTICE: PAINTER - Local 35 Zone 2 - BRUSH NEW						
Ratio 1:1 Step % 1 50.00 2 55.00 3 60.00 4 65.00 5 70.00 6 75.00 7 80.00 8 90.00						
Apprentice wages shall be no less than the following: Steps are 750 hrs.						
Step 1$24.06/2$31.08/3$32.71/4$34.33/5$44.16/6$45.78/7$47.41/8$50.66						
PAINTER / TAPER (BRUSH, REPAINT)	01/01/2011	$51.970	07/01/2011	$52.970	01/01/2012	$53.970
	07/01/2012	$54.970	01/01/2013	$55.970		
APPRENTICE: PAINTER Local 35 Zone 2 - BRUSH REPAINT						
Ratio 1:1 Step % 1 50.00 2 55.00 3 60.00 4 65.00 5 70.00 6 75.00 7 80.00 8 90.00						
Apprentice wages shall be no less than the following: Steps are 750 hrs.						
Step 1$23.09/2$30.01/3$31.54/4$33.07/5$42.80/6$44.33/7$45.86/8$48.91						
PANEL & PICKUP TRUCKS DRIVER	12/01/2010	$44.260	06/01/2011	$45.010	12/01/2011	$45.670
	06/01/2012	$46.320	12/01/2012	$47.350		
PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK)	08/01/2010	$62.570	08/01/2011	$65.320		
PILE DRIVER	08/01/2010	$62.570	08/01/2011	$65.320		

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Prevailing Wage Rates

As determined by the Commissioner under the provisions of the Massachusetts General Laws, Chapter 149, Sections 26 to 27H

Awarding Authority: City of Haverhill, Massachusetts

Contract Number: CWSRF-3403 **City/Town:** HAVERHILL

Description of Work: Capping and closure of the 35-acre Southern Mound of the Haverhill Landfill, including grading and shaping and installation of the final cap, stormwater controls, and landfill gas controls

Job Location: Old Groveland Road Haverhill, MA

Classification	Effective Dates and Total Rates					
APPRENTICE: PILE DRIVER - Local 56 Zone 1						
Ratio Step 1 2 3 4 5 6 7 8						
1:3 % 60.00 65.00 70.00 75.00 80.00 85.00 90.00 95.00						
Apprentice wages shall be no less than the following:						
Step 1$46.76/2$48.74/3$50.71/4$52.69/5$54.67/6$56.64/7$58.62/8$60.59						
PIPEFITTER & STEAMFITTER	09/01/2010	$64.400				
APPRENTICE: PIPEFITTER Local 537 (Local 138)						
Ratio Step 1 2 3 4 5						
** % 40.00 45.00 60.00 70.00 80.00						
Apprentice wages:Step1$30.50/2$40.33/3$46.90/4$51.27/5$55.65 ** 1:3; 3:15; 1:10 thereafter / Steps are 1 yr.						
Refrig/AC Mechanic **1:1;1:2;2:4;3:6;4:8;5:10;6:12;7:14;8:17;9:20;10:23(Max)						
PIPELAYER	12/01/2010	$46.000	06/01/2011	$47.000	12/01/2011	$48.250
PLUMBER	09/01/2010	$63.420	03/01/2011	$63.420	09/01/2011	$64.170
	03/01/2012	$64.970	09/01/2012	$66.220	03/01/2013	$67.470
APPRENTICE: PLUMBER/GASFITTER - Local 12 (Local 138)						
Ratio Step 1 2 3 .4 5						
1:5 % 35.00 40.00 55.00 65.00 75.00						
Apprentice wages shall be no less than the following:						
Step 1$28.58/2$31.26/3$39.30/4$44.66/4lic$47.35/5$50.03/5licS52.69						
PNEUMATIC CONTROLS (TEMP.)	09/01/2010	$64.400				
PNEUMATIC DRILL/TOOL OPERATOR	12/01/2010	$46.000	06/01/2011	$47.000	12/01/2011	$48.250
POWDERMAN & BLASTER	12/01/2010	$46.750	06/01/2011	$47.750	12/01/2011	$49.000
POWER SHOVEL/DERRICK/TRENCHING MACHINE	12/01/2010	$60.980				
PUMP OPERATOR (CONCRETE)	12/01/2010	$60.980				
PUMP OPERATOR (DEWATERING, OTHER)	12/01/2010	$49.690				
READY-MIX CONCRETE DRIVER	05/01/2010	$33.790				
RECLAIMERS	12/01/2010	$60.630				
RESIDENTIAL WOOD FRAME CARPENTER **	04/01/2009	$35.620				
** The Residential Wood Frame Carpenter classification applies only to the construction of new, wood frame residences that do not exceed four stories including the basement.						
As of 9/1/09 Carpentry work on wood-frame residential WEATHERIZATION projects shall be paid the RESIDENTIAL WOOD FRAME CARPENTER rate.						
APPRENTICE: CARPENTER (Residential Wood Frame) - Zone 2						
Ratio Step 1 2 3 4 5 6 7 8						
1:5 % 60.00 60.00 65.00 70.00 75.00 80.00 85.00 90.00						
Apprentice wages shall be no less than the following:						
Step 1$20.13/2$26.04/3$27.23/4$28.43/5$29.63/6$30.83/7$32.03/8$33.22						
RIDE-ON MOTORIZED BUGGY OPERATOR	12/01/2010	$46.000	06/01/2011	$47.000	12/01/2011	$48.250
ROLLER/SPREADER/MULCHING MACHINE	12/01/2010	$60.630				
ROOFER (Inc.Roofer Waterproofng &Roofer Damproofg)	02/01/2009	$53.860				

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As determined by the Commissioner under the provisions of the Massachusetts General Laws, Chapter 149, Sections 26 to 27H

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GEORGE E. NOEL
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HEATHER E. ROWE
Acting Commissioner of
Division of Occupational Safety

Awarding Authority: City of Haverhill, Massachusetts

Contract Number: CWSRF-3403 **City/Town:** HAVERHILL

Description of Work: Capping and closure of the 35-acre Southern Mound of the Haverhill Landfill, including grading and shaping and installation of the final cap, stormwater controls, and landfill gas controls

Job Location: Old Groveland Road Haverhill, MA

Classification	Effective Dates and Total Rates					
APPRENTICE: ROOFER - Local 33						
Ratio Step 1 2 3 4 5						
** % 50.00 60.00 65.00 75.00 85.00						
** 1:5, 2:6-10, the 1:10; Reroofing: 1:4, then 1:1 — Step 1 is 2000 hrs.; Steps 2-5 are 1000 hrs.						
Apprentice rates no less than: Step 1$29.91/2$40.04/3$41.76/4$45.22/5$48.68						
ROOFER SLATE / TILE / PRECAST CONCRETE	02/01/2009	$54.110				
APPRENTICE: ROOFER (Slate/Tile/Precast Concrete) - Local 33						
Ratio Step 1 2 3 4 5						
** % 50.00 60.00 65.00 75.00 85.00						
Apprentices wages shall be paid no less than the following:						
Step 1$30.04/2$40.19/3$41.93/4$45.41/5$48.89						
SHEETMETAL WORKER	02/01/2011	$65.210	08/01/2011	$66.460	02/01/2012	$67.710
	08/01/2012	$68.960	02/01/2013	$70.210		
APPRENTICE: SHEET METAL WORKER - Local 17-A						
Ratio Step 1 2 3 4 5 6 7						
1:4 % 40.00 45.00 50.00 60.00 65.00 75.00 85.00						
Apprentice wages shall be no less than the following: — Steps 1-3 are 1 year; Steps 4-7 are 6 mos.						
Step 1$25.34/2$33.89/3$36.57/4$41.95/5$44.65/6$50.02/7$54.89						
SIGN ERECTOR	06/01/2009	$37.780				
APPRENTICE: SIGN ERECTOR - Local 35 Zone 2						
Ratio Step 1 2 3 4 5 6 7 8 9						
1:1 % 50.00 55.00 60.00 65.00 70.00 75.00 80.00 85.00 90.00						
Apprentice wages shall be no less than the following: — Steps are 4 mos.						
Step 1$19.48/2$23.12/3$24.36/4$25.60/5$30.34/6$31.58/7$32.82/8$34.06/9$35.30						
SPECIALIZED EARTH MOVING EQUIP < 35 TONS	12/01/2010	$44.720	06/01/2011	$45.470	12/01/2011	$46.130
	06/01/2012	$46.780	12/01/2012	$47.810		
SPECIALIZED EARTH MOVING EQUIP > 35 TONS	12/01/2010	$45.010	06/01/2011	$45.760	12/01/2011	$46.420
	06/01/2012	$47.070	12/01/2012	$48.100		
SPRINKLER FITTER	01/01/2011	$66.100	09/01/2011	$66.900	01/01/2012	$67.050
	03/01/2012	$67.800	09/01/2012	$68.800	01/01/2013	$68.950
	03/01/2013	$69.950				
APPRENTICE: SPRINKLER FITTER - Local 550 (Section B)						
Ratio Step 1 2 3 4 5 6 7 8 9 10						
1:1 % 40.00 45.00 50.00 55.00 60.00 65.00 70.00 75.00 80.00 85.00						
Apprentices wages shall be no less than the following steps:						
1$34.42/2$36.75/3$39.08/4$41.40/5$43.73/6$46.06/7$48.39/8$50.71/9$53.04/10$55.37						
STEAM BOILER OPERATOR	12/01/2010	$60.630				
TAMPERS, SELF-PROPELLED OR TRACTOR DRAWN	12/01/2010	$60.630				
TELECOMMUNICATION TECHNICIAN	09/01/2010	$55.050	03/01/2011	$56.300		

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Awarding Authority: City of Haverhill, Massachusetts

Contract Number: CWSRF-3403 **City/Town:** HAVERHILL

Description of Work: Capping and closure of the 35-acre Southern Mound of the Haverhill Landfill, including grading and shaping and installation of the final cap, stormwater controls, and landfill gas controls

Job Location: Old Groveland Road Haverhill, MA

Classification	Effective Dates and Total Rates					
APPRENTICE: TELECOMMUNICATION TECHNICIAN - Local 103						
Ratio Step 1 2 3 4 5 6 7 8						
1:1 % 40.00 45.00 50.00 55.00 60.00 65.00 75.00 80.00						
Apprentice wages shall be no less than the following:						
Step 1$35.84/2$37.44/3$39.05/4$40.64/5$42.24/6$43.85/7$47.05/8$48.65						
TERRAZZO FINISHERS	02/01/2011	$69.840	03/01/2011	$69.840	08/01/2011	$71.940
	02/01/2012	$72.930				
APPRENTICE: TERRAZZO FINISHER - Local 3 Marble & Tile						
Ratio Step 1 2 3 4 5						
1:3 % 50.00 60.00 70.00 80.00 90.00						
Apprentice wages shall be no less than the following: Steps are 800 hrs.						
Step 1$47.27/2$51.78/3$56.30/4$60.81/5$65.33						
TEST BORING DRILLER	12/01/2010	$50.500	06/01/2011	$51.500	12/01/2011	$52.750
TEST BORING DRILLER HELPER	12/01/2010	$49.220	06/01/2011	$50.220	12/01/2011	$51.470
TEST BORING LABORER	12/01/2010	$49.100	06/01/2011	$50.100	12/01/2011	$51.350
TRACTORS/PORTABLE STEAM GENERATORS	12/01/2010	$60.630				
TRAILERS FOR EARTH MOVING EQUIPMENT	12/01/2010	$45.300	06/01/2011	$46.050	12/01/2011	$46.710
	06/01/2012	$47.360	12/01/2012	$48.390		
TUNNEL WORK - COMPRESSED AIR	12/01/2010	$61.680	06/01/2011	$62.930	12/01/2011	$64.180
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE)	12/01/2010	$63.680	06/01/2011	$64.930	12/01/2011	$66.180
TUNNEL WORK - FREE AIR	12/01/2010	$53.750	06/01/2011	$55.000	12/01/2011	$56.250
TUNNEL WORK - FREE AIR (HAZ. WASTE)	12/01/2010	$55.750	06/01/2011	$57.000	12/01/2011	$58.250
VAC-HAUL	12/01/2010	$44.720	06/01/2011	$45.470	12/01/2011	$46.130
	06/01/2012	$46.780	12/01/2012	$47.810		
WAGON DRILL OPERATOR	12/01/2010	$46.000	06/01/2011	$47.000	12/01/2011	$48.250
WASTE WATER PUMP OPERATOR	12/01/2010	$60.980				
WATER METER INSTALLER	09/01/2010	$63.420	03/01/2011	$63.420	09/01/2011	$64.170
	03/01/2012	$64.970	09/01/2012	$66.220	03/01/2013	$67.470

This wage schedule must be posted at the work site in accordance with M.G.L. c. 149, § 27. Failure of the employer to pay "prevailing wage rates," which are the minimum wage rates listed above, on public works projects is a violation of M.G.L. c. 149, § 27. Employees not receiving such rates should report the violation to the Fair Labor Division of the Office of the Attorney General , 100 Cambridge Street, Boston, MA 02108; Tel: 617-727-3465. Contractors with questions about the wage rates or classifications included on the wage schedules have an affirmative obligation to inquire with DOS at www.mass.gov/dos/pw or at 617-626-6952.

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DIVISION OF OCCUPATIONAL SAFETY

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lieutenant Governor

Prevailing Wage Rates

As determined by the Commissioner under the provisions of the Massachusetts General Laws, Chapter 149, Sections 26 to 27H

JOANNE F. GOLDSTEIN
Secretary of Labor and Workforce Development

GEORGE E. NOEL
Director of Labor

HEATHER E. ROWE
Acting Commissioner of
Division of Occupational Safety

Awarding Authority: City of Haverhill, Massachusetts

Contract Number: CWSRF-3403 **City/Town:** HAVERHILL

Description of Work: Capping and closure of the 35-acre Southern Mound of the Haverhill Landfill, including grading and shaping and installation of the final cap, stormwater controls, and landfill gas controls

Job Location: Old Groveland Road Haverhill, MA

Classification	Effective Dates and Total Rates

Additional Apprentice Information:
Minimum wage rates for apprentices employed on public works projects are listed above as a percentage of the pre-determined hourly wage rate established by the Commissioner under the provisions of the M.G.L. c. 149, ss. 26-27D. Apprentice ratios are established by the Division of Apprenticeship Training pursuant to M.G.L. c. 23, ss. 11E-11L.

All apprentices must be registered with the Division of Apprenticeship Training in accordance with M.G.L. c. 23, Section 11.

All steps are six months (1000 hours) unless otherwise specified.

* Ratios are expressed in allowable number of apprentices to journeymen or fraction thereof.
** Multiple ratios are listed in the comment field.
*** The job site ratio of 2 apprentices (APP) for every 3 journeymen (JM) is allowed as follows:
1 JM: 1 APP; 2-3 JM: 2 APP; 4-6 JM: 4 APP; 7-9 JM: 6 APP; 10-12 JM: 8 APP; 13-15 JM: 10 APP; etc.
**** The job site ratio of 2 apprentices (APP) for every 3 journeymen (JM) is allowed as follows:
1-2 JM: 1 APP; 3-4 JM: 2 APP; 5 JM: 3 APP; 6-7 JM: 4 APP; 8 JM: 5 APP; etc.

This wage schedule must be posted at the work site in accordance with M.G.L. c. 149, § 27. Failure of the employer to pay "prevailing wage rates," which are the minimum wage rates listed above, on public works projects is a violation of M.G.L. c. 149, § 27. Employees not receiving such rates should report the violation to the Fair Labor Division of the Office of the Attorney General , 100 Cambridge Street, Boston, MA 02108; Tel: 617-727-3465. Contractors with questions about the wage rates or classifications included on the wage schedules have an affirmative obligation to inquire with DOS at www.mass.gov/dos/pw or at 617-626-6952.

Diesel Construction Equipment Standard

All diesel powered non-road construction equipment and vehicles greater than 50 brake horsepower which will be used in the performance of the work under the Contract (hereinafter "Diesel Construction Equipment") must have the following pollution control device installed unless exempt as provided below:

1. Emission control technology verified by U.S. Environmental Protection Agency ("EPA") or the California Air Resources Board ("CARB") for use with non-road engines;
2. Emission control technology verified by EPA or CARB for use with on-road engines provided that such equipment is operated with diesel fuel that has no more than 15 parts per million sulfur content (i.e. Ultra Low Sulfur Diesel fuel); or
3. Emission control technology certified by the manufacturer that such technology meets or exceeds the emission reductions provided by on-road or off-road emission control technology verified by EPA or CARB, i.e. that a Diesel Oxidation Catalyst is achieving the following minimum emission reductions: particulate matter 20%; carbon monoxide 40%; volatile organic compounds 50%; or a Diesel Particulate Filter is achieving a minimum of 85% emission reductions for particulate matter.

Emission control devices, such as oxidation catalysts or particulate filters, shall be installed on the exhaust system side of the Diesel Construction Equipment. The Contractor shall be responsible to insure that the emissions control technology is operated, maintained, and serviced as recommended by the manufacturer.

For the latest up-to-date list of EPA verified-technologies, see:
http://www.epa.gov/otaq/retrofit/retroverifiedlist.htm
For the latest up-to-date list of CARB verified technologies, see:
http://www.arb.ca.gov/diesel/verdev/verifiedtechnologies/vt.htm

Exemptions

The following Diesel Construction Equipment shall be exempt from the standard above. The Contractor shall include such Diesel Construction Equipment in the required recordkeeping:

1. Diesel Construction Equipment not owned by the Contractor and used in the performance of the work under this Contract for 30 calendar days (cumulative days but not necessarily consecutive) or less;
2. Unless otherwise exempt, additional Diesel Construction Equipment originally not anticipated to be used under the Contract or used as permanent replacement after the work under the Contract has commenced, for 15 calendars days from the date such Diesel Construction Equipment is brought on site;

3. Diesel Construction Equipment with an engine that meets the EPA particulate matter (PM) Tier emission standards in effect at the start of the Contract for non-road diesel engines for the applicable engine power group (e.g., as of January 1, 2009, a piece of

Diesel Construction Equipment with a Tier 3 engine is exempt from meeting the standard until the piece of Diesel Construction Equipment is available with a Tier 4 engine) provided that if such emissions standards are superseded during the Contract then such Diesel Construction Equipment must be retrofitted in accordance with the standards above prior to the end of the Contract;

4. A large crane (e.g. a sky crane or link belt crane which is responsible for critical lift operations) if such device would adversely affect the operation of the crane provided the Contractor submits to the municipality's project engineer written technical justification documenting the adverse impact on operation; and

5. Diesel Construction Equipment that the project engineer has determined is necessary to control a compelling emergency including but not limited to, the need for rescue vehicles or other equipment to prevent harm to human beings or additional equipment required to address a catastrophic emergency such as structure collapse or imminent collapse. After the compelling emergency is controlled, such non-compliant equipment must be removed from the Contract site and may not be used in further performance of the work under this Contract. Meeting Contract deadlines is not a compelling emergency.

Contractor Certification

Each bidder shall submit as part of its bid, the Statement of Intent to Comply. Within 10 days of being notified that it has been awarded a contract, the bidder and each of its Contractors and Subcontractors shall submit a Diesel Retrofit Program Contractor Certification. Each such Certification shall contain the following information for each piece of Diesel Construction Equipment:

1. Contractor or Subcontractor name;
2. Equipment type, make, model;
3. Vehicle Identification Number or VIN;
4. Engine model and year of manufacture;
5. Engine HP rating;
6. Emission Control Device (ECD) type (Diesel Oxidation Catalyst or Diesel Particulate Filter);
7. ECD make, model, and manufacturer;
8. ECD EPA or CARB Verification Number or manufacturer's certification that the DOC or DPF meets or exceeds emission reductions provided by similar emission control technology verified by EPA or CARB;
9. ECD installation date;
10. Type of fuel to be used; and
11. Whether the equipment is owned or rented.

Recordkeeping

Each Contractor and Subcontractor shall maintain detailed records of all Diesel Construction Equipment used under the Contract, including the dates and duration times the Diesel

Construction Equipment is used at the Contract site. Records shall be available for inspection by DEP. Each Contractor and Subcontractor shall notify DEP within 48 hours of any new Diesel Construction Equipment brought onto the Contract site.

For Diesel Construction Equipment that has an emissions control device with a manufacturer's certification, the Contractor shall maintain records of all supporting emissions test data and test procedures. If upon review the emissions reductions are not supported by the test data and test procedures, then the emissions control device may need to be replaced with a compliant retrofit device.

Project Regulatory Agreement

The following language shall be included section 4 (Covenants of the Borrower) of the municipality's Project Regulatory Agreement if it receives funds from the State Revolving Fund:

> The Borrower shall require each Contractor and Subcontractor to submit the Diesel Retrofit Program Contractor Certification to DEP and the Borrower prior to commencing work on the Project. The Borrower shall not allow any Contractor or Subcontractor to commence work at the Project site prior to submitting such Certification.

STATEMENT OF INTENT TO COMPLY

This form must be signed and submitted by the bidder as part of the bid.

Local Governmental Unit _____ **SRF Project No.** _____

Contract No. _____ **Contact Title** _____

Bidder _____

The undersigned, on behalf of the above-named Bidder, agrees that, if awarded the Contract:

1. **the Bidder shall comply with the Department of Environmental Protection's ("DEP") Diesel Retrofit Program by ensuring that all diesel powered non-road construction equipment and vehicles greater than 50 brake horsepower which will be used in the performance of the work under the Contract are equipped or retrofitted with a pollution control device in accordance with the Diesel Retrofit Program Standard;**

2. **the Bidder shall require all Subcontractors to comply with MassDEP's Diesel Retrofit Program by ensuring all diesel powered non-road construction equipment and vehicles greater than 50 brake horsepower which will be used in the performance of the work under the Contract are equipped or retrofitted with a pollution control device in accordance with the Diesel Retrofit Program Standard; and**

3. **The Bidder shall submit and shall require each Subcontractor to submit a Diesel Retrofit Program Contractor Certification (form attached) with a Diesel Retrofit List to DEP (NAME and ADDRESS) and the Bidder within 10 days of the bidder being notified that it has been awarded the Contract. The Bidder shall require each Subcontractor to update such Certification and List within 2 days of using additional Diesel Construction Equipment on the project under the Contract.**

_____

(Signature of Bidder's Authorized Representative) **(Date)**

DIESEL RETROFIT PROGRAM CONTRACTOR CERTIFICATION

Each Contractor and its Subcontractor(s) must sign and submit this form to MassDEP and the Municipality within 10 days after the Contractor is notified that it is awarded the Contract.

Local Governmental Unit _____ **SRF Project No.** _____

Contract No. _____ **Contact Title** _____

Contractor _____

I, _____**, an authorized signatory for** _____**, whose principal place of business is at** _____ **do hereby certify that any and all diesel powered non-road construction equipment and vehicles greater than 50 brake horsepower which will be used in the performance of the work under the Contract (hereinafter "Diesel Construction Equipment") have pollution control devices, such as oxidation catalysts or particulate filters, installed on the exhaust system side of the diesel combustion engine equipment in accordance with the Diesel Retrofit Program Standard.**

I am submitting on behalf of _____ **a list of all said Diesel Construction Equipment, labeled "Diesel Retrofit List," that will be used in connection with this Contract by** _____**. I hereby certify that the information on the attached Diesel Retrofit List is correct and accurate as of the date of signature. The List includes the following information for each piece of Diesel Construction Equipment:**

1. **Equipment type, make, model;**
2. **Vehicle Identification Number or VIN;**
3. **Engine model and year of manufacture;**
4. **Engine HP rating;**
5. **Emission Control Device ("ECD") type (Diesel Oxidation Catalyst or Diesel Particulate Filter);**
6. **ECD make, model, and manufacturer;**
7. **ECD EPA or CARB Verification Number or manufacturer's certification that the DOC or DPF meets or exceeds emission reductions provided by similar emission control technology verified by EPA or CARB;**
8. **ECD installation date;**
9. **Type of fuel to be used; and**
10. **Whether the equipment is owned or rented.**

DIESEL RETROFIT PROGRAM CONTRACTOR CERTIFICATION

_____shall notify MassDEP within 48 hours of any new Diesel Construction Equipment brought onto the Contract site.

_____shall maintain detailed records of all Diesel Construction Equipment used at the Contract site, including the dates and duration times the Diesel Construction Equipment is used at the Contract site. _____ shall make such records available for inspection by MassDEP. _____shall ensure that the emissions control technology for each piece of Diesel Construction Equipment is operated, maintained, and serviced as recommended by the manufacturer. _____ shall retrofit prior to the end of the Contract any Diesel Construction Equipment no longer exempt from meeting the Diesel Construction Equipment Standard under exemption 3 (because it had an engine that met the EPA particulate matter (PM) Tier emission standards currently in effect at the start of the Contract for non-road diesel engines for the applicable engine power group and such emissions standards were superseded during the Contract).

I acknowledge that this certificate is being furnished as a requirement under this Contract and is subject to applicable State and federal laws, both criminal and civil. Signed under pains and penalty of perjury on this date _____.

Signature_____

Name: _____

Title: _____

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
ONE WINTER STREET, BOSTON, MA 02108 617-292-5500

ARGEO PAUL CELLUCCI
Governor

JANE SWIFT
Lieutenant Governor

BOB DURAND
Secretary

LAUREN A. LISS
Commissioner

DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF RESOURCE PROTECTION
DIVISION OF MUNICIPAL SERVICES POLICIES

The Division of Municipal Services (DMS) has established the following policies for all Division financially-assisted projects.

POLICY MEMORANDUM NO. CG-1 EASEMENTS AND RIGHTS OF WAY

Prior to the approval of financial assistance for construction, the owner shall obtain and shall thereafter retain, a fee simple or such estate or interest in the site of construction and rights of access as will assure undisturbed use and possession for the purpose of construction and operation for the estimated life of the project. The Division may refuse to approve financial assistance until it has received from the owner sufficient assurances that such interests have been obtained. Unless the Division otherwise notifies the owner, the certificate (under pains and penalties of perjury) of the owner's legal representative shall constitute such sufficient assurance.

Additional cost which result from interruptions of construction or extensions of contract time caused by the owner's failure to obtain the necessary interests in land shall be ineligible for financial assistance, and all such additional costs shall be borne by the owner.

POLICY MEMORANDUM NO. CG-2 PERMITS

The owner shall be responsible for identifying and obtaining all federal, state, local and railroad permits required by the nature and location of construction, including but not limited to building construction permits and permits for street and highway cuts and openings, and all such permits shall be listed in a separate permits section of the contract documents. To the extent possible, such permits shall be obtained by the owner prior to the solicitation of bids for construction, and copies of all permits so obtained shall be included in the said permits section. The status of the application for each permit, including the permit conditions, and costs, not obtained prior to the solicitation of bids shall also be indicated in the contract documents permits section. The Division may refuse to approve financial assistance for construction unless and until it has received from the owner sufficient assurances that all necessary permits have been or will be obtained prior to the commencement of construction.

The contractor shall be responsible for obtaining all permits required of his equipment, work force, or particular operations (such as blasting) in the performance of the contract and not otherwise specified in the two preceding paragraphs as to be obtained by the owner. These permit fees shall be paid by the contractor.

The owner shall be responsible for the payment of all other permit fees required by the construction.

The following permits shall not be eligible for financial participation by the Department of Environmental Protection (DEP).

- Permits and insurance for construction in railroads' rights of way;
- Building permits;
- Permits for opening public streets and other public or municipal rights of way;
- Permits for the use of explosives;
- Permits for the disposal of waste materials;
- Permits and fees for connecting to municipal utilities.

Permits required by extraordinary circumstances and not specifically excluded from eligibility above may be eligible for DEP participation. For such permits to be so eligible, the owner or his representative must notify the DEP project engineer in advance of obtaining such permit and receive from the engineer specific agreement that such permit will be eligible for DEP participation. Eligibility for such participation will not be made retroactively.

Additional costs which result from interruptions of construction or extensions of contract time resulting from the owner's or the contractor's failure to obtain the necessary permits may be ineligible for participation.

POLICY MEMORANDUM NO. CG-3 — FIELD CONTROLS

The Owner shall be responsible for indicating on the contract drawings all easement limits and all property and other control lines for locating the principal component parts of the work together with those elevations and bench marks used in the design of the work, all hereinafter referred to as "field controls". Where easement and property limits have not previously been established in the field, the owner shall be responsible for establishment of such limits. From the information provided by the Owner, unless otherwise specified, the Contractor shall develop and make all layouts required for construction, such as slope stakes, batter boards, stakes for pipe locations and other working points, lines, elevations and cut sheets.

Whenever he has reason to believe that an error exists or whenever he is otherwise unable to locate the field controls, the contractor shall promptly notify the owner and the owner's engineer of such error with appropriate documentation.

POLICY MEMORANDUM NO. CG-4 — RECORD DRAWINGS:

The Owner shall be responsible for the preparation of all record drawings required by this contract. This responsibility may be delegated to the Owner's representative. The responsibility for preparation of record drawings shall not be delegated or transferred to the contractor. They may use the contractor's and sub-contractor's certified AS BUILT drawings along with their own marked up set in the preparation of the Record Drawings.

Division approved contract drawings shall be revised upon completion of the contract to reflect any changes made and/or final quantities, as appropriate.

POLICY MEMORANDUM NO. CG-5 — PLAN SCALE

Unless otherwise approved in advance by the Division, the horizontal scale for construction plans for non-structural facilities shall be 1" = 40'. A larger horizontal scale shall be used where appropriate to show sufficient detail to construct the project. The vertical scale for construction plans for non-structural facilities shall be 1" = 4'. Based on the best information available at the time of their preparation, the location of underground utilities and support structures for overhead utilities shall be shown on the plans.

Unless otherwise exempted in advance by the Division, construction plans shall be updated whenever the date of the advertisement for bids for the construction of such facilities is more than one year after the date of approval by the Division or EPA; and in the case of approval by both such agencies, the later approval date shall be used in determining the need for update.

The consulting engineer shall receive adequate compensation for updating plans and specifications, and such additional cost shall be eligible for assistance to the extent not otherwise prohibited by USEPA and Division regulations and program guidance.

All revision, or review without need for revision, shall be noted and dated on the plans prior to advertisement of the project for bid.

POLICY MEMORANDUM NO. CG-6 — BORINGS LOGS

All soil borings shall be taken as close as practicable to the construction line, and the location of all such borings shall be clearly indicated on the contract drawings. The plan view shall show the location and boring number of each boring. The profile view shall show the location, elevation, and depth of each soil boring, the location of each change in soil stratum, the groundwater level, and the average of blow counts at each five foot interval. As a minimum, boring logs to be submitted with the plans and specifications shall show the name of the company taking the borings, the soil classification, the number of blows per foot of penetration, the groundwater elevation, and the date on which the borings were taken.

As part of the submission of plans and specification for approval, the owner's representative shall include written justification for the lesser frequency and depth of borings where their interval is more than approximately 300' or their depth is less than 50% below depth of pipe invert.

POLICY MEMORANDUM NO. CG-7 BREAKDOWN OF BID ITEMS

The following items shall, where applicable, be listed separately in the bid documents.

1. Mobilization
2. Pavement
   a. Municipal
      i. temporary
      ii. permanent
   b. State
      i. temporary
      ii. permanent
3. Concrete cradle or encasement (to be identified where applicable)
4. Rock-Excavation
5. Wood or steel sheeting left in place
6. Excavation of unsuitable materials below grade.
7. Select and/or borrow material
8. Dewatering
9. Special Dewatering (coffer dam)

Mobilization costs are the costs of initiating the contract, exclusive of the cost of materials. Payment for mobilization shall be a lump sum at the price bid for this item in the proposal and shall be payable when the contractor is operational on the site. For purposes of this policy, "operational" shall mean the substantial commencement of work on site.

The lump sum price bid for mobilization shall not exceed five per centum (5%) of the total amount of the bid.

POLICY MEMORANDUM NO. CG-8 PAVEMENT

All roads and trenches therein shall be refilled and repaved in accordance with specifications provided by the owner in the contract documents. Please note that this policy may be excludable on Federally assisted projects where bid alternative items may be required (i.e. trench width vs. full width pavement). You are advised to seek project specific clarification.

Loan eligibility shall be limited to the following:

A. Where the depth of the pipe invert is 0 to 8', the maximum pavement widths which shall be eligible for financial assistance are as follows:

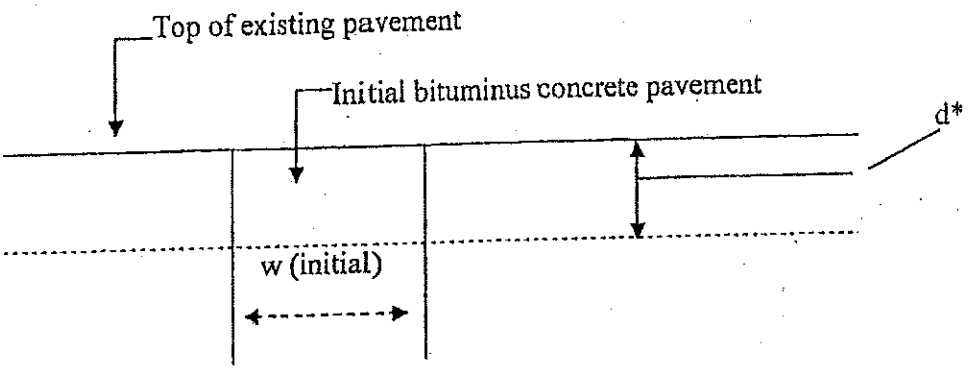
Nominal Pipe Diameter	Maximum Eligible Widths	
	Initial Pavement	Permanent Trench
0-24"	6'-6"	8'-6"

Where the nominal pipe diameter is greater than 24" the maximum eligible width for Initial re-paving shall be the nominal diameter of the pipe plus four (4) feet, and for permanent trench re-paving the maximum eligible width shall be the nominal pipe diameter plus six (6) feet.

B. For each additional four (4) feet (or fraction thereof) of pipe invert depth, add three feet to the eligible width limits stated in paragraph A.

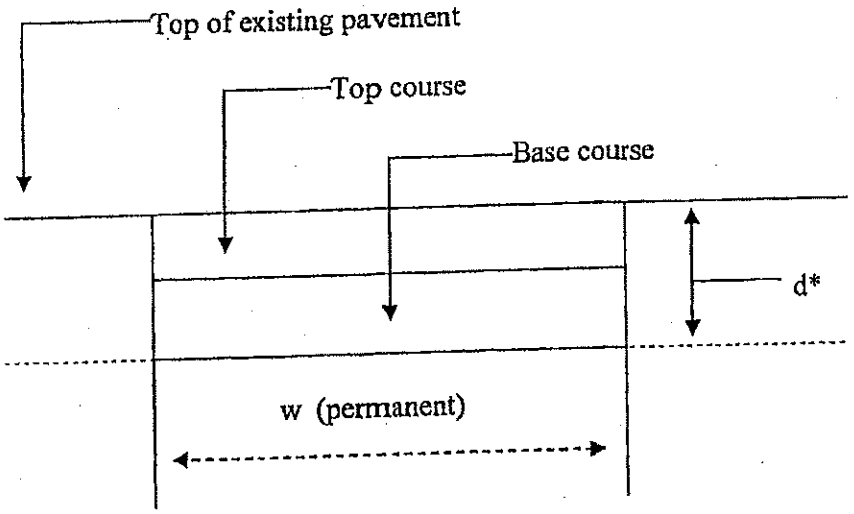
At the design phase of a project the owner has the option to elect either Initial Pavement with Option I (Permanent Trench replacement) or Initial with Option II (curb to curb over initial)

Initial Pavement



d*= depth of existing pavement to a maximum of 3 inches (see general notes #3)
w = maximum eligible Initial pavement width as described in paragraphs "A" & "B" on page DEP-DMS-CG's-P4.

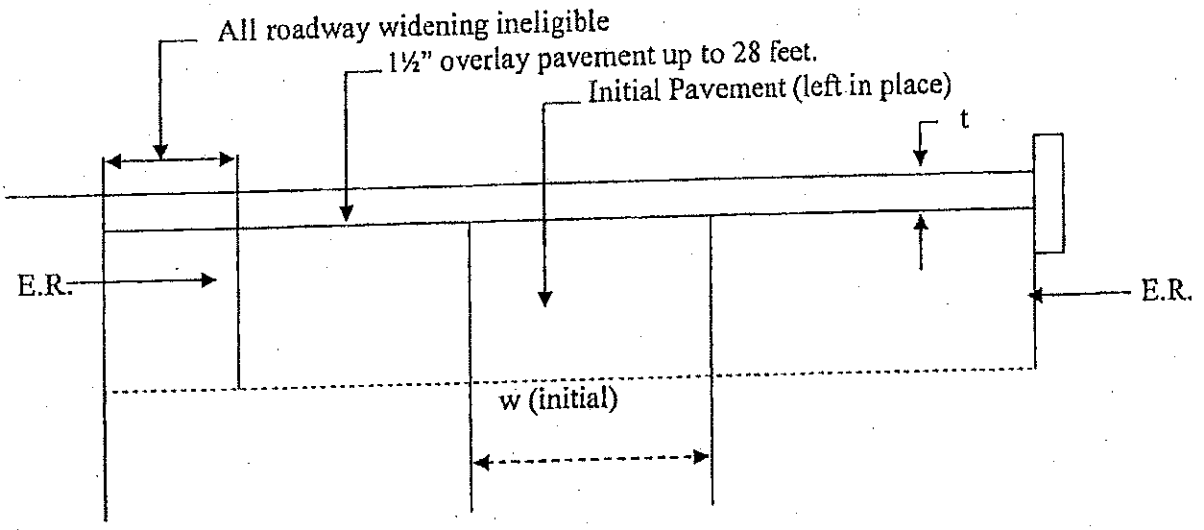
OPTION I Permanent Trench Pavement



d*= depth of existing pavement trench to a maximum of 3 inches (see general notes #3)
w = maximum eligible permanent pavement width as described in paragraphs "A" & "B". equals initial width plus 2 feet and includes:

- Cutting edges for the permanent trench
- Removal of initial patch plus two feet of existing pavement
- Fine grading/compacting gravel
- Placement of Permanent Trench pavement in two courses.

OPTION II Curb to Curb Pavement (overlay pavement for roadways up to 28 feet)



E.R.= edge of existing paved roadway
t = one and one half inch (1½") overlay of bituminus concrete pavement

GENERAL NOTES:

1. Repavement of settled areas and crown restoration within the trench limits shall be the responsibility of the contractor.
2. Leveling outside the trench limits shall be the responsibility of the owner.
3. Sewer trench re-fill and pavement re-paving on public ways under the jurisdiction of the Massachusetts Department of Public Works, the Metropolitan District Commission, or other such agency shall be in accordance with permit(s) issued therefor by that Department or Commission, as the case may be.
4. The Division will consider requests for increase in the participating pay limits defined in paragraphs A and B, when such increases are, in the Division's opinion, reasonable. Such requests should be documented in writing and submitted to the Division in a timely manner.
5. Projects which deviate from the above options are required to seek Division review and approval.

POLICY MEMORANDUM NO. CG-9 — PIPE TESTING

Monthly payment estimates shall be prepared in accordance with contract documents. All pipe shall be tested in accordance with the contract documents and sound engineering practice. If, after 60 days following submission of a monthly payment estimate for pipe items, the pipe for which payment is requested has not been successfully tested, the owner may withhold up to 10% of the amount requested for such pipe items until the pipe has been so tested. However, in the case of a major (pipe diameter 24 inches or greater) interceptor pipe installation, sums retained by the owner pursuant to this policy memorandum shall not exceed two per centum (2%) of the costs of such pipe items.

POLICY MEMORANDUM NO. CG-10 — CHANGE ORDERS

Executed change orders submitted to the Division for review and processing for financial assistance must be prepared on the attached Change Order Forms (CG-10, Attachment 1, pages A-1 & A-2) with a duplicate copy, calculation sheet(s) (CG-10, Attachment 2), and all other supporting documentation necessary for evaluation. Failure to comply with these instructions will result in delays in processing the change order and/or limited financial assistance.

M.G.L. c.44, s.31C requires that the auditor, accountant, or other municipal officer having similar duties must certify that adequate funding in an amount sufficient to cover the total cost of the change order has been made. Change orders will not be processed or approved until this certification is made on the face of the Change Order Form (CG-10 Attachment 1).

Payment of Change Orders:

Payment of all change orders shall be in accordance with the relevant provisions of Massachusetts General laws, Chapter 30, Section 39G for non-building construction and Section 39K for building construction.

Payment of change orders shall be made in accordance with one of the following three methods:

A. Existing unit prices as set forth in the contract; or
B. Agreed upon lump sum or unit prices; or
C. Time and materials

A. Payment for work for which there is a unit price in the contract:

Where the contract contains a unit price for work and the Engineer orders a change for work of the same kind as other work contained in the contract and is performed under similar physical conditions, the contractor may accept full and final payment at the contract unit price(s) for the acceptable quantities.

B. Payment for work or materials for which no price is contained in the contract:

If the Engineer directs, the contractor shall submit promptly in writing to the Engineer and offer to do the required work on a lump sum or unit price basis, as specified by the Engineer. The stated price, either lump sum or unit price, shall be divided so as to show that it is the sum of:

(1) The estimated cost of labor, plus
(2) Direct Labor Cost, plus
(3) Material and Freight Costs, plus
(4) Equipment Costs, plus
(5) An amount not to exceed 20% of the sum of items (1) through (4) for overhead and profit, plus (if applicable),
(6) In the case of work done by a subcontractor and amount not to exceed 7 ½ %, for the general contractor of the sum of items (1) through (4) for his overhead and profit, less, if applicable,
(7) Credits for work deleted from the contract.

C. Payment for work on a time and materials basis:

Unless an agreed lump sum and/or unit price is obtained from above and is so stated in the change price, the contractor shall accept as full payment for which no other agreement is contained in contract, and amount equal to:

(1) The estimated cost of Labor, plus
(2) Direct Labor Cost, plus
(3) Material and Freight Costs, plus
(4) Equipment Costs, plus
(5) An amount not to exceed 20% of the sum of items (1) through (4) for overhead and profit, plus (if applicable),
(6) In the case of work done by a subcontractor and amount not to exceed 7 ½ %, for the general contractor of the sum of items (1) through (4) for his overhead and profit, less, if applicable,
(7) Credits for work deleted from the contract.

Explanation of items (1) through (7) as outlined in "B" and "C":

(1) Labor – Only those workers employed on the project who are doing the extra work, including the foreman in charge, are allowable. General foremen, superintendents, or other supervisory personnel are considered to be included in the overhead markup as provided in items (5) and/or (6). Hourly labor rates in excess of those as listed in the contract wage rates (Federal or State, whichever applies require documentation. As a minimum, an explanation and the appropriate copy of the certified payroll are required.

(2) Direct Labor Costs - These costs are limited to those which are required in the contract document. Coverage in excess of the contract provisions, secured by the contractor/subcontractor(s) at his option, are ineligible for financial assistance. The following list of typical direct labor charges is provided for your assistance and is in no way intended to be complete or all encompassing:

- Workman's Compensation
- Federal/State: Social Security Tax and Unemployment Tax;
- Health, Welfare and Pension Benefits; (this cost is included in the wage rates appearing in the Mass. Wage Rates of the contract specifications)
- Liability Insurance: Bodily Injury;
  Excess Umbrella;
  Property damage;
  Public Liability
- Blasters Insurance
- Builders Risk Insurance
- Experience Modification Insurance
- Surcharges

))))))) If applied to any required direct labor costs.

Following award and prior to execution of a construction contract, the contractor and filed sub-bidders (where applicable) shall submit for review by the owner, documentation to establish the Direct Labor Cost percentage(s) (Direct Labor markup percentage(s)).

The documented direct labor markup for this contract may be adjusted on an annual basis as measured from the date the contract is executed. The contract agreement will provide for the establishment of the Direct Labor Cost percentage.

(3) Material and Freight – Only those materials required as a result of the change order and reasonable freight charges for delivery of same are allowable.

(4) Equipment – Only the equipment required as a result of the change order is allowable. Equipment rental rates shall be governed by the current Nielson/Dataquest Rental Rate bluebook for Construction Equipment (the "Bluebook"). In determining the rental rate the following shall apply:

(a) For equipment already on the project – the monthly prorated rental rate by the hourly use shall be applicable;
(b) For equipment not on the project the daily rate, the weekly rate, or monthly rate will prevail, whichever will prove to be most cost effective. Small tools and manual equipment are examples of costs not allowable under this item. These costs are considered to be included in the overhead markup as provided in items (5) and/or (6) (1 month (normal use) = 176 hours)

(5) & (6) Overhead and Profit – All other costs not previously mentioned are considered to be included in this item, be it for the general contractor or subcontractor(s).

(7) Credits – Work deleted, material and equipment removed from the contractor, stored and/or returned shall be credited to the cost of the change order, less costs.

The Contractor shall furnish itemized statements of the cost of the work ordered and shall give the Engineer access to all accounts, bills and vouchers relating thereto; and unless the Contractor shall furnish such itemized statements, and access to all accounts, bills and vouchers, he shall not be entitled to payment for any items of extra work for which such information is sought by the Engineer. Deviations from any of the above will be reviewed for financial assistance on a case-by-case basis.

The change order will be prepared in such manner as to clearly separate Eligible and Ineligible Costs.

CHANGE ORDER FORM

SRF Number _____
Public Entity _____
Contract Number _____
Change Order Number _____

Contract Amount (As Bid) $ _____

Net Change in Contract Price (this change order) $ _____

Total Adjusted Contract Price (including this and all other change orders) $ _____

This change order extends the time to complete the work by _____ calendar days.

The extended completion date is _____

This change order checked by _____ _____
(Chief) Resident Engineer Date

This change order is requested by: _____

This change order is recommended by: _____

_____ _____ _____
Consultant Engineer P.E. Number Date

The undersigned agree to the terms of the change order.

_____ _____
Contractor Date

_____ _____
Owner Date

Certification of Appropriation under M.G.L. c.44, §31C: Adequate funding in an amount sufficient to cover the total cost of this change order is available.

By: _____ _____
Certification Officer (Auditor, accountant, treasurer) Date

Do not write below: this space reserved for STATE AGENCY APPROVAL

DEP/DMS

CHANGE ORDER FORM (Continued)

Public Entity _____

SRF No: _____ Contract No. _____ Change Order No. _____

Contract Title: _____

Owner's Name: _____

Owner's Address: _____

Contractor's Name: _____

Contractor's Address: _____

Description of Change

_____

_____

_____

_____

_____

_____

_____

_____

Reason for Change

_____

_____

_____

_____

_____

_____

_____

_____

_____

CALCULATION SHEET

(1) Labor

Foreman	10 hrs @ $10.00/hr.	$ 100.00	
Engineer	10 hrs @ 8.50/hr	85.00	
Operator	10 hrs @ 9.50/hr	95.00	
Laborers	24 hrs @ 7.00/hr	168.00	
			$448.00

(2) Direct Labor Cost (use the agreed upon Direct Labor Cost)

* (30)% of $448 134.00
* (Used for example purposes only)

(3) Materials & Freight

150 l.f. of 12" pipe @ $2.00/l.f.	$ 300.00	
15 v.f. precaset SMH	1,700.00	
Freight (slip # _____ Enclosed)	25.00	
		2,025.00

(4) Equipment

1 Backhoe 10 hrs @ $80.00/hr	$ 800.00	
1 Truck-crane 10 hrs @ $100.00/hr	1,000.00	
		1,800.00
Total (Items 1 through 4)		4,407.00

(5) 20% markup for Overhead, Profit

20% of $4,407 881.00

(6) 7 ½% markup for general contractor (if subcontractor is involved)

7 ½% of $4,407 331.00

(7) Credits (deductibles) - 323.00

Total Cost $ 5,296.00

Reminder: Provide support documentation as necessary i.e. vouchers, correspondence, Calculation, photographs, reports .....

POLICY MEMORANDUM NO. CG-11 UTILITY RELOCATION

The construction of treatment facilities, sewers, pumping stations, force mains and appurtenant work can cause the relocation of utilities. Costly relocation can sometimes be minimized by early communication and cooperation of the representatives of the municipality (owner) and the utilities.

Every possible effort should be made by the owner and each utility to establish the location of existing utilities in the vicinity of the proposed construction. The owner or its consulting engineer should make every reasonable effort to design the proposed construction so that relocation of existing utilities is minimized whenever possible. If the proposed construction is in an area of many existing utilities or in an otherwise critical area, the utilities are encouraged to mark the location of their existing utilities at the site during the design phase of the project.

During the design phase of the project, the municipality should provide timely notice to all utilities known or thought to have facilities in or proximate to the site of such future construction.

POLICY MEMORANDUM NO. CG-12 REFUNDABLE DEPOSITS FOR PLANS AND SPECIFICATIONS

For each set of project plans and specifications provided, the owner may require a deposit in form of cash or other appropriate security, in an amount sufficient to cover the costs of production of such plans and specifications.

Upon return of the plans and specifications to the owner within a reasonable time and in good condition, such deposit shall be refunded.

Actual mailing costs, if any, shall be borne by the party requesting such plans and specifications.

POLICY MEMORANDUM NO. CG-13 BID OPENING PROCEDURES

As a minimum, bid documents shall be reviewed/inspected for conformance to the following bid opening procedure in the order presented below. Failure to comply with any of these steps shall render the bid non-responsive and upon determination of such non-responsiveness, such bid shall be rejected immediately, set aside, and shall receive no further consideration.

Bid Opening Procedure

Step #1. Timeliness – The bid must be filed at the place and within the time specified therefore in the invitation to bid, and no bid shall be accepted after such time. The time at which a bid is filed should be time/date stamped or otherwise prominently noted on the bid;

Step #2. Bid Security – Properly executed bid security, in the amount and terms specified in the invitation to bid (equal to 5% of Base Bid or Highest Possible Amount considering all alternatives) shall be placed in a seal envelope and attached to the outside of the envelop containing the bid at the time of its submission;

A. Bid Bond

The Bid bond must be dated On or Before the Bid Date;
Issued by a Bonding Company Licensed in Massachusetts;
Accompanied by a Current Power of Attorney;
Signed by Surety;

B. Check

The Check must be a Certified, Cashiers or Bank Treasurer's;
Dated On or Before the Bid Date;

Step #3. Bid Signature – The bid and all accompanying documents so required shall be signed by the bidder or its authorized representative before submission;

Step #4. Addenda – All addenda shall be sent certified mail, return receipt requested, by the owner to all individuals and organizations which have received plans and specifications and shall be mailed not later than five days prior to the date established for submission of bids. All bidders shall include with their bids written acknowledgement of receipt of all addenda, which acknowledgement may be on a form provided therefore by the owner.

Alternates – Any Alternates shall be acknowledged.

Step #5. Written Dollar Amounts – The total dollar amount of each bid shall be read, and the three lowest bids shall be selected for further consideration. The remaining bids shall then be set aside. The three apparent low bids shall be read to determine whether the unit price for each line item of each bid has been written therein in words. If it has not, such bid shall be rejected and shall receive no further consideration. ***Bid amounts shall be consistent (words vs. numbers) and if words and numbers differ, the words govern.*** This procedure shall then be repeated with the next apparent low bid until three are acceptable which have all the unit prices written in words, at which time the lowest bid shall be announced as the apparent low bidder, and the bid opening procedure shall be closed.

The Division recommends that this policy memorandum be included in all contract specifications and that the owner's evaluator(s) use the attached form (CG-13 Attachment #1) for bid opening procedures.

The Contractor's Bid Opening Checklist also attached hereto, is for use by each contractor to assure that his bid conforms with this policy memorandum. It is recommended that the checklist (CG-13 Attachment #2) be included in information for bidders, or at the end of the bid proposal, or in some other prominent part of the bid specifications

FORM FOR BID OPENING PROCEDURES
(to be completed by the owner's evaluator(s))

CONTRACT NO.: _____ DATE: _____

CONTRACT NAME: _____ BID OPENING TIME: _____

All non-responsive bids shall be rejected forthwith by the awarding authority upon determination of such bids' non-responsiveness at the time bids are opened and read. Failure to comply with any one of the requirements shall render the bid non-responsive, and upon determination of such non-responsiveness such bid shall be rejected and receive no further consideration.

A = Acceptable N-R = Non-Responsive (explain reasons on supplemental sheet & attach)

BIDDER		1. TIMELINESS	2. BID SECURITY	3. SIGNATURE	4. ADDENDA ALTERNATIVES	WRITTEN 5. DOLLAR AMOUNTS	COMPLIANCE (CIRCLE ONE)	
1							YES	NO
2							YES	NO
3							YES	NO
4							YES	NO
5							YES	NO
6							YES	NO
7							YES	NO
8							YES	NO
9							YES	NO
10							YES	NO
11							YES	NO
12							YES	NO

DEP/DMS

Evaluator(s) _____

_____

_____

BID OPENING PROCEDURES
CONTRACTORS CHECKLIST

CONTRACT NO.: _____ BIDDER: _____ DATE: _____

All non-responsive bids shall be rejected forthwith by the awarding authority upon determination of such bids' non-responsiveness at the time bids are opened and read. Failure to comply with one or more of the following requirements shall render the bid non-responsive, and upon determination of such non-responsiveness such bid shall be rejected and receive no further consideration.

ITEM	REQUIREMENTS	COMPLIANCE (CIRCLE 1)		REASONS FOR REJECTION
1. Timeliness	Bid filed w/in time specified	Yes	No; Rejected	
2. Bid Security	Appropriate and properly Executed security w/bid.	Yes	No; Rejected	
3. Signature	Bid signed by authorized Representative	Yes	No; Rejected	
4. Addenda	All addenda acknowledge Any alternative	Yes	No; Rejected	
5. Dollar Amount	Dollar amount in words Specified for each line item in bid	Yes	No; Rejected	

POLICY MEMORANDUM NO. CG-14 PAYMENT FOR ROCK EXCAVATION

There shall be in the contract documents a separate pay item for rock excavation. For such purposes, "rock" shall mean igneous, sedimentary, metamorphic, and conglomerate rock, which for excavation must be drilled, blasted, broken, or ripped by power tools. Boulders and concrete structures one cubic yard or greater, however removed, are included within this definition of rock for payment purposes. At the option of the owner or his representative a separate pay item for boulders, concrete structures, or concrete road base may be used.

Depth From Ground Surface To Invert Pipe	Pay Width (Nominal Pipe Diameter)	
	0-24"	Over 24"
* 0 – 12'	5'0"	D+3'0"
* Over 12' – 20'	7'0"	D+5'

Engineer's plans and specifications shall establish pay limits below pipe and structures.

- See CG-14 Attachment #1 (typical cross section)

Payment width for depths over twenty feet (20') shall be determined on a case-by-case basis consistent with the foregoing chart.

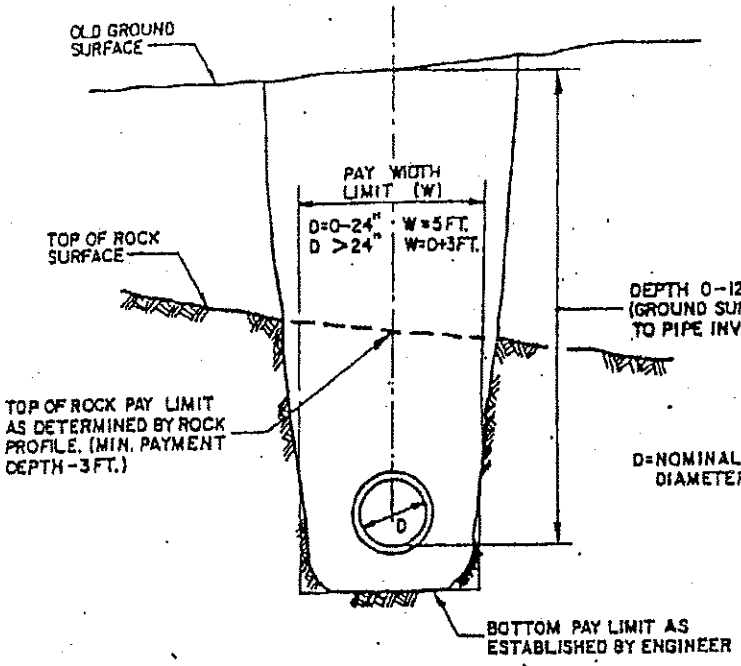
The pay limit for rock removal outside proposed manholes shall commence one foot (1') outside the widest dimension of the structure of shall be the maximum connecting trench width, whichever is greater.

Payment depth for rock which is encountered in a trench shall be no less than three feet (3') when removal can be accomplished only by drilling and blasting or by use of jack (air or hydraulic) hammers.

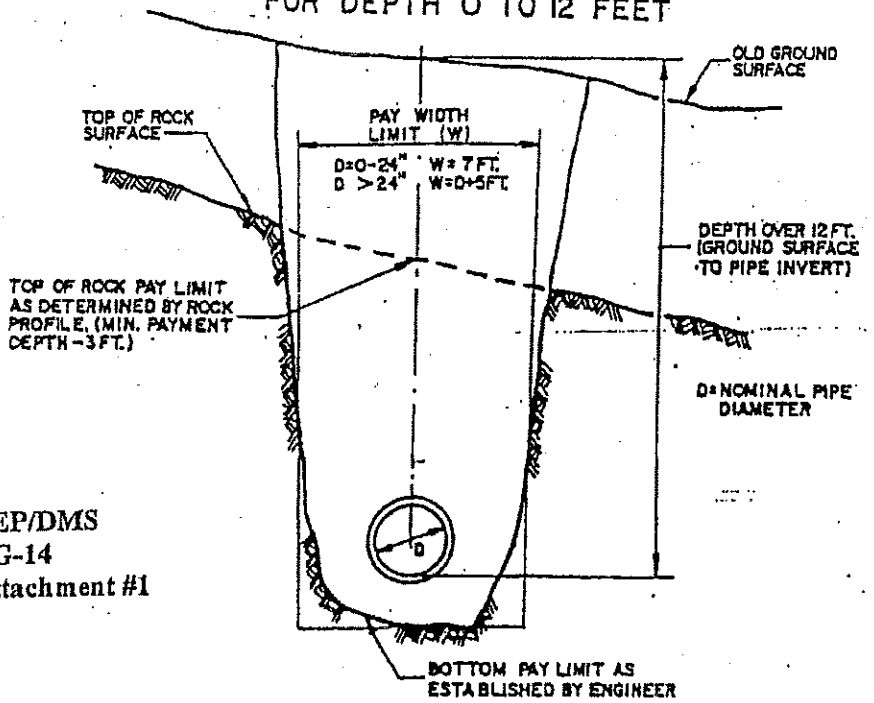
Payment for rock removed, using the same or equal equipment as utilized for normal trench excavation, shall be limited to the actual depth removed within the limits established by the contract documents.

Boulders encountered within the pay limits of excavation, whose volume is one cubic yard or greater, part of which extends outside said limits shall be paid in accordance with the actual volume excavated.

CG-14 ROCK EXCAVATION



FOR DEPTH 0 TO 12 FEET



FOR DEPTH OVER 12 FEET AND UP TO 20 FEET

DEP/DMS
CG-14
Attachment #1

POLICY MEMORANDUM NO. CG-15 TRAFFIC POLICE

The reasonable costs for police details required for traffic control on a construction project which receives financial assistance shall be considered as an eligible administrative cost. A police detail item shall not be included as a bid item in the contract documents.

"Police" as used in this memorandum includes local, county, capital, state, regular and auxiliary police.

Owner's Responsibility

It shall be the owner's responsibility to submit in writing the hourly rate of pay to be established for detailed traffic police and each change in rate during the course of the project. It is the owner's responsibility to arrange, document and pay for such police details. The owner or its representative shall meet with the police chief or other officer in charge of police detail duty to review contract needs. The owner shall maintain a daily record of the following:

a. Officer's name
b. Hours worked
c. Location of assignment
d. Hourly rate

POLICY MEMORANDUM NO. CG-16 DOCUMENTATION REQUIRED TO SUBSTANTIATE CONTRACT QUANITITES

Unit	Documentation required
Acres (A)	Location, station, offset and calculations. Location = Street right-of-way, etc; Station = Point on Baseline; Offset = Distance left or right of Baseline
Cubic Yard (C.Y.)	Location, stations, widths, depths, calculations and Cross sections as necessary
Each (Ea.)	Location, station, and offset.
Gallon (Gal.)	Location, stations, calculations (if appropriate) and delivery slips.
Hour (Hr.)	Hours and location.
Linear Feet (L.F.)	Location, stations, and offsets.
Month (Mo.)	Location, period of time and calculations if applicable.

1000 Foot Board Measure (MFBM)	Location, stations, offset, elevations, grade, and calculations. Attach invoices where applicable.
Pound (Lb.)	Locations, stations, and calculations (if applicable). Attach Delivery weight slips.
Square Feet (S.F.)	Locations, stations and calculations
Square Yard (S.Y.)	Locations, stations and calculations
Ton	Locations, stations and calculations (if applicable). Attach Delivery weight slips.
Vertical Feet (V.F.)	Locations, stations, elevations, and offsets.

Note:

1. All of the above, that apply must be submitted with a final payment request or change order as applicable.
2. Where in place measurement is not possible or practical, delivery slips may be used to substantiate quantities.
3. Change orders – See CG-10 in which some of the above may be applicable in justifying materials, equipment and labor.
4. When necessary, itemized quantities must be separated into eligible and non-eligible units with separate calculations to justify eligible costs.
5. Overruns and underruns of any specific item shall be explained with an appropriate sentence or paragraph.
6. On all quantities, units of payment shall be maintained at the project site and shall be updated daily so that upon field inspection by the C.O.E., EPA or DMS, the quantities paid to date can be substantiated.
7. In the case of unforeseen conditions, photos should be submitted with the applicable item in addition to the recommended documentation.
8. Documentation of units of payment shall be clearly legible and cross referenced to the applicable sheets of the record drawings.
9. For record drawings policy, please see CG-4.

DMS Policies 1 through 16 Approved By:

Steven J. McCurdy
Division of Municipal Services

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
ONE WINTER STREET, BOSTON, MA 02108 617-292-5500

MITT ROMNEY
Governor

KERRY HEALEY
Lieutenant Governor

ELLEN ROY HERZFELDER
Secretary

LAUREN A. LISS
Commissioner

Review Of Sewer Line/Water Supply Protection

Effective Date: 1-23-03 DWP Policy #: BRP/DWM/WS/P03-1
Program Applicability: All Boston and regional BRP programs
Supersedes DWS Policy #: 88-02 Review of Sewer Line/Water Supply Protection
Approved by: Glenn Haas, Director, Division of Watershed Management

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PURPOSE: This policy has been amended to reflect current terminology. Minor changes have been made to DWS Policy #88-02 without affecting the intent of that document. The original policy, dated 4-15-88, was adopted to implement the Department of Environmental Protection (then DEQE) policy statement dated February 2, 1988.

Policy

It is the Program's policy to implement fully the Review of Sewer Line/Water Supply Protection policy of the Department which is attached hereto and made a part hereof.

Policy For Review of Sewer Line/Water Supply Protection

The intent of this policy is to protect existing and potential drinking water supplies from potentially negative effects of leaking sewer lines. This policy will apply to new sewer construction and replacement sewer construction statewide.

Gravel Packed and Tubular Wells

- Within the Zone I protective distance around gravel packed wells, all sewer lines and appurtenances are prohibited, unless they are necessary to eliminate existing and/or potential sources of pollution to the well.

- Within an Interim Wellhead Protection Area (IWPA) or unless otherwise documented by an appropriate study specifically defining the Zone II and approved by the Drinking Water Program, all sewer lines and appurtenances will be designed and constructed for maximum watertightness.

    - **Force Mains or Pressure Sewers:** shall be tested at 150% above maximum operating pressure or 150 p.s.i. whichever is greater. Testing shall conform to the requirements of the American Water Works Association (AWWA) standard C 600.

    - **Gravity Sewers:** shall be tested by approved methods which will achieve test results for infiltration or exfiltration of less than 100 gallons/inch diameter/mile/24 hours.

    - **Manholes:** shall be installed with watertight covers with locking or bolted and gasketed assembles. Testing for infiltration/exfiltration shall conform to the same standard as the maximum allowed for pipes in the manhole as required for gravity sewers, indicated above.

    - Satisfactory test results for Force Mains, Manholes and Gravity Sewers shall be performed prior to the expiration of the contractor's one year guarantee period.

    - All pumping stations within this zone shall have standby power high water alarms telemetered to an appropriate location that is manned at all times. An emergency contingency plan must be developed by the pumping station owner and approved by the Department.

    - A minimum of Class B bedding as defined by WPCF-MOP9 must be used for all piping.

    - Service connections (laterals and house connections) shall be rigidly inspected by the appropriate municipal official. Certified inspection reports shall be submitted to the Department.

Bedrock Wells

The above requirements are the same for bedrock wells, with the Department reserving the right to require more stringent controls as necessary to protect public health. Such additional controls may be necessary due to the potential for quicker flow transport through bedrock fracture systems.

Surface Water Supplies

- Within the Zone A of all surface water supplies and tributaries, all sewer lines and appurtenances are prohibited except as required to cross tributaries or to eliminate existing or potential pollution to the water supply. In the latter case watertight construction methods shall be used as described above.

- Tributary stream crossings shall employ watertight construction methods of sewer lines and manholes. Watertight construction must be employed within the Zone A.

- Within 1,000 feet of surface water supplies and tributaries, all pumping stations shall have standby power and high water alarms telemetered to an appropriate location that is manned at all times. An emergency contingency plan must be developed by the owner of the wastewater treatment facility and submitted to the Department for approval.

- Beyond 1,000 feet, and within the watershed of surface water supplies, the Department may in specific circumstances, after review, require additional controls when deemed necessary for protection of public health.

Potential Public Water Supplies

The above requirements also apply to potential public water supplies. A proposed drinking water source that is proceeding through the Source Approval Process and has an approved Zone II/Zone A, and/or an approved withdrawal rate associated with it, will be considered a potential public water supply.

Baseline Data Requirements

Two (2) copies of an appropriately scaled map(s) shall be submitted to the Department which details the proposed sewers and/or appurtenances and also includes the following:

1. the location of all nearby existing or potential surface water supplies, tributaries thereto, and watershed boundaries;
2. the location of existing and potential public and municipal potable groundwater supply wells;

The Department reserves the right to impose more restrictive measures than those contained in this policy as deemed necessary to protect public health.

Definitions

- Appurtenances - all attachments to sewer lines necessary for the transport and operation and maintenance of sewer lines, including manholes, pumping stations, siphons, etc.

- Class B Bedding – as defined in WPCF Manual of Practice No. 9.

- Interim Wellhead Protection Area (IWPA) – For public water systems using wells or wellfields that lack a DEP approved Zone II, the Department will apply an interim wellhead protection area. This interim wellhead protection area shall be a one-half mile radius measured from the well or wellfield for sources whose approved pumping rate is 100,000 gpd or greater. For wells or wellfields that pump less than 100,000 gpd, the IWPA radius is proportional to the approved pumping rate which may be calculated according to the following equation: IWPA radius in feet

= [32 x pumping rate in gallons per minute] + 400. [This equation is equivalent to the second graph in Appendix D of the 2001 Guidelines and Policies for Public Water Systems.] A default IWPA radius shall be applied to transient noncommunity (TNC) and nontransient noncommunity (NTNC) wells when there is no metered rate of withdrawal or no approved pumping rate. The default IWPA radius shall be 500 feet for TNC wells and 750 feet for NTNC wells.

- Potential public water supply – areas designated by communities for water supply purposes where land has been set aside and Department approved pump tests conducted and surface water supplies as defined below.

- Public Water Supply Systems – as defined in 310 CMR 22.02 (DEP Drinking Water Regulations).

- Surface Water Supply – Waters classified as Class A by the Department.

- Zone A – (a) the land area between the surface water source and the upper boundary of the bank; (b) the land area within a 400 foot lateral distance from the upper boundary of the bank of a Class A surface water source, as defined in 314 CMR4.05(3)(a), or edge of the watershed, whichever is less; and (c) the land area within a 200 foot lateral distance from the upper boundary of the bank of a tributary or associated surface water body, or edge of watershed, whichever is less.

- Zone I – the protective radius required around a public water supply well or wellfield. For public water system wells with approved yields of 100,000 gpd or greater, the protective radius is 400 feet. Tubular wellfields require a 250 foot protective radius. Protective radii for all other public water system wells are determined by the following equation: Zone I radius in feet = [150 x log of pumping rate in gpd] – 350. [This equation is equivalent to the graph in Appendix C.] A default Zone I radius shall be applied to transient noncommunity (TNC) and nontransient noncommunity (NTNC) wells when radii cannot be calculated because there is no metered rate of withdrawal or no approved pumping rate. The default Zone I radius shall be 100 feet for TNC wells and 250 feet for NTNC wells.

- Zone II – that area of an aquifer which contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated (180 days of pumping at the approved yield, with no recharge from precipitation). It is bounded by the groundwater divides which result from pumping the well and by the contact of the aquifer with less permeable materials such as till and bedrock. In some cases, streams and lakes may act as recharge boundaries. In all cases, Zone II shall extend upgradient to its point of intersection with prevailing hydrogeologic boundaries (a groundwater flow divide, a contact with till or bedrock, or a recharge boundary).

SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.01 LOCATION OF WORK

A. The former municipal Haverhill Landfill is located off Old Groveland Road in the City of Haverhill. The Haverhill Landfill is a "Superfund Site", as defined by USEPA, but being closed under the Massachusetts Solid Waste Management Regulations (310 CMR 19.000). The Haverhill Landfill consists of two landfill mounds bisected by a former railroad bed now leased by the National Grid on which overhead electrical transmission lines are present. The National Grid property and associated electrical utilities are hereafter referred to as the "National Grid Corridor." The Town of Groveland has an easement for a 24-inch sewer force main along the National Grid corridor which extends to the Haverhill Wastewater Treatment Plant. The Southern Mound is approximately 35 acres of landfilled waste, located south of the National Grid property and bounded to the west by wetlands. The Northern Mound is approximately 20 acres in size and is bound by the National Grid property to the south and the Merrimack River to the north. The subject of this contract is the Southern Mound, hereafter referred to as "the Site".

1.02 EXISTING SITE CONDITION

A. The Southern Mound is in the process of receiving shaping and grading material under the Massachusetts Department of Environmental Protection (MassDEP) COMM-97-001 soils policy. The Owner is using this material to shape and grade the site prior to capping. The proposed grades are based on the approved volume of 640,000 cubic yards. At the conclusion of the soils project on March 31, 2011, approximately 200,000 cubic yards of the approved volume will remain available to be filled.

B. Engineer shall provide to Contractor available survey plans of the site, which were conducted previous to and/or during the soils project. Such plans are available in AutoCAD 2008, as prepared by Richard F. Kaminski & Associates of Lawrence, Massachusetts.

1.03 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required to cap and close the Southern Mound of the Haverhill Landfill, including but not limited to mobilization, site preparation, grading, waste consolidation, construction of the landfill capping system, wetland restoration, clean-up, and demobilization as shown on the Drawings and as specified herein.

B. As shown on the Drawings, design of the Southern Mound closure has been based on the Site receiving the full 640,000 cubic yards of volume approved for shaping and grading material. As stated in Paragraph 1.02 above, there remains capacity available for the continued delivery of shaping and grading materials to the Site to meet current design grades. Through the bid process, the OWNER will consider the option of discontinuing the further receipt of shaping and grading materials in which case capping can proceed following regrading of the Site. Alternatively, additional shaping and grading materials can be accepted in some volume not to exceed the grades shown on the Drawings. For either option, development of a revised grading plan is required prior to the initiation of cap construction.

C. Final shaping and grading of the Site to the final design grades shall be the responsibility of the Contractor subject to the following options to achieve the final grades which shall be selected and directed by the Owner.

1. *Option 1:* No further shaping and grading materials are to be accepted at the site (Base Bid). Under this scenario, work will proceed as follows:

   a. Contractor shall conduct an existing conditions survey of the Site inclusive of the topographic grade and all site features. Such survey shall be performed under the direction of a Massachusetts Registered Land Surveyor (RLS) and submitted to Engineer for review and approval.

   b. Using Contractor's survey, Engineer shall prepare a revised grading plan of landfill cap subgrade elevations using existing site shaping and grading materials. The revised grading plan shall have 3H:1V and shall not appreciably alter the proposed stormwater management controls shown on the design plans.

   c. Engineer shall submit the revised grading plan to MassDEP as a permit modification.

   d. No regrading work shall occur until MassDEP approves the permit modification and Owner directs Contractor to initiate site work based upon this approval.

   e. Schedule under Option 1 shall be as follows:

Construction Contract Execution - Contractor shall be immediately provided site access for the purpose of conducting the Site existing conditions survey	April 1, 2011
Contractor's submittal of existing conditions survey plan to Engineer for review and approval	May 1, 2011
MassDEP approval of the modification permit (i.e., revised grading plan) – expected	June 30, 2011
Contractor to be provided access to the Site for initiation of site regrading and closure construction – expected	July 1, 2011
Substantial Completion - completion of all closure construction including seeding	July 1, 2012
Site maintenance – one season assumed Fall 2012	November 15, 2012

2. *Option 2:* Additional shaping and grading materials are to be accepted at the site, based upon Owner's acceptance of Add Alternate No. 1. Under this scenario, work will proceed as follows:

   a. Contractor shall conduct an existing conditions survey of the Site inclusive of the topographic grade and all site features. Such survey shall be performed under the direction of a Massachusetts Registered Land Surveyor (RLS) and submitted to Engineer for review and approval.

   b. Using Contractor's survey, Engineer shall prepare a revised grading plan of landfill cap subgrade elevations using existing site shaping and grading materials and inclusive of additional volume approved for acceptance by Owner based on Add Alternate No. 1 acceptance. The revised grading plan shall have 3H:1V and shall not appreciably alter the proposed stormwater management controls shown on the design plans. The revised grading plan prepared by Engineer shall include a detailed construction schedule indicating a phased approach to capping and identifying areas of the landfill to be capped during each phase. At a minimum, the cap shall be constructed in three phases, with each phase approximately 12 acres in size based on the following preliminary schedule:

      - First 12 acres shall be completed by November 30, 2011
      - Second 12 acres shall be completed by November 30, 2012
      - Cap construction shall be completed by June 30, 2013

   c. Engineer shall submit the revised grading plan and cap construction phasing plan to MassDEP as a permit modification.

   d. No soils deliveries nor grading work shall occur until MassDEP approves the permit modification and Owner directs Contractor to initiate site work based upon this approval.

   e. Schedule under Option 2 shall be as follows:

      Construction Contract Execution — April 1, 2011

      - Contractor shall be immediately provided site access for the purpose of conducting the Site existing conditions survey

      Contractor's submittal of existing conditions survey plan to Engineer for review and approval — May 1, 2011

      MassDEP approval of the modification permit (i.e., revised grading plan) – expected — June 30, 2011

      Contractor to be provided access to the Site for initiation of soil deliveries, regrading and closure construction – expected — July 1, 2011

      Substantial Completion - completion of all closure

construction including seeding, with phasing of cap construction in accordance with the approved cap construction phasing plan	July 1, 2013
Site maintenance – one season assumed Fall 2013	November 15, 2013

D. In addition to the work identified in Options 1 and 2 above, the work also includes, but is not necessarily limited to, the following:

1. Submit required plans and schedules.

2. Install temporary Site Identification Sign. Site Identification Sign shall meet the specifications of the Wetlands Protection Act Order of Conditions issued by the City of Haverhill Conservation Commission (included in Appendix).

3. Locate and flag wetlands based on the wetland lines shown on the Drawings.

4. Locate and stake the municipal boundary between the City of Haverhill and Town of Groveland which coincides with the east edge of Aggregate Industries "Lot 26" within the City of Haverhill. Under no circumstances will work be allowed to occur within the Town of Groveland municipal limits.

5. Establish approved stormwater controls and sedimentation and erosion controls in accordance with the Drawings and Specifications and the Wetlands Protection Act Order of Conditions. All work shall also meet requirements of the Army Corps of Engineers Category 2 Massachusetts General Permit (GP) and MassDEP Water Quality Certification issued for the project (included in Appendix A).

6. Stage construction and maintain the Site in a manner that prevents sedimentation of the surrounding wetlands and protects wetland areas from runoff and sedimentation damage from on-site construction.

7. Prepare a Stormwater Pollution Prevention Plan (SWPPP) in accordance with the U.S. Environmental Protection Agency's National Pollutant Discharge Elimination System (NPDES) regulations and submit a Notice of Intent (NOI) for discharge under the NPDES General Permit for Stormwater Discharges from Construction Activities. The Contractor shall be responsible for implementing, monitoring, and modifying the SWPPP for construction activities to meet changing project site conditions. The SWPPP and NPDES NOI should address required best management practices for soils project activities, should Option 2 be incorporated into the Contract.

8. Construct landfill cap including grading the side slopes and waste consolidation, grading of the top of the landfill, installation of drainage sand, loam and seed, grassed drainage swales, sub-drain piping, and all appurtenant work.

9. Install passive landfill gas management system including passive landfill gas vents and horizontal passive gas collector trenches.

10. Perform all waste relocation and consolidation shown on the plan. Such work shall include removal of soils in the western wetland swale and subsequent wetland restoration.

11. At Engineer's request and subject to Engineer's approval, Contractor shall assume responsibility for site maintenance, including but not limited to ensuring slope stability, maintenance of stormwater controls, and maintenance of erosion/sedimentation controls, etc., from date of contract execution (assumed April 1, 2011) through the date of Contractor's mobilization for the purpose of initiating grading and capping (expected July 1, 2011).

1.04 WORK BY OTHERS

A. As shown on plans, Aggregate Industries shall remove two existing building on land within the Town of Groveland, immediately adjacent to "Lot 26" which lies within the municipal boundary of the City of Haverhill. In addition, Aggregate Industries shall remove a building southwest of Basin #1 and building debris south of Basin #1, as shown on the plans. All such work by Aggregate Industries shall be completed by May 1, 2011, prior to Contractor's mobilization for construction.

B. Two National Grid utility poles within the limits of landfill waste shall be removed by the National Grid prior to the Contractor's initiation of grading and capping (expected July 1, 2011).

1.05 SEQUENCE OF CONSTRUCTION

A. Submit detailed construction schedule based upon option of approach adopted by Owner (see paragraph 1.03C of this Section).

1.06 CONTRACTOR'S USE OF PREMISES

A. Coordinate the scheduling of his work with the City of Haverhill and Aggregate Industries.

B. Contractor may perform work at the site Monday through Friday, 7:00 am to 5:00 pm and Saturday and Sunday with special permission from Owner.

C. Contractor shall assume full responsibility for security of all his and his subcontractors' materials and equipment stored on the site as well as site improvements.

D. Upon mobilization to the site, the Contractor shall be responsible for the following:

1. Installation, monitoring, and maintenance of erosion control measures including existing stormwater basins No. 1 and No. 2 to minimize the amount of material being washed from the site.

2. Control of odors and dust, in accordance with odor control and dust control plans approved by the Engineer, to prevent nuisance conditions at the site.

END OF SECTION

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 BID

A. The work covered by this Bid shall include the furnishing of all labor, materials, equipment, and incidentals required to construct the Haverhill Landfill Southern Mound Closure Project in Haverhill, Massachusetts, in its entirety as shown on the Drawings and as specified herein.

1.02 PRE-CONSTRUCTION SURVEY AND REVISED GRADING PLANS (ITEM 1)

A. Measurement

1. Measurement for payment under Item 1 on the Bid Form will be on a lump sum basis for preparation of an existing conditions survey plan of the Site to be prepared prior to mobilization/demobilization and subject to approval of Engineer prior to construction.

B. Payment

1. Payment under Item 1 will be on a lump sum basis for preparation of an existing conditions survey plan and stamped by a Massachusetts Registered Land Surveyor (RLS), to be prepared prior to construction. Payment shall be full compensation for all labor, equipment, materials, and incidentals for the preparation of this plan and approval of this plan by Engineer.

1.03 MOBILIZATION/DEMOBILIZATION (ITEM 2)

A. Measurement

1. Measurement for payment under Item 2 on the Bid Form will be on a lump sum basis for all required mobilization/demobilization.

B. Payment

1. Payment for all mobilization/demobilization will be made at the lump sum price bid for Item 2 for which price and payment shall be full compensation for all work relating to mobilization/demobilization of materials and equipment to the site and shall not exceed 5 percent of the Base Bid less this item.

1.04 SITE PREPARATION (ITEM 3)

A. Measurement

1. Measurement for payment under Item 3 on the Bid Form will be on a lump sum basis for all required site preparation in accordance with the Drawings and Specifications.

B. Payment

1. Payment for site preparation will be made at the lump sum price bid for Item 3 which price and payment shall be full compensation for all work including but not limited to clearing and grubbing, performing approximately 15 exploratory test pits, all required signage, locating wetland flags, staking the limits of work, and any other items not covered specifically in other bid items but shown on the Drawings and/or required in the Specifications.

2. Payment for gravel access road construction is covered under Item 22.

1.05 SITE GRADING (ITEM 4)

A. Measurement

1. Measurement for payment under Item 4 on the Bid Form will be on a cubic yard basis measured in place based on the difference in volume between the MassDEP approved revised cap subgrade plan and the pre-construction existing conditions survey.

B. Payment

1. Payment for Item 4 on the Bid Form, including grading of earth to the lines and grades shown on the MassDEP approved revised cap subgrade plan, will be made for the quantity determined above at the unit price bid per cubic yard which price and payment shall be full compensation for all work including but not limited excavation, grading, and compacting soils; and all other work required to attain subbase grades shown on the revised approved plan suitable for gas venting layer and membrane placement.

1.06 EROSION CONTROL BARRIERS (ITEM 5)

A. Measurement

1. Measurement for payment under Item 5 on the Bid Form will be on a linear foot basis for hay bales and silt fence furnished and installed within the limits of the Project as shown on the Drawings.

B. Payment

1. Payment for Item 5 will be made for the quantity determined above at the unit price bid per linear foot which price and payment shall be full compensation for all labor, equipment and materials required to erect and maintain hay bales and silt fences during the construction and maintenance period, including replacement and re-installation, as shown on the Drawings or as directed by the Engineer.

1.07 EROSION CONTROL BLANKET (ITEM 6)

A. Measurement

1. Measurement for payment under Item 6 on the Bid Form will be on a square yard basis measured in place based on the plan view area placed on all slopes 4H:1V or steeper with no allowance for slope correction.

B. Payment

1. Payment for Item 6 will be made for the quantity determined above at the price bid per square yard, which price and payment shall be full compensation for furnishing and placing the erosion control blanket on all slopes 4H:1V and steeper as specified. Erosion control blanket placed in drainage swales and in the sedimentation basin shall be paid for under those payment items.

1.08 VEGETATED DRAINAGE SWALES (ITEM 7a)

A. Measurement

1. Measurement for payment under Item 7a on the Bid Form will be on a linear foot basis measured in-place along the centerline of all grass-lined swales.

B. Payment

1. Payment for Item 7a will be made for the quantity determined above at the unit price bid which shall be full compensation for final grading of drainage swales; constructing of common fill berm with LLDPE flap, furnishing and placing all material as required including filter fabric, erosion control fabric, perforated pipe, screened gravel and all other related materials and required to construct the drainage swales as shown on the Drawings.

1.09 RIPRAP DRAINAGE SWALES (ITEM 7b)

A. Measurement

1. Measurement for payment under Item 7b on the Bid Form will be on a linear foot basis measured in-place along the centerline of all riprap swales.

B. Payment

1. Payment for Item 7b will be made for the quantity determined above at the unit price bid which shall be full compensation for final grading of drainage swales; constructing of common fill berm with LLDPE flap, furnishing and placing all material as required including filter fabric, erosion control fabric, perforated pipe, riprap, screened gravel and all other related materials and required to construct the drainage swales as shown on the Drawings.

1.10 SEDIMENTATION BASINS (ITEMS 8a – 8c)

A. Measurements

1. Measurement for payment under Items 8a – 8c on the Bid Form will be on a lump sum basis for the sedimentation basins constructed complete as shown on the Drawings.

B. Payment

1. Payment for Item 8a – 8c will be made at the lump sum price bid which price and payment shall be full compensation for all excavation and grading and all other work necessary to construct the sedimentation basins including construction of forebay, filter fabric and riprap, loaming and seeding the interior berm walls and floor of the basin, furnishing and

installing outlet structure, and all other work necessary to construct the sedimentation basin as shown on the Drawings.

1.11 GAS VENTING LAYER (ITEM 9)

A. Measurement

1. Measurement for payment under Item 9 on the Bid Form will be on a square yard basis measured in place, based on the plan view of the work with no allowances for slope correction or compaction, after placement to the depth shown on the Drawings.

B. Payment

1. Payment for Item 9 will be made for the quantity determined above at the unit price bid per square yard which price and payment shall be full compensation for, but shall not be limited to, furnishing, placing to the thickness shown, moisture adjustment, finish grading, and all required testing of the gas venting layer as shown on the Drawings and as specified. Repair and replacement of soil lost to erosion during construction and maintenance period will also be included with this item.

1.12 LINEAR LOW DENSITY POLYETHYLENE (LLDPE) LINER (ITEM 10)

A. Measurement

1. Measurement for payment under Items 10 on the Bid Form will be on a square yard basis for the furnishing and installation of a 40 mil textured LLDPE liner. Measurement will be performed in place to the inside (landfill side) edge of the keylock trench based on plan view area of the completed liner, with no allowances for slope correction, overlaps, anchor trenches or waste.

B. Payment

1. Payment for Item 10 will be made for the quantity determined above at the unit price bid per square yard which price and payment shall be full compensation for furnishing and installing the LLDPE liner to the lines and grades shown on the Drawings including all materials required in the anchor trenches. No payment will be made for overlapping material along the seams. Payment for Item 10 shall also include excavation and backfill of anchor trenches, all submittals, on site representatives, penetrations, boots, quality control/quality assurance testing, tie in connections, and all other items necessary to complete the LLDPE liner installation.

1.13 ANCHOR TRENCH (ITEM 11)

A. Measurement

1. Measurement for payment under Item 11 on the Bid Form will be on a linear foot basis measured in-place along the edge of the LLDPE liner.

B. Payment

1. Payment for Item 11 will be made for the quantity determined above at the unit price bid which shall be full compensation for constructing anchor trench, furnishing and placing

perimeter riprap and all other related materials required to construct the anchor trench and perimeter riprap as shown on the Drawings.

1.14 SAND DRAINAGE LAYER (ITEM 12)

A. Measurement

1. Measurement for payment under Item 12 on the Bid Form will be on a square yard basis measured in place based on the plan view area constructed after placement to the depth shown on the Drawings, with no allowance for slope correction.

B. Payment

1. Payment for 12 will be made for the quantity determined above at the unit price bid per square yard which price and payment shall be full compensation for, but shall not be limited to, furnishing and placing the drainage material to the required thickness as shown on the Drawings, submittals, testing, processing, finish grading, moisture adjustment, testing and any other work necessary to complete the installation of the drainage layer. Repair and replacement of soil lost to erosion during construction and maintenance period will also be included with this item.

1.15 18-INCH PERFORATED HDPE FLAT PANEL PIPE (ITEM 13)

A. Measurement

1. Measurement for payment under Item 13 on the Bid Form will be on a linear foot basis measured in-place along the centerline of the 18-inch perforated flat panel pipe.

B. Payment

1. Payment for Item 13 will be made for the quantity determined above at the unit price bid which shall be full compensation for furnishing and placing 18" perforated ADS AdvanEDGE HDPE Flat Pipe or equivalent oblong subdrain pipe on the liner to the lines and grades shown on the plans or as specified by the Engineer. Perforated drainage pipe placed in grass lined drainage swales shall be paid for under Item 13.

1.16 RIPRAP DOWNCHUTES (ITEM 14)

A. Measurement

1. Measurement for payment under Item 14 on the Bid Form will be on a linear foot basis measured in-place along the centerline of all mortared riprap downchutes.

B. Payment

1. Payment for Item 14 will be made for the quantity determined above at the unit price bid which shall be full compensation for final grading of downchutes; furnishing and placing all material as required including riprap, mortar, filter fabric, screened gravel and all other related materials and required to construct the drainage swales as shown on the Drawings.

1.17 TOPSOIL AND HYDROSEEDING (ITEM 15)

A. Measurement

1. Measurement for payment under Item 15 on the Bid Form will be made on a square yard basis for the topsoil and seed installed on the landfill cap by the Contractor as shown on the Drawings in plan view, with no allowance for slope correction.

B. Payment

1. Payment for Item 15 will be made for the quantity determined above at the unit price bid per square yard which price and payment shall be full compensation for providing topsoil from off site; placing, compacting, and fine grading topsoil; seeding, fertilizing, maintaining grassed areas; and all else incidental to the Work as shown on the Drawings and as specified and not paid for under other items. Repair and replacement of soil lost to erosion during construction and maintenance period will also be included with this item.

2. Payment for topsoiling and seeding the vegetated drainage swales and sedimentation basins is included under Item Numbers 7a and 8, respectively.

1.18 WETLAND RESTORATION (ITEM 16)

A. Measurement

1. Measurement for payment under Item 16 on the Bid Form will be made on a square yard basis for wetland restoration by the Contractor as shown on the Drawings in plan view, with no allowance for slope correction.

B. Payment

1. Payment for Item 16 will be made for the quantity determined above at the unit price bid per square yard which price and payment shall be full compensation for excavation of all non-native soils, backfilling, providing clean common fill and topsoil from off site; placing, compacting, and fine grading topsoil; seeding with a wetland seed mix, fertilizing, maintaining wetland areas and all else incidental to the Work as shown on the Drawings and as specified and not paid for under other items. Repair and replacement of soil lost to erosion during construction and maintenance period will also be included with this item.

1.19 WETLAND PLANTINGS (ITEMS 17a – 17e)

A. Measurement

1. Measurement for payment under Item 17a – 17e on the Bid Form will be made on a per each basis for wetland plantings by the Contractor as shown on the Drawings.

B. Payment

1. Payment for Item 17a – 17e will be made for the quantity determined above at the unit price bid per each which price and payment shall be full compensation for planting, fertilizing, maintaining plants and all else incidental to the Work as shown on the Drawings and as specified and not paid for under other items.

1.20 PASSIVE GAS VENT (ITEM 18)

A. Measurement

1. Measurement for payment under Item 18 on the Bid Form will be on a vertical foot basis for passive gas vents installed complete as shown on the Contract Drawings.

B. Payment

1. Payment under Item 18 will be made for the quantity determined above at the unit price bid for passive gas vents installed which price and payment shall be full compensation for furnishing and installing the gas vent complete, including drilling/ excavating, proper disposal of excavated materials in the landfill, perforated and solid PVC pipe as specified, geotextile fabric, concrete collars, crushed stone, coarse sand, bentonite seals and grout, all required valves and connections, and all other work necessary to install the gas vent complete as specified and as shown on the Drawings.

1.21 LANDFILL GAS PASSIVE VENT FLARE (ITEM 19)

A. Measurement

1. Measurement for payment under Item 19 on the Bid Form will be on a unit price basis for each landfill gas passive vent flare installed complete as shown on the Contract Drawings.

B. Payment

1. Payment under Item 19 will be made for the quantity determined above at the unit price bid for each landfill gas passive vent flare installed. For which price and payment shall be full compensation for furnishing and installing the landfill gas passive vent flare complete, including all required valves and connections and all other work necessary to install the landfill gas passive vent flare complete as specified and as shown on the Drawings.

1.22 PASSIVE HORIZONTAL GAS COLLECTION TRENCH (ITEM 20)

A. Measurement

1. Measurement for payment under Item 20 on the Bid Form will be on a lump sum basis for installing a passive horizontal gas collection trench as shown on the Contract Drawings.

B. Payment

1. Payment under Item 20 will be made at the lump sum price bid for a passive horizontal gas collection trench. Payment shall be full compensation for furnishing and installing the passive horizontal gas collection trench complete, including excavating, proper disposal of excavated materials in the landfill, perforated and solid HDPE pipe as specified, geotextile fabric, concrete collars, crushed stone, coarse sand, bentonite seals and grout, all required connections, and all other work necessary to install the passive horizontal gas collection trench complete as specified and as shown on the Drawings.

1.23 GAS MONITORING WELLS (ITEM 21)

A. Measurement

1. Measurement for payment under Item 20 on the Bid Form will be on a unit price basis for each vertical foot of gas monitoring well installed as shown on the Drawings.

B. Payment

1. Payment under Item 21 will be at the unit price bid which shall be full compensation for drilling the well, furnishing and installing the piping and testing ports, backfill materials, and protective casings as specified and as shown on the Drawings.

1.24 GRAVEL ACCESS ROAD (ITEM 22)

A. Measurement

1. Measurement for payment under Item 22 on the Bid Form will be on a square yard basis for the two gravel access roads constructed complete at the locations shown on the Drawings.

B. Payment

1. Payment for Item 22 will be made for the quantity determined above at the unit price bid which shall be full compensation for PE-stamped design of the two gravel access roads subject to Engineer's approval and construction of those access roads per plans approved by Engineer and specified herein including but not limited to clearing, grubbing, and grading within the limits of the access road; furnishing and installing structural fill; furnishing, grading, and compacting dense processed gravel base; and furnishing, grading, and compacting dense graded crushed stone surface to the thickness and dimensions shown on the approved plan.

1.25 FENCING (ITEM 23)

A. Measurement

1. Measurement for paymen under Item 22 on the Bid Form will be on a linear foot basis measured in-place.

B. Payment

1. Payment for Item 23 will be made for the quantity determined above at the unit price bid which shall be full compensation for furnishing all related materials and required to install fence as shown on the Drawings.

1.26 DOUBLE LEAF CHAIN LINK SWING GATE (ITEM 24)

A. Measurement

1. Measurement for payment under Item 24 on the Bid Form will be made on a per each basis for double leaf chain link swing gate by the Contractor as shown on the Drawings.

B. Payment

1. Payment for Item 24 will be made for the quantity determined above at the unit price bid per each which price and payment shall be full compensation for furnishing and installing gate as shown on the Drawings and as specified.

1.27 VEHICLE ENTRY GATE (ITEM 25)

A. Measurement

1. Measurement for payment under Item 25 on the Bid Form will be made on a per each basis for vehicle entry gate by the Contractor as shown on the Drawings.

B. Payment

1. Payment for Item 25 will be made for the quantity determined above at the unit price bid per each which price and payment shall be full compensation for furnishing and installing gate as shown on the Drawings and as specified.

1.28 WASTE RELOCATION (ITEM 26)

A. Measurement

1. Measurement for payment under Item 26 on the Bid Form will be on a per cubic yard basis for performing waste relocation as shown on the Drawings.

A. Payment

1. Payment for Item 26 will be made for the quantity determined above at the unit price bid per cubic yard which price and payment shall be full compensation for waste relocation completed as shown on the Drawings and specified herein including but not limited to relocating waste to within the limit of the LLDPE cap; consolidation and compaction of relocated waste, daily cover; confirmatory sampling in specified areas, backfilling and grading, clean common fill and placing 4-in of topsoil and seeding.

1.29 SLUDGE RELOCATION (ITEM 27)

A. Measurement

1. Measurement for payment under Item 26 on the Bid Form will be on a per cubic yard basis for performing sludge relocation as shown on the Drawings.

B. Payment

1. Payment for Item 27 will be made for the quantity determined above at the unit price bid per cubic yard which price and payment shall be full compensation for sludge relocation completed as shown on the Drawings and specified herein including but not limited to relocating sludge; consolidation and compaction of relocated sludge, daily cover; confirmatory sampling in specified areas, backfilling and grading, clean common fill and placing 4-in of topsoil and seeding.

1.30 SOIL REMOVAL/RELOCATION (ITEM 28)

A. Measurement

1. Measurement for payment under Item 27 on the Bid Form will be on a per cubic yard basis for performing soil removal from wetland and relocation to within cap limits as shown on the Drawings.

B. Payment

1. Payment for Item 28 will be made for the quantity determined above at the unit price bid per cubic yard which price and payment shall be full compensation for soil excavation from wetland and relocation completed as shown on the Drawings and specified herein including but not limited to relocating soil; consolidation and compaction of relocated soil, daily cover; confirmatory sampling and analysis in specified areas, backfilling and grading, clean common fill and placing 4-in of topsoil and seeding.

1.31 RE-USE OF PILES ON LOT 26 (ITEM 29)

A. Measurement

1. Measurement for payment under Item 29 on the Bid Form will be on a lump sum basis to confirm the material type and quantity and re-use such material for landfill closure construction.

B. Payment

1. Payment under Item 29 will be made at the lump sum price bid for re-use of the material in the two asphalt piles, one mixed rubble and soil pile, and one ground asphalt pile all located east of the Site on Lot 26. Payment shall be full compensation for confirming the material type by conducting test pits, identifying material quantities, submitting a plan to Engineer for re-use of such materials (i.e., for roadways, slope stability, etc.), implementation of the plan following its approval by Engineer, and providing final records of all material re-used.

1.32 MISCELLANEOUS WORK AND CLEANUP (ITEM 30)

A. Measurement

1. Measurement for payment under Item 30 on the Bid Form will be on a lump sum basis for performing all miscellaneous work and cleanup required to complete the work as shown on the Drawings and as specified in Section 02901.

B. Payment

1. Payment for Item 30 will be made at the lump sum price bid which price and payment shall be full compensation for providing and complying with a site specific Health and Safety Plan; all temporary facilities and utilities; all odor and dust controls; all grading and restoration of disturbed areas not covered in other items; removal of drainage line below the National Grid corridor to Basin 2, final site cleanup, restoration of private property, easements and rights-of-was as specified and all else required to complete the work for which separate payment is not provided under other Items.

1.33 SITE MAINTENANCE FROM CONTRACT EXECUTION TO CONSTRUCTION MOBILIZATION – LUMP SUM (ITEM 31)

A. Measurement

1. Upon Owner's request, Contractor shall perform site maintenance on a time and material basis by task, with the price established and agreed to between the Contractor and Owner for each individual task. A Lump Sum of $25,000 is included in the Bid Form as an upper limit to cover these costs.

B. Payment

1. Payment under Item 31 shall be on a time and material basis by task, based on the price established and agreed to between the Contractor and Owner for each individual task conducted. Payment shall be full compensation for tasks conducted to maintain the Site from the date of contract execution (expected April 1, 2011) through the date of construction mobilization (expected July 1, 2011). Such tasks may include, but not be limited to: hay bale/silt fence repair/replacement; drainage swale repair; sediment removal in basins/swales; ensuring slope stability; seeding, etc.

2. Requests for services under Item 31 shall be made to the Contractor by Engineer on behalf of Owner. Contractor shall provide a written cost estimate and schedule for the work requested. Upon acceptance of the cost estimate, Owner shall provide authorization to proceed and Contractor shall perform the work in accordance with the agreed upon schedule.

PART 2 ADD ALTERNATE

1.34 Acceptance of Grading and Shaping Material (add alternate no. 1)

A. Measurement

1. Measurement for a credit payment to Owner under Add Alternate No. 1 on the Bid Form will be made on a lump sum basis for the volume of shaping and grading material identified by Contractor for delivering and placing at the site.

B. Credit Amount

1. Add Alternate No. 1 will provide a credit to the Base Bid, in the amount of the lump sum price bid, for Contractor to retain rights for a certain volume of air space for delivery of shaping and grading materials. The volume of shaping and grading materials delivered shall be the amount identified by Contractor in his/her bid.

2. The credit amount shall consider all costs for labor, materials, equipment and incidentals to furnish and install the shaping and grading materials in accordance with Section 02125, cover any additional costs to the Base Bid for phasing of the cap construction over a two year project duration, and cover the cost of a Supplemental Performance Bond the value of which shall be determined as follows:

Supplemental Performance Bond Value = (xx cyds identified in bid X $24.00/cyd) + $250,000.00 for one year oversight

whereby $24.00/cyd represents cost to deliver and place common fill.

3. Contractor shall be responsible for filling the air space volume accepted by Owner under Add Alternate No. 1. Contractor may elect to fill said air space with common fill. Inability of Contractor to fill the committed air space volume shall be cause for Owner to pull the Supplemental Bond.

END OF SECTION

SECTION 01046

CONTROL OF WORK

PART 1 GENERAL

1.01 MATERIALS

A. Furnish materials and equipment, which will be efficient, appropriate, and large enough to secure a satisfactory quality of work and a rate of progress that will ensure the completion of the work within the Contract Time. If at any time such materials appear to the Engineer to be inefficient, inappropriate, or insufficient for securing the quality of work required, control of odor and dust from the site, or for producing the rate of progress aforesaid, he/she may order the Contractor to increase the efficiency, change the character, or increase the materials and equipment and the Contractor shall conform to such order. Failure of the Engineer to give such order shall in no way relieve the Contractor of his/her obligations to secure the quality of the work and rate of progress required.

1.02 PRIVATE LAND

A. Do not enter or occupy private land outside of easements, except by permission of the land owner.

B. Owner shall obtain access permission to the rear portion of 158 Old Groveland Road for the purpose of waste relocation. Contractor shall abide by all provisions of the final executed access agreement between the Owner and property Owner. No work on this property shall occur until the access agreement is in place and contractor has been provided written authorization to enter and perform the work.

C. Owner shall obtain access permission to the National Grid corridor for both waste relocation and equipment/vehicular use on the access road along the National Grid corridor. Contractor shall abide by any provisions of any executed access agreement between the Owner and National Grid.

1.03 OPEN EXCAVATIONS

A. Adequately safeguard all open excavations by providing temporary barricades, caution signs, lights, and other means to prevent accidents to persons and damage to property. Provide suitable and safe bridges and other crossings for accommodating travel by pedestrians and workmen. Remove bridges provided for access during construction when no longer required. The length or size of excavation will be controlled by the particular surrounding conditions, but shall always be confined to the limits prescribed by the Engineer. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, the Engineer may require special construction procedures such as limiting the length of the open trench, prohibiting stacking excavated material in the street, and requiring that the trench shall not remain open overnight.

B. As mandated by Chapter 82A of the Massachusetts General Law (MGL), the trench safety regulations require that all Contractors, whether public or private, take specific precautions to protect the general public and prevent unauthorized access to unattended trenches. Accordingly, unattended trenches must be covered, barricaded or backfilled. Covers shall be road plates at least 3/4 –in thick or equivalent; barricades shall be fences at least 6-ft high with no openings greater than 4-in between vertical supports; backfilling shall be sufficient to eliminate the trench. Alternatively, Contractors may choose to attend trenches at all times, for instances by

hiring a police detail, security guard or other attendant who shall be present during times when the trench will be unattended by the Contractor. For purposes of this Paragraph, a "trench" shall be defined as an excavation which is narrow in relation to its length, made below the surface ground in excess of 3 feet below grade and the depth of which is, in general, greater than the width, but the width of the trench, as measured at the bottom, is no greater than 15 feet and the words "excavator", "excavation" and "emergency" shall have the same meanings as defined in Section 40 of Chapter 82 of the MGL. The word "excavator" as used in this Paragraph shall also mean "Contractor".

B. Maintain an adequate supply of odor controls on-site (masking agent, lime etc.) to prevent nuisance conditions due to odors.

1.04 TEST PITS

A. Excavate test pits, at the direction of the Engineer, to locate underground pipelines, edge of solid waste, or structures in advance of the construction shall be excavated Backfill test pits s immediately after their purpose has been satisfied and the surface restored and maintained in a manner satisfactory to the Engineer.

1.05 MAINTENANCE OF TRAFFIC

A. Coordinate scheduling of work with Aggregate Industries to minimize impact to their operations.

B. Access to the site for truck traffic will be from the Aggregate Industries entrance via Yemma Road off of Main Street in Groveland.

C. Under no circumstances shall the former landfill access road off of Old Groveland Road in Haverhill be used for site access.

D. Identify and resolve vehicular traffic issues relating to or resulting from the Work.

E. Use of police for traffic control shall be in conformance with Massachusetts Bureau of Municipal Facilities Policy Memorandum No. CG-15 included in Part II of the Supplementary Conditions.

F. Contractor shall abide by approved truck haul routes, their schedule of use, and truck trip limitations as presented in Section 01601.

1.06 CARE AND PROTECTION OF PROPERTY

A. Be responsible for the preservation of all public and private property and use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the Contractor, restore such property to a condition similar or equal to that existing before the damage was done, or make good the damage in other manner acceptable to the Engineer.

1.07 PROTECTION AND RELOCATION OF EXISTING STRUCTURES AND UTILITIES

A. Assume full responsibility for the protection of all buildings, structures, and utilities, public or private, including poles, signs, services to buildings, utilities in the street, gas pipes, water pipes, hydrants, sewers, drains, and electric and telephone cables, whether or not they are shown on the Drawings. Carefully support and protect all such structures and utilities from injury of any kind. Immediately repair any damage resulting from the Contractor's.

B. Assistance will be given the Contractor in determining the location of existing services. The Contractor, however, shall bear full responsibility for obtaining all locations of underground structures and utilities (including existing water services, drain lines, septic systems, and sewers). Maintain services to buildings and pay costs or charges resulting from damage thereto.

C. Protection and temporary removal and replacement of existing utilities and structures as described in this Section shall be a part of the work under the Contract and all costs in connection therewith shall be included in the Total Price Bid in the Bid Form.

D. Notify all utility companies in writing at least 72 hours (excluding Saturdays, Sundays and Legal holidays) before initiating any excavation and/or regrading. Also notify Massachusetts Dig Safe, telephone 1-888-344-7233 at least 72 hours prior to start of work.

E. If, in the opinion of the Engineer, permanent relocation of a utility owned by the City of Haverhill is required, he/she may direct the Contractor, in writing, to perform the work. Work so ordered will be paid for at the Contract unit prices, if applicable, or as extra work under Article 11 of the Supplementary Conditions. If relocation of a privately owned utility or other publicly owned utility is required, the City will notify the Utility to perform the work as expeditiously as possible. Cooperate with the City and Utility. No claim for delay will be allowed due to such relocation.

1.08 WATER FOR CONSTRUCTION PURPOSES

A. City of Haverhill water is available at the site via a hydrant along Old Groveland Road near the entrance to the former access road.

B. The Contractor will be charged for water used based on City of Haverhill water rates.

C. Provide and install water meter.

D. Contractor shall obtain, including payment of any fees, and comply with all local permits as required to obtain water from the City of Haverhill.

1.09 MAINTENANCE OF FLOW

A. Provide for the flow of sewers, drains, and water courses interrupted during the progress of the work, and immediately cart away and remove all offensive matter. Discuss the entire procedure of maintaining existing flow with the Engineer well in advance of the interruption of any flow.

1.10 CLEANUP AND DISPOSAL OF EXCESS MATERIAL

A. During the course of the work, keep the site of operations as clean and neat as possible. Dispose of all residues resulting from the construction work and, at the conclusion of the work, remove and haul away any surplus excavation, broken pavement, lumber, equipment, temporary

structures, and any other refuse remaining from the construction operations and leave the entire site of the work in a neat and orderly condition.

B. In order to prevent environmental pollution arising from the construction activities related to the performance of this Contract, comply with all applicable Federal, State and local laws and regulations concerning waste material disposal, as well as the specific requirements stated in this Section and elsewhere in the Specifications.

C. Disposal of excess excavated material in wetlands, stream corridors, and plains is strictly prohibited even if the permission of the property owner is obtained. Any violation of this restriction by the Contractor, or any person employed by him, will be brought to the immediate attention of the responsible regulatory agencies, with a request that appropriate action be taken against the offending parties. The Contractor will be required to remove the fill and restore the area impacted at no increase in the Contract Price.

1.11 SITE MAINTENANCE PRIOR TO START OF CONSTRUCTION

A. Contractor shall be responsible for site maintenance from the date of contract execution through start of construction. Upon request of Owner and/or Engineer, Contractor shall perform site maintenance to include, but not be limited to: maintenance of stormwater, erosion and sedimentation controls; provide/install hay bales and/or silt fence if required; sediment removal from basins or swales; re-establishment of drainage swales; implementing measures to ensure slope stability, etc. Such measures shall only be implemented when specifically authorized in writing by Engineer at Owner's request.

END OF SECTION

SECTION 01102

SAFETY, HEALTH AND EMERGENCY RESPONSE REQUIREMENTS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. This Section describes the responsibilities of the Contractor for safety, health, and emergency response. Owner requires that work performed under this specification will not result in:

1. Injuries to employees or other persons.

2. Employee exposures to health hazards above the occupational limits established by OSHA, ACGIH, or the Nuclear Regulatory Commission (full names provided below).

3. Exposure of area residents to air contaminants above the levels established for general public exposure by USEPA, NRC, or the State.

4. Significant increases in the levels of contaminants in soil, water, or sediment near the site.

5. Violations of OSHA, EPA, NRC, or State regulations.

B. Any disregard for the provision of these Health and Safety requirements may be deemed just and sufficient cause for termination of the Contract without compromise or prejudice to the rights of the Contractor.

C. Maintain a comprehensive health and safety program that addresses lines of authority and responsibility for health and safety, medical monitoring, training, and equipment programs, and health and safety recordkeeping. Site-specific requirements are discussed elsewhere in this Section.

1.02 FORESEEABLE HAZARDS IN LANDFILL WORK

A. Hazardous Substances

1. During the excavation of a sanitary landfill, the possibility exists that hazardous substances may be uncovered during the excavation portion of the Project. Hazardous substances are defined as materials which are flammable, explosive, toxic, corrosive, or reactive. Although the origin of the solid wastes at this Site is anticipated to be primarily municipal solid wastes, the potential exists for the presence of hazardous substances. Although some environmental data exists on the Site, the Contractor should exercise due caution and anticipate reasonable occurrences of waste materials.

2. Hazardous materials may be found as liquids (in containers or as leachate), as solid materials, or as gases. The operator excavating in waste shall observe all exposed material and shall respond to the presence of the following hazards and any others discovered in the field; steel drums containing liquid; containers of industrial materials; deposits of powdered or granular material; non-natural colored material; or other unusual waste deposits. The operator shall also respond to strong or unusual odors. The operator shall respond by avoiding further disturbances to the areas. The Contractor's representative on the site shall

immediately notify the Owner or the Engineer on-site. The Owner shall arrange for assessment and removal of hazardous materials, as needed. The Contractor should continue work in an unaffected portion of the Site in accordance with health and safety procedures.

B. Surface Conditions

1. Landfills include steep slopes and soft unstable soil areas. Surfaces of excavated refuse areas may have voids, soft spots, sharp protruding objects, slippery conditions, or other hazards.

C. Landfill Gas

1. Decomposing solid waste produces gas consisting of methane, carbon dioxide, and lesser amounts of hydrogen sulfide. Methane may be flammable or explosive when exposed to the air. Carbon dioxide is heavier than air and can displace air in confined spaces, thereby, causing loss of oxygen and potential asphyxiation. Methane and carbon dioxide are both odorless but are usually present with other odorous products created from solid waste decomposition such as hydrogen sulfide. Hydrogen sulfide has a "rotten egg" odor and can be toxic. Other organic vapors associated with the uncontrolled disposal of gasoline, petroleum products, paint products, and domestic or industrial solvents are also routinely encountered in off gases at sanitary landfills. A number of these organic vapors may pose a health hazard even at relatively low concentrations.

2. The atmosphere at the surface from which refuse has been excavated should be tested by the Contractor or his subcontractor using a portable combination combustible gas/hydrogen sulfide gas/oxygen detector. The excavated area should be tested in accordance with the requirements set forth in the Contractor's Health and Safety Plan. Portable instrumentation such as photoionization detectors (PIDs), flame ionization detectors (FIDs), an indicator with alarm such as Model 261 by MSA International, or equivalent can be used to monitor organic vapors in the breathing zone of on-site personnel.

D. Confined Spaces

1. In addition, this project may involve entry into confined spaces. A permit-required Confined Space is an enclosed space which:

2. Is large enough and configured such that an employee can bodily enter and perform assigned work.

3. Has limited or restricted means of entry or exit.

4. Is not designed for continuous employee occupancy.

5. Has one or more of the following characteristics:

   a. Contains or has a known potential to contain a hazardous atmosphere.

   b. Contains a material that can engulf an entrant.

   c. Has a configuration that could trap or asphyxiate an entrant.

d. Contains any other recognized serious safety or health hazard.

1.03 SUBMITTALS

A. Submit the following information at or prior to the Pre-Construction Conference.

1. Name of Contractor's Health and Safety Officer.

2. A statement reflecting the number of Contractor's employees who have completed the training and medical requirements required for hazardous waste employees.

3. A Safety Health and Emergency Response Plan, which addresses the issues described in Paragraphs 1.08 B and C of this Section.

4. Certification of health and safety officer's authority.

5. Name and address of Contractor's consulting physician.

6. Name and resume of health and safety professional.

7. Personal protection (including respiratory) programs.

8. A confined space entry procedure (if applicable).

1.04 REGULATORY REQUIREMENTS

A. Contractor's health and safety practices shall follow the standards and guidelines established in the publications listed below. These standards are incorporated in this Section by reference:

1. Safety and Health Standards 29 CFR 1910 (General Industry), US Department of Labor, Occupational Safety and Health Administration (OSHA). Hereafter, referred as "29 CFR 1910."

2. OSHA 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response, U.S. Dept. of Labor, OSHA.

3. OSHA 29 CFR 1910.146 Permit-Required Confined Spaces, U.S. Dept. of Labor, OSHA.

4. OSHA Safety and Health Standards 29 CFR 1926 (Construction Industry), US Department of Labor, OSHA

5. Standard Operating Safety Guides, US Environmental Protection Agency (EPA), Office of Emergency and Remedial Response PB92-983414.

6. Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, US Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health (NIOSH).

7. Standards for Radiation Protection, 10 CFR 20, Nuclear Regulatory Commission (NRC) (if applicable).

8. Guidelines for Decontamination of Facilities and Equipment prior to Release for Unrestricted Use, NRC, 1976 (if applicable).

B. This Section implements and amplifies procedures and requirements of the above referenced regulations and guidelines. These publications define terms and establishes procedures discussed in this Section, which incorporates them by reference. Where conflicts arise between the requirements of this Section and the above-listed standards and guidelines, the most restrictive requirement shall apply.

1.05 CONTRACTOR'S PERSONNEL

A. Assign persons to fill each of the following roles. An individual can fill as many roles for which he or she is qualified.

B. Health and Safety Officer - Contractor shall designate an employee or company principal as its health and safety officer (HSO). This HSO must have the authority to command sufficient resources to safely perform the Work. Contractor shall identify its HSO in the site safety and health plan. Owner will direct health and safety correspondence to this HSO.

C. Health and Safety Professional - Designate a health and safety professional to take responsibility for evaluating hazards of the site and controls that will appear in the site safety plan. This professional shall be certified as either a certified industrial hygienist or a certified safety professional. This Section calls this person a Certified Industrial Hygienist (CIH).

D. Site Health and Safety Coordinator

1. Designate a Site Health and Safety Coordinator (SHSC) for this project. Day-to-day industrial hygiene support, including air monitoring, training, site safety inspections, shall be provided by the SHSC. The SHSC shall have the authority to stop on-site operations whenever conditions threaten the health or safety of employees. The SHSC shall remain on-site during all project operations.

2. The SHSC shall report directly to the HSO or the CIH. The SHSC shall have; a sound working knowledge of occupational safety and health regulations, experience on the type of project described in these specifications, and training in air monitoring practices and techniques.

E. On-site Operations Manager - The on-site activity of this project shall be under the control of an on-site operations manager. This manager shall have demonstrable experience with hazardous materials remediation.

F. On-site Workers - All on-site personnel performing or supervising work in accordance with the provisions of the SHERP above Level D protection shall possess the following credentials:

1. Have completed a forty hour health and safety training course or refresher training course within the last year.

2. Have completed a medical monitoring exam within the last year.

3. Have passed a fit test for any respirator they may wear on the site.

4. Have completed a confined space entry training course (Requirement applies if Contractor employees may enter confined spaces in the course of the project).

1.06 TRAINING

A. All employees exposed to hazardous substances, health hazards, or safety hazards shall complete the employee training requirements listed below. Employees shall not participate in field activities until they have been trained to a level required by their job function and responsibility.

B. Submit a statement indicating that personnel who will enter confined spaces understand the hazards, and are trained and qualified in compliance with 29 CFR 1910.146.

C. Maintain, at the work site, documentation that shows that each on-site employee or subcontractor has the health and safety training courses.

D. At least one person who has been trained and certified in First Aid and CPR by the American Red Cross, or an equivalent organization, shall be present on-site during all project operations.

1.07 ACCIDENT OR INCIDENT REPORTS

A. If an accident, an explosion or fire, or a release of toxic materials occurs during the course of the project, the Owner and Engineer shall both be telephoned immediately and receive a written notification within 24 hours. Within two working days of any reportable accident, complete and submit to Owner, an accident report addressing the following items:

1. Name, organization, telephone number, and location of the Contractor.

2. Name and title of the person(s) reporting.

3. Date and time of the accident/incident.

4. Location of the accident/incident, i.e., site location, facility name.

5. Brief summary of the accident/incident giving pertinent details including type of operation ongoing at the time of the accident/incident.

6. Cause of the accident/incident, if known.

7. Casualties (fatalities, disabling injuries).

8. Details of any existing chemical hazard or contamination.

9. Estimated property damage, if applicable.

10. Nature of damage, effect on contract schedule.

11. Action taken by Contractor to ensure safety and security.

12. Other damage or injuries sustained public or private.

1.08 HEALTH AND SAFETY PLAN

A. Prepare a Safety Health and Emergency Response Plan (SHERP) that addresses each concern mentioned in this Section and other concerns the Engineer and Contractor deem necessary. The plan shall be based on all applicable OSHA standards and regulations. The SHERP shall be site-specific and shall include measures to be taken by Contractor and subcontractor(s) to control physical, radiological, and chemical hazards associated with site remediation. Contractor's standard policies may constitute much of this SHERP. Contractor's CIH shall sign and date the SHERP.

B. The SHERP shall, at a minimum address the following elements: staff organization, responsibilities, and authorities; site description; hazard analysis for each project task and operation; general and site-specific training; personal protective equipment; medical surveillance; personal and environmental exposure monitoring; standard operating safety procedures, engineering controls, and work practices; communications; illumination; site control measures; personnel hygiene and decontamination; equipment decontamination; emergency equipment and first aid; emergency response and contingency procedures; and logs, reports and recordkeeping.

C. An Accident Prevention Plan shall appear in the SHERP. This APP shall address methods for avoiding the physical hazards (e.g. open manholes). Contractor and subcontractor(s) shall follow the approved Accident Prevention Plan throughout construction. The Accident Prevention Plan shall address, at a minimum, the following items:

1. Safety Meetings
2. Fire Prevention and Protection
3. Walking and Working Surfaces
4. Site Housekeeping
5. Mechanical Equipment Inspection
6. Sanitation
7. Daily Safety Inspections
8. Accident Reporting

D. Prepare and submit a confined space entry procedure which shall address the following elements: staff organization, responsibilities, and authorities; permit preparation, approval, and cancellation; training; personal protective equipment; medical surveillance; personal and environmental exposure monitoring; standard operating safety procedures, engineering controls, and work practices; communications; illumination; provision of an attendant; personnel hygiene; emergency removal and first aid; and recordkeeping. Contractor's standard policies may constitute this procedure.

E. Submit the SHERP and confined space entry procedure to the Engineer at or prior to the Pre-Construction Conference. Indicate its commitment to following the SHERP by an affidavit, signed by the company health and safety officer.

F. Contractors that seek to modify any portion or provision of the SHERP, shall request a modification from Engineer in writing. The requested modification will not be implemented until authorized in writing by the Engineer.

G. Quickly notify Engineer, both verbally and in writing, of any unforeseen hazard, safety-related factor, or condition they observe during the work at this site. In the interim, take prudent action to establish and maintain safe working conditions and to safeguard employees, the public, and the environment in accordance with the Health and Safety Plan.

H. Should Engineer require modification of any portion or provision of the SHERP, it will notify the Contractor in writing of such modifications.

1.09 SITE - SPECIFIC EQUIPMENT PRACTICES

A. Supply all protective clothing and equipment necessary for their personnel and maintain it in accordance with the manufacturer's specifications. All equipment shall carry applicable MSHA/NIOSH approvals. Specific equipment requirements must be stated in the Contractor's Plan. The Engineer may reject the use of the equipment if, in his or her opinion, it provides less protection than that specified in the SHERP.

B. Maintain a sufficient supply of PPE for two Owner or Engineer employees per day for the duration of the project. Owner and Engineer will provide respiratory protection and safety shoes for its employees.

C. Personnel shall not enter an area or perform a task for which a respirator might be required unless they have passed a fit test with the make and model of respirator in use. Respirators shall not be interchanged between workers without cleaning and sanitizing. Canisters and filters shall be changed daily.

D. Prescription eyeglasses worn on site must meet ANSI standard Z87.1. Provide prescription lens inserts for employees who need to wear full-face respirators. Personnel shall wear the protective equipment specified in the SHERP for each on-site task.

E. All personal protective equipment worn on-site will be decontaminated or properly disposed of at the end of the workday.

F. Operations under this Contract will require work exposure to potentially hazardous materials. Provide and assure the wearing of all necessary personal protective equipment (PPE) for its on-site personnel. All personnel entering the work area shall don, at a minimum, Level D PPE.

G. The initial minimum level of protection for each major site activity shall be described in the SHERP. Conform to the initial level of protection unless an upgrade or downgrade is warranted by air monitoring data and an evaluation of work practices/controls.

H. Downgrade level of protection only when 1) the Site Health and Safety Coordinator (SHSC) makes the change based on site activity, air monitoring of contaminant levels, and work place practices as specified in the SHERP or 2) the Certified Industrial Hygienist (CIH) approves the change with the knowledge of the Engineer.

I. Respiratory protective equipment shall carry National Institute of Occupational Safety and Health approval for the contaminants of concern. Do not switch respirators or facepieces between employees without cleaning between uses.

J. The SHERP shall include a written respirator policy which meets 29 CFR 1910.134 and establishes procedures to assure daily cleaning and maintenance of respirators. Breathing air shall be Compressed Gas Association Grade D or better. Cartridges and filters shall be changed

at least daily. Respirators and filter cartridges shall be stored in a place and manner that they cannot become contaminated with hazardous materials.

K. All personnel who may wear a respirator shall be qualitatively fit-tested with irritant smoke, isoamyl acetate, or equivalent methods according to OSHA Standard 29 CFR 1926.58, Appendix C at least semiannually. Quantitative fit-testing exceeds this requirement. Employees shall perform negative pressure fit-checks in accordance with manufacturers' recommendations on air purifying respirators each time they are put on. No facial hair, which interferes with a satisfactory fit of a respiratory mask-to-face-seal, is allowed on personnel required to wear respiratory protective equipment. A "two-day" growth of beard is considered to interfere with the fit of the respirator.

1.10 STANDARD SAFETY OPERATING PROCEDURES

A. The SHERP shall contain a section outlining Standard Safety Operating Procedures to be implemented for this project. Personnel shall observe the following contamination control rules while on-site.

1. Eating, drinking, smoking, chewing gum or tobacco, and other practices that increase the probability of hand-to-mouth transfer and ingestion of material is prohibited in any area designated contaminated.

2. Hands and face shall be thoroughly washed upon leaving the work area and before eating, drinking, urinating, or other activities.

3. Whenever decontamination procedures for protective clothing is in effect, the entire body shall be thoroughly washed as soon as possible after the protective clothing is removed.

4. Medicine and alcohol can increase the effects of exposure to toxic chemicals. Therefore:

   a. Personnel using prescription drugs shall inform the doctor who prescribed them of their potential contact with toxic materials;

   b. Personnel who take over-the-counter drugs within a day before work on a site must inform the SHSC of the warnings listed on the drug's container (the part of the label that says, for example, "Do not take this medication if you are operating a motor vehicle");

   c. Alcoholic beverage intake will be prohibited during project operations. Personnel under the influence of alcohol or recreational or illegal drugs will not be allowed on site.

1.11 GENERAL HEALTH AND SAFETY CONCERNS

A. Each work day, Contractor's SHSC shall inspect the site and the work practices followed on the site to determine whether the SHERP is being followed.

B. When work area temperatures exceed 80 degrees F (75 degrees F when workers wear synthetic coveralls), take steps to control heat stress among its personnel. When temperatures are lower than 32 degrees F, take steps to control cold stress among its personnel. Such steps should include; dry layered clothing, break shelters, and provision of fires or heaters.

C. Electrical installations and appliances used shall meet applicable 1993 National Electrical Code specifications. All electrical devices utilized by the Contractor or his subcontractors on this

project shall be grounded and equipped with and utilize ground fault circuit interrupter (GFCI) protected outlets or extension cord sets. Electrical devices used in confined spaces that may contain flammable vapors shall be explosion - safe.

D. No Contractor employee may enter a confined space unless the procedures below are followed.

1. Pre-entry permits are preparation and reviewed.

2. Appropriate safety equipment is selected and provided.

3. Hazardous conditions are monitored per Health & Safety Plan.

4. Hazardous gases are ventilated from the space.

5. Rescue procedures and equipment are instituted.

END OF SECTION

PHYSICIAN'S CERTIFICATION FOR EMPLOYEES

Name _____ Date of Exam _____

Firm _____

WORK ASSIGNMENT:

This is to certify that I, the undersigned licensed physician, have supervised a physical examination consistent with the requirements of OSHA 29 CFR 1910.120 for the above named individual for the above stated work assignment. I hereby certify that this individual is, in my opinion (complete 1, 2, and 3):

1. ( ) medically qualified to perform the stated work assignment.

   ( ) not medically qualified to perform the stated work assignment.

2. ( ) medically qualified to use respiratory protective devices for the stated work assignment.

   ( ) not medically qualified to use respiratory protective devices for the stated work assignment.

3. ( ) NO RESTRICTIONS

   ( ) RESTRICTIONS: Summarize below or attach summary.

Doctor's Signature _____

Printed Name _____

Address _____

Phone (_____)_____

SECTION 01110

ENVIRONMENTAL PROTECTION PROCEDURES

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnishing all labor, materials, and equipment and perform all work required for the prevention of environmental pollution in conformance with applicable laws and regulations, during and as the result of construction operations under this Contract. For the purpose of this Section, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents that adversely affect human health or welfare, unfavorably alter ecological balances of importance to human life, affect other species of importance to man, or degrade the utility of the environment for aesthetic and/or recreational purposes.

B. The control of environmental pollution requires consideration of air, water, and land and involves management of noise, odors, surface water runoff, and solid waste, as well as other pollutants.

C. Schedule and conduct all work in a manner that will minimize the erosion of soils in the area of the work. Provide erosion control measures such as diversion channels, sedimentation or filtration systems, berms, staked hay bales, seeding, mulching, or other surface treatments as are required to prevent silting and muddying of streams, rivers, impoundments, creeks, etc. All erosion control measures shall be in place in an area prior to any construction activity in that area. Specific requirements for erosion and sedimentation controls are specified in Section 02270.

D. This Section intended to ensure that construction is achieved with a minimum of disturbance to the existing ecological balance between a water resource and its surroundings. These are general guidelines. It is the Contractor's responsibility to determine the specific construction techniques to meet these guidelines.

E. All phases of sedimentation and erosion control shall comply with and be subject to the approval of the Massachusetts Department of Environmental Protection (MassDEP) and the City of Haverhill Conservation Commission (the Commission). Contractor shall prepare a sedimentation and erosion control plan meeting the requirements of the MassDEP and the Commission. The plan must be reviewed and approved by the Engineer.

1.02 APPLICABLE REGULATIONS

A. Comply with all applicable Federal and state laws and regulations concerning environmental pollution control and abatement including, but not limited to, all MassDEP approvals and the City of Haverhill Conservation Commission Order of Conditions (see Appendix A)

1.03 NOTIFICATIONS

A. The Engineer will notify the Contractor in writing of any non-compliance with the foregoing provisions or of any environmentally objectionable acts and corrective action to be taken. State or local agencies responsible for verification of certain aspects of the environmental protection requirements shall notify the Contractor in writing, through the Engineer, of any non-compliance

with State or local requirements. After receipt of such notice from the Engineer or from the regulatory agency through the Engineer, immediately take corrective action. Such notice, when delivered to the Contractor or his/her authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the Contractor fails or refuses to comply promptly, the Owner may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the Contfactor unless it is later determined that the Contractor was in compliance.

B. Prior to work on site, Contractor shall submit a detailed sequence of construction.

1.04 SUBMITTALS

A. Prior to work on site, Contractor shall submit a detailed sequence of construction and vegetation.

B. Contractor shall provide the location of storage and stockpiling areas and areas for temporary construction facilities.

C. Contractor shall provide a detailed odor control plan including the proposed odor masking agents to be used, the quantity to be kept on-site and methods of application.

1.05 IMPLEMENTATION

A. Prior to commencement of the work, meet with the Engineer to develop mutual understandings relative to compliance with these provisions, all environmental permits issued for this work, and administration of the environmental pollution control program.

B. Remove temporary environmental control features, when approved by the Engineer and incorporate permanent control features into the project at the earliest practicable time.

PART 2 PRODUCTS - (NONE THIS SECTION)

PART 3 EXECUTION

3.01 EROSION CONTROL

A. Provide positive means of erosion control such as shallow ditches around construction to carry off surface water. Erosion control measures, such as siltation basins, hay check dams, mulching, erosion control blankets, and other equivalent techniques, shall be used as appropriate. Flow of surface water into excavated areas shall be prevented. Ditches around construction areas shall also be used to carry away water resulting from dewatering of excavated areas. At the completion of the work, ditches shall be backfilled, stabilized and the ground surface restored to original condition.

3.02 PROTECTION OF STREAMS

A. Take all precautions to prevent, or reduce to a minimum, any damage to any stream from pollution by debris, sediment or other material, or from the manipulation of equipment and/or materials in or near such streams. Water that has been used for washing or processing or that contains oils or sediments that will reduce the quality of the water in the stream shall not be directly returned to the stream. Divert such waters through a settling basin or filter before being directed into streams or surface waters.

B. Do not discharge water from dewatering operations directly into any live or intermittent stream, channel, wetlands, salt marsh, surface water, or any storm sewer. Water from dewatering operations shall be treated by filtration, settling basins, or other approved method to reduce the amount of sediment and floatables contained in the water to allowable levels.

C. Do not perform refueling activities within 100 feet of the wetland bank. Take all preventative measures to avoid spillage of petroleum products and other pollutants. In the event of any spillage, prompt remedial action shall be taken in accordance with a contingency action plan meeting the requirements of the Massachusetts Department of Environmental Protection. Submit two copies of approved contingency plans to the Engineer.

3.13 EQUIPMENT AND VEHICLE DECONTAMINATION

A. Design and construct a decontamination pad to be used to decontaminate equipment and vehicles exiting the site. The Contractor shall be responsible for the maintenance and operation of the decontamination station (decontamination pad and wash down equipment) throughout the duration of the work activities. Provide a collection system for the decontamination pad wash water. Collect all wash water resulting from the decontamination process. At the completion of the project, dismantle and properly dispose of the decontamination pad and resulting contaminants.

B. The minimum design requirements of the decontamination pad are as follows:

1. Pad shall have adequate size to accommodate the width and length of the largest piece of equipment that will be used in the management of contaminated soil and the minimum length of an 18-wheel trailer dump truck.

2. Pad shall be equipped with 3-feet high splash guards draped inside the bermed pad to prevent over-spray.

3. Pad shall be sloped to a low point sump to allow for thorough collection of decontamination water.

C. Wash down equipment shall as a minimum include both a high pressure water and steam system. The Contractor shall provide equipment. Power required to generate steam and high pressure water (greater than 90 psi) shall be the responsibility of the Contractor.

D. All decontamination water within the decontamination pad shall be collected, pumped to, and contained in an aboveground secure tank for storage and settlement of solids. Decontamination water shall be disposed of in the forebay to Basin 1 and settled solid shall be disposed beneath the cap.

E. The decontamination pad shall be removed and disposed of following the completion of Work.

3.03 PROTECTION OF LAND RESOURCES

A. After completion of construction, restore land resources within the project boundaries and outside the limits of permanent work to a condition that will appear to be natural and not detract from the appearance of the project. Confine all construction activities to areas shown on the Drawings.

B. Outside of areas requiring earthwork for the construction of the new facilities, do not deface, injure, or destroy trees or shrubs, nor remove or cut them without prior approval. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorage unless specifically authorized by the Engineer. Where such special emergency use is permitted, first wrap the trunk with a sufficient thickness of burlap or rags over which softwood cleats shall be tied before any rope, cable, or wire is placed. The Contractor shall in any event be responsible for any damage resulting from such use.

C. Where trees may possibly be defaced, bruised, injured, or otherwise damaged by the Contractor's equipment, dumping or other operations, protect such trees by placing boards, planks, or poles around them. Monuments and markers shall be protected similarly before beginning operations near them.

D. Any trees or other landscape feature scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to its original condition. The Engineer will decide what method of restoration shall be used and whether damaged trees shall be treated and healed or removed and disposed of.

1. All scars made on trees by equipment, construction operations, or by the removal of limbs larger than 1-in in diameter shall be coated as soon as possible with an approved tree wound dressing. All trimming or pruning shall be performed in an approved manner by experienced workmen with saws or pruning shears. Tree trimming with axes will not be permitted.

2. Climbing ropes shall be used where necessary for safety. Trees that are to remain, either within or outside established clearing limits, that are subsequently damaged by the Contractor and are beyond saving in the opinion of the Engineer, shall be immediately removed and replaced.

E. The locations of the Contractor's storage and other construction buildings, required temporarily in the performance of the work, shall be cleared portions of the job site and shall require written approval of the Engineer and shall not be within 100 feet horizontal of wetlands. The preservation of the landscape shall be an imperative consideration in the selection of all sites and in the construction of buildings. Drawings showing storage facilities shall be submitted for approval of the Engineer.

F. If soils are to be exposed for an extended period of time the soils shall be stabilized. A stabilization plan shall be submitted to the Engineer for approval.

G. Remove all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess waste materials, or any other vestiges of construction as directed by the Engineer. It is anticipated that excavation, filling and plowing of roadways will be required to restore the area to near natural conditions that will permit the growth of vegetation thereon. The disturbed areas shall be prepared and seeded as described in Section 02930, or as approved by the Engineer.

H. All debris and excess material will be disposed of offsite in an environmentally sound manner, and in compliance with all Federal, State, and local requirements.

3.04 PROTECTION OF AIR QUALITY

A. Burning - The use of burning at the project site for the disposal of refuse and debris will not be permitted.

B. Dust Control - Maintain all excavations, embankments, stockpiles, access roads, plant sites, waste areas, borrow areas and all other work areas within or without the project boundaries free from dust that could cause the standards for air pollution to be exceeded and which would cause a hazard or nuisance to others.

C. Sweep the access road and Main Street as necessary to control dust. Work with Owner, Engineer, and Neighborhood Group to determine when street sweeping is required.

D. In addition to street sweeping, water sprinkling or other similar methods will be permitted to control dust. The use of petroleum products is prohibited.

E. Sprinkling, to be approved, must be repeated at such intervals as to keep all parts of the disturbed area at least damp at all times, and the Contractor must have sufficient competent equipment on the job to accomplish this if sprinkling is used. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs, or as directed by the Engineer.

F. All material being delivered to the site must be covered.

3.05 MAINTENANCE OF POLLUTION CONTROL FACILITIES DURING CONSTRUCTION

A. During the life of this Contract, maintain all facilities constructed for pollution control as long as the operations creating the particular pollutant are being carried out or until the material concerned has become stabilized to the extent that pollution is no longer being created.

3.06 NOISE CONTROL

A. Make every effort to minimize noises caused construction operations. Equipment shall be equipped with silencers or mufflers designed to operate with the least possible noise in compliance with State and Federal regulations.

B. Comply with the five (5) minute idle law.

3.07 ODOR CONTROL

A. During the periods when the landfill is being excavated or regraded or waste materials are being placed, dispense a masking agent as directed by the Engineer to minimize and control odors. Maintain an adequate supply on-site of the masking agent through the term of the Contract. Work with Owner, Engineer, and Neighborhood Group to determine the effectiveness of masking agent and to determine if additional measures are required.

B. Minimize, to the extent practicable, the amount of uncapped areas to minimize the potential for odors.

C. No excavations shall be left open overnight and all exposed waste shall be covered with a minimum of 6-inches of soil cover at the end of the day.

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

A. This Section specifies the general methods and requirements of submissions applicable to the following work-related submittals: Shop Drawings, Product Data, and Samples. Additional general submission requirements are contained in Paragraphs 6.24 and 6.25 of the General Conditions. Detailed submittal requirements will be specified in the technical specifications' sections.

B. All submittals shall be clearly identified by reference to Specification Section, Paragraph, Drawing Number, or Detail as applicable. Submittals shall be clear and legible and of sufficient size for sufficient presentation of data.

1.02 SHOP DRAWINGS, PRODUCT DATA, SAMPLES

A. Shop Drawings

1. Shop drawings, as defined in the General Conditions, and as specified in individual work Sections include, but are not necessarily limited to, custom-prepared data such as fabrication and erection/installation (working) drawings, scheduled information, setting diagrams, actual shopwork manufacturing instructions, custom templates, coordination drawings, individual system or equipment inspection and test reports and certifications, as applicable to the Work.

2. All shop drawings submitted by subcontractors for approval shall be sent directly to the Contractor for checking. The Contractor shall be responsible for their submission at the proper time so as to prevent delays in delivery of materials.

3. The Contractor shall check all subcontractor's shop drawings regarding measurements, size of members, materials, and details to satisfy himself that they conform to the intent of the Drawings and Specifications. Shop drawings found to be inaccurate or otherwise in error shall be returned to the subcontractors for correction before submission thereof.

4. All details on shop drawings submitted for approval shall show clearly the relation of the various parts to the main members and lines of the structure and where correct fabrication of the work depends upon field measurements; such measurements shall be made and noted on the drawings before being submitted for approval.

B. Product Data

1. Product data as specified in individual Sections, include, but are not necessarily limited to, standard prepared data for manufactured products (sometimes referred to as catalog data), such as the manufacturer's product specification and installation instructions, manufacturer's printed statements of compliances and applicability, catalog cuts, production or quality control inspection and test reports and certifications, mill reports, product operating and maintenance instructions and recommended spare-parts listing and printed product warranties, as applicable to the Work.

C. Samples

1. Samples specified in individual Sections, include, but are not necessarily limited to, physical examples of the work such as sections of manufactured or fabricated work, small cuts or containers of materials, and units of work to be used by the Engineer or Owner for independent inspection and testing, as applicable to the Work.

1.03 CONTRACTOR'S RESPONSIBILITIES

A. The Contractor shall review shop drawings, product data, and samples, including those by subcontractors, prior to submission to determine and verify the following:

1. Field measurements

2. Field construction criteria

3. Catalog numbers and similar data

4. Conformance with the Specifications and Drawings.

B. Each shop drawing, sample and product data submitted by the Contractor shall have affixed to it the following Certification Statement including the Contractor's Company name and signed by the Contractor: "Certification Statement: by this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have reviewed and approved this submittal and checked and coordinated each item with other applicable approved shop drawings and all Contract requirements." Shop drawings and product data sheets 11-in x 17-in and smaller shall be bound together in an orderly fashion and bear the above Certification Statement on the cover sheet. The cover sheet shall fully describe the packaged data and include a listing of all items within the package. Provide to the Resident Project Representative a copy of each submittal transmittal sheet for shop drawings, product data, and samples at the time of submittal of said drawings, product data, and samples to the Engineer.

C. Notify the Engineer in writing, at the time of submittal, of any deviations in the submittals from the requirements of the Contract Documents.

D. The review and approval of shop drawings, samples, or product data by the Engineer shall not relieve the Contractor from his responsibility with regard to the fulfillment of the terms of the Contract. All risks of error and omission are assumed by the Contractor and the Engineer will have no responsibility therefor.

E. No portion of the work requiring a shop drawing, sample, or product data shall be started nor shall any materials be fabricated or installed prior to the approval or qualified approval of such item. Fabrication performed, materials purchased or on-site construction accomplished which does not conform to approved shop drawings and data shall be at the Contractor's risk. The Owner will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity.

F. Project work, materials, fabrication, and installation shall conform to approved shop drawings, applicable samples, and product data.

1.04 SUBMISSION REQUIREMENTS

A. Make submittals promptly in accordance with approved schedule and in such sequence as to cause no delay in the Work or in the work of any other contractor.

B. Each submittal, appropriately coded, will be returned within 30 working days following receipt of submittal by the Engineer.

C. Number of submittals required:

1. Shop Drawings as defined in Paragraph 1.02 A: Six copies.

2. Product Data as defined in Paragraph 1.02 B: Three copies.

3. Samples: Submit the number stated in the respective Specification Sections.

D. Submittals shall contain:

1. The date of submission and the dates of any previous submissions.

2. The Project title and number.

3. Contractor identification.

4. The names of:

a. Contractor
b. Supplier
c. Manufacturer

5. Identification of the product, with the specification section number, page, and paragraph(s).

6. Field dimensions, clearly identified as such.

7. Relation to adjacent or critical features of the Work or materials.

8. Applicable standards, such as ASTM or Federal Specification numbers.

9. Identification of deviations from Contract Documents.

10. Identification of revisions on resubmittals.

11. A blank space suitably sized for Contractor and Engineer stamps.

1.05 REVIEW OF SHOP DRAWINGS, PRODUCT DATA, WORKING DRAWINGS AND SAMPLES

A. The review of shop drawings, data, and samples will be for general conformance with the design concept and Contract Documents. They shall not be construed:

1. as permitting any departure from the Contract requirements;

2. as relieving the Contractor of responsibility for any errors, including details, dimensions, and materials;

3. as approving departures from details furnished by the Engineer, except as otherwise provided herein.

B. The Contractor remains responsible for details and accuracy, for coordinating the work with all other associated work and trades, for selecting fabrication processes, for techniques of assembly, and for performing work in a safe manner.

C. If the shop drawings, data or samples as submitted describe variations and show a departure from the Contract requirements, which Engineer finds to be in the interest of the Owner and to be so minor as not to involve a change in Contract Price or time for performance, the Engineer may return the reviewed drawings without noting an exception.

D. Submittals will be returned to the Contractor under one of the following codes.

Code 1 - "APPROVED" is assigned when there are no notations or comments on the submittal. When returned under this code the Contractor may release the equipment and/or material for manufacture.

Code 2 - "APPROVED AS NOTED". This code is assigned when a confirmation of the notations and comments IS NOT required by the Contractor. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product.

Code 3 - "APPROVED AS NOTED/CONFIRM". This combination of codes is assigned when a confirmation of the notations and comments IS required by the Contractor. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product. This confirmation shall specifically address each omission and nonconforming item that was noted. Confirmation is to be received by the Engineer within calendar days of the date of the Engineer's transmittal requiring the confirmation.

Code 4 - "APPROVED AS NOTED/RESUBMIT". This combination of codes is assigned when notations and comments are extensive enough to require a resubmittal of the package. The Contractor may at Contractor's own risk release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product. This resubmittal is to address all comments, omissions, and non-conforming items that were noted. Resubmittal is to be received by the Engineer within 15 calendar days of the date of the Engineer's transmittal requiring the resubmittal.

Code 5 - "NOT APPROVED" is assigned when the submittal does not meet the intent of the Contract Documents. The Contractor must resubmit the entire package revised to bring the submittal into conformance. It may be necessary to resubmit using a different manufacturer/vendor to meet the Contract Documents.

Code 6 - "COMMENTS ATTACHED" is assigned where there are comments attached to the returned submittal, which provide additional data to aid the Contractor.

Codes 1 through 5 designate the status of the reviewed submittal with Code 6 showing there has been an attachment of additional data.

E. Resubmittals will be handled in the same manner as first submittals. On resubmittals the Contractor shall direct specific attention, in writing on the letter of transmittal and on resubmitted shop drawings by use of revision triangles or other similar methods, to revisions other than the corrections requested by the Engineer, on previous submissions. Any such revisions, which are not clearly identified, shall be made at the risk of the Contractor. The Contractor shall make corrections to any work done because of this type revision that is not in accordance to the Contract Documents as may be required by the Engineer.

F. Partial submittals may not be reviewed. The Engineer will be the only judge as to the completeness of a submittal. Submittals not complete will be returned to the Contractor and will be considered "Not Approved" until resubmitted. The Engineer may at his option provide a list or mark the submittal directing the Contractor to the areas that are incomplete.

G. If the Contractor considers any correction indicated on the shop drawings to constitute a change to the Contract Documents, the Contractor shall give written notice thereof to the Engineer at least seven working days prior to release for manufacture.

H. When the shop drawings have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.

1.06 DISTRIBUTION

A. Distribute reproductions of approved shop drawings and copies of approved product data and samples, where required, to the job site file and elsewhere as directed by the Engineer. Number of copies shall be as directed by the Engineer but shall not exceed 6.

1.07 SCHEDULES

A. Provide all schedules required by Articles 2.6, 2.9, 14.1, and elsewhere in the General Conditions.

1.08 PROFESSIONAL ENGINEER (P.E.) CERTIFICATION FORM

A. If specifically required in other Sections of these Specifications, the Contractor shall submit a P.E. Certification for each item required, in the form attached to this Section, completely filled in and stamped.

1.09 GENERAL PROCEDURES FOR SUBMITTALS

A. Coordination of Submittal Times: Prepare and transmit each submittal sufficiently in advance of performing the related work or other applicable activities, or within the time specified in the individual work sections, of the Specifications, so that the installation will not be delayed by processing times including disapproval and resubmittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery and similar sequenced activities. No extension of time will be authorized because of the Contractor's failure to transmit submittals sufficiently in advance of the Work.

END OF SECTION

P.E. CERTIFICATION FORM

The undersigned hereby certifies that he/she is a Professional Engineer registered in the (State) (Commonwealth) of _____ and that he/she has been employed by (Name of Contractor) _____ to design _____ in accordance with Specification Section _____ for the (Name of Project) _____. The undersigned further certifies that he/she has performed the design of the _____, that said design is in conformance with all applicable local, state and federal codes, rules, and regulations, and that his/her signature and P.E. stamp have been affixed to all calculations and drawings used in, and resulting from, the design.

The undersigned hereby agrees to make all original design drawings and calculations available to the (Insert Name of Owner) _____ or Owner's representative with seven days following written request therefor by the Owner.

_____
P.E. Name

_____
Signature

_____
Address

_____
Contractor's Name

_____
Signature

_____
Title

_____
Address

SECTION 01410

TESTING AND TESTING LABORATORY SERVICES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Contractor shall employ and pay for the services of an Independent Testing Laboratory to perform testing specifically indicated in the Contract Documents.

1. Cooperate with the laboratory to facilitate the execution of its required services.

2. Employment of the laboratory shall in no way relieve Contractor's obligations to perform the Work of the Contract.

B. Owner reserves the right, at his own expense, to employ a separate independent testing laboratory to verify Contractor's results.

1.02 RELATED REQUIREMENTS

A. Conditions of the Contract: Inspections and testing required by laws, ordinances, rules, regulations, orders, or approvals of public authorities.

B. Respective sections of specifications: Certification of products.

C. Each specification section listed: Laboratory tests required and standards for testing.

1.03 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

A. Laboratory is not authorized to:

1. Release, revoke, alter, or enlarge on requirements of Contract Documents.

2. Approve or accept any portion of the Work.

3. Perform any duties of the Contractor.

1.04 CONTRACTOR'S RESPONSIBILITIES

A. Cooperate with laboratory personnel; provide access to work and to manufacturer's operations.

B. Secure and deliver to the laboratory adequate quantities of representational samples of materials proposed to be used and which require testing.

C. Provide to the laboratory the preliminary data on proposed materials and other mixes that require control by the testing laboratory.

D. Materials and equipment used in the performance of work under this Contract are subject to inspection and testing at the point of manufacture or fabrication. Standard specifications for quality and workmanship are indicated in the Contract Documents. The Engineer may require

the Contractor to provide statements or certificates from the manufacturers and fabricators that the materials and equipment provided by them are manufactured or fabricated in full accordance with the standard specifications for quality and workmanship indicated in the Contract Documents. All costs of this testing and providing statements and certificates shall be a subsidiary obligation of the Contractor, and no extra charge to the Owner shall be allowed on account of such testing and certification.

E. Furnish incidental labor and facilities:

1. To provide access to work to be tested.

2. To obtain and handle samples at the project site or at the source of the product to be tested.

3. To facilitate inspections and tests.

4. For storage of test samples.

F. Notify laboratory sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES

PART 1 GENERAL

1.01 TEMPORARY OFFICES

A. Temporary offices shall be established on the job site where approved or directed by the Engineer, adequately furnished, and maintained in a clean, orderly condition by the Contractor.

B. The Contractor shall provide a partitioned off space of at least 100 sq ft of floor space in Contractor's building for the exclusive use of the Engineer throughout the period of construction. The temporary office shall be weathertight, have a tight floor at least 8-in off the ground and shall be insulated all around with rigid insulation board not less than 1/2-in thick and suitably ventilated. The office shall have at least three screened windows capable of being opened, a screen door and a solid door provided with cylinder lock and three keys. The office shall be provided with heating equipment, electrical wiring, outlets, and fixtures suitable to light the tables and desk adequately as directed.

C. Provide the following furniture and equipment in the Engineer's portion of the office:

1. One plan table, 3-ft by 5-ft and one stool
2. Desk about 3-ft by 5-ft with desk chair
3. Two-drawer, filing cabinet with lock
4. Coat rack and hooks
5. Air Conditioner (12,000 BTU)
6. First aid kit suitable for ten people with manual, American White Cross No. K10 or equal.

D. Office shall be powered using solar energy. Provide solar panels suitable to power office equipment and provide backup generator.

E. Supply all fuel for heating and backup power generation.

F. An approved, suitably constructed and equipped trailer of proper size may be furnished.

1.02 TEMPORARY TELEPHONE

A. Install a private telephone in the Engineer's field office for the Engineer's exclusive use and pay all bills charged against the Engineer's telephone, including installation charge and all monthly charges throughout the construction period.

B. Provide the telephone with an automatic telephone answering device to record messages when the office is not manned.

D. All materials delivered to the job shall be unloaded and placed in a manner that will not hamper the normal operation of the existing facilities or interfere with the flow of necessary traffic.

1.03 TRUCK TRAFFIC

A. Truck Routes shall be as shown on the attached figure and described as follows:

1. I-495 Route: I-495 to Route 125 South Main Street to Salem Street to Old Groveland Road to the landfill

2. I-95 Primary Route: I-95 to Route 133 to Route 97 (Georgetown), to Salem Street (in Groveland) to Washington Street to the landfill;

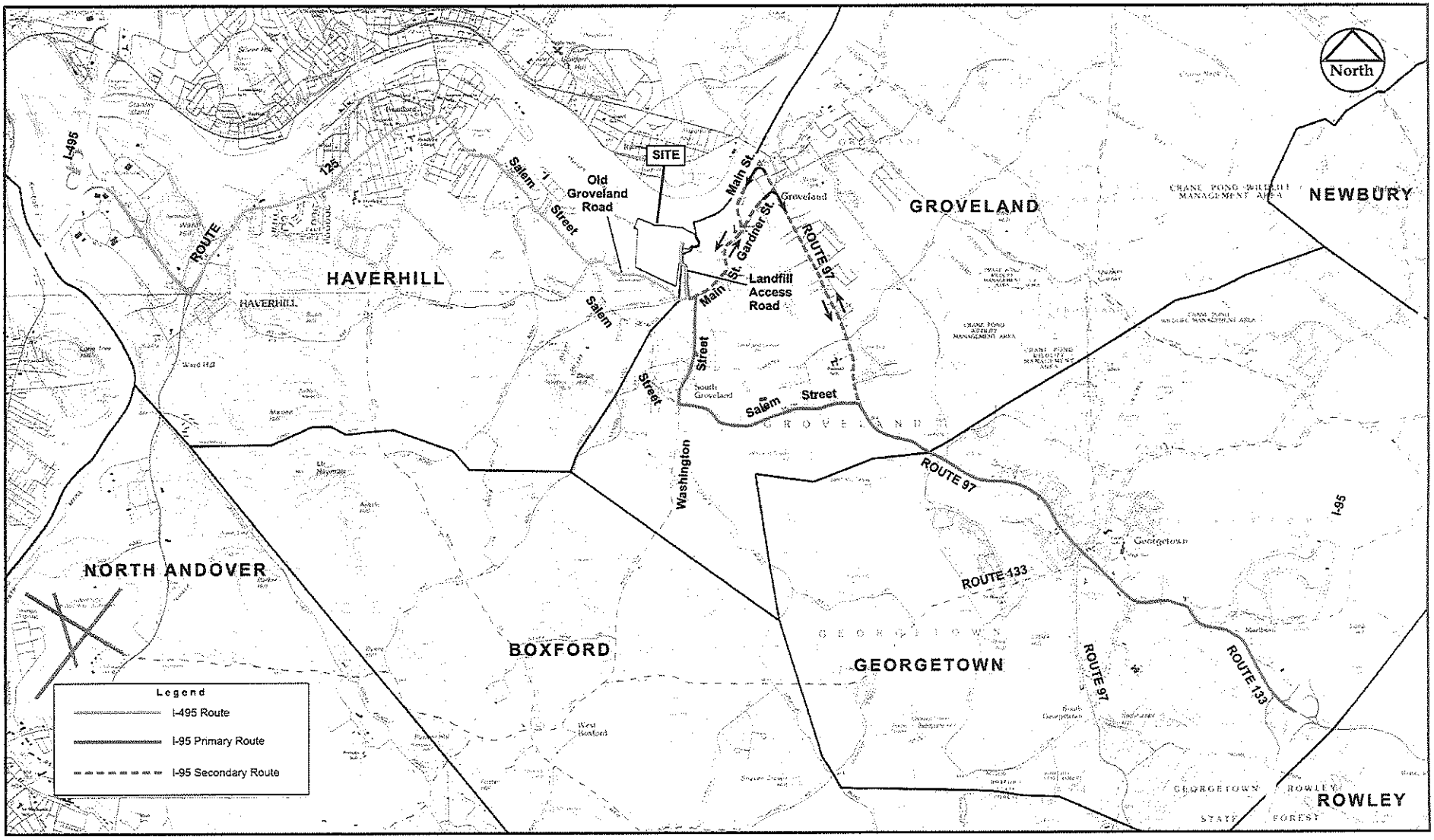
3. I-95 Secondary Route through Groveland: I-95 to Route 133 to Route 97 (in Georgetown/Groveland), to Main Street in Groveland, to the landfill. Because this portion of Main Street allows only one way traffic, the return is from the landfill to Main Street to Gardner Street to Route 97 to Route 133 to I-95. The secondary route is available daily from 9:00 am to 3:00 pm.

B. Truck trips shall not exceed 240 truck trips per day (120 round trips per day) and shall be split as even as possible between the I-495 Route and the I-95 Routes.

C. Deliveries to the site shall be between 7:00 a.m. to 7:00 p.m., Monday through Friday; and 7:00 a.m. to 3:00 p.m. on Saturdays. Primary routes shall be used prior to 9:00 am and after 3:00 p.m.

D. During hours of operation, all traffic shall be split evenly between the I-495 route and I-95 routes. The I-95 Secondary Route is available between the hours of 9:00 a.m. and 3:00 p.m., to avoid rush hour traffic at the Route 97/Main Street intersection. During these hours, truck traffic along the I-95 Route shall be split as evenly as possible between the I-95 Primary Route and the I-95 Secondary Route, depending upon traffic.

END OF SECTION



0 2000 4000
Scale in Feet

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Notes:
(1) I-95 Secondary Route through Groveland shall be available daily from 9:00 a.m. to 3:00 p.m., approximately half of the I-95 truck trips (which equates to ~ 25% of the total project truck trips).
(2) When traveling to the landfill on the I-95 Secondary Route, trucks must use Route 97 to Main Street. When leaving the landfill via the I-95 Secondary Route, trucks must travel Main Street to Gardner Street to Route 97.
(3) Truck Routes in effect for the ongoing Soils Project are intended to continue for Southern Mound Closure Construction.

Haverhill Landfill
Haverhill, Massachusetts

Figure 1
Truck Routes for Southern Mound Closure

B. Refill all grubbing holes and depressions excavated below the original ground surface with suitable materials and compact to a density conforming to the surrounding ground surface in accordance with Section 02200.

3.03 STRIPPING

A. Strip topsoil from all areas to be occupied by buildings, structures, and roadways and all areas to be excavated or filled.

B. Topsoil shall be free from brush, trash, large stones, and other extraneous material. Avoid mixing topsoil with subsoil.

C. Stockpile and protect topsoil until it is used in landscaping, loaming, and seeding operations. Dispose of surplus topsoil after all work is completed.

3.04 DISPOSAL

A. Cut tree trunks and limbs exceeding 4-in in diameter shall be cut into 4-ft lengths and stockpiled on site in the area designated on the Drawings.

B. Dispose of material and debris from site preparation operations by hauling such materials and debris to an area on the landfill to be capped to be buried prior to cap installation.

C. Burning of cleared and grubbed materials or other fires for any reason will not be permitted.

3.05 PROTECTION

A. Trees and other vegetation designated on the Drawings or directed by the Engineer to remain shall be protected from damage by all construction operations by erecting suitable barriers, guards and enclosures, or by other approved means. Conduct clearing operations in a manner to prevent falling trees from damaging trees and vegetation designated to remain and to the work being constructed and so as to provide for the safety of employees and others.

B. Maintain protection until all work in the vicinity of the work being protected has been completed.

C. Do not operate heavy equipment or stockpile materials within the branch spread of existing trees.

D. Immediately repair any damage to existing tree crowns, trunks, or root systems. Roots exposed and/or damaged during the work shall immediately be cut off cleanly inside the exposed or damaged area.

E. When work is completed, remove all dead and downed trees. Live trees shall be trimmed of all dead and diseased limbs and branches. All cuts shall be cleanly made at their juncture with the trunk or preceding branch without injury to the trunk or remaining branches.

F. Restrict construction activities to those areas within the limits of construction designated on the Drawings, within public rights-of-way, and within easements provided by the Owner. Adjacent properties and improvements thereon, public or private, which become damaged by construction

operations shall be promptly restored to their original condition, to the full satisfaction of the property owner.

END OF SECTION

SECTION 02117

CONTAMINATED SEDIMENT EXCAVATION

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, material, tools, and equipment necessary for excavating, handling, stockpiling, sampling, and analysis of contaminated sediment.

1.02 RELATED WORK

A. Safety, Health, and Emergency Requirements are included in Section 01102.

B. Environmental Protection Procedures are included in Section 01110.

C. Earthwork is included in Section 02200.

1.03 SUBMITTALS

A. Submit work plan providing details of contaminated sediment excavation.

B. Submit analytical data directly from laboratory.

C. Submit data summary tables within one week of receipt of data.

1.04 REGULATORY REQUIREMENTS

A. Commonwealth of Massachusetts, 310 CMR 40.0000, Massachusetts Contingency Plan.

PART 2 PRODUCTS

2.01 HIGH DENSITY POLYETHYLENE (HDPE) LINING

A. The high density polyethylene shall be manufactured of new, first-quality product designed and manufactured specifically for the intended use and have the following properties:

1. The material shall be 3-ply polyethylene reinforced with a non-woven grid of high strength nylon cord.

2. The material shall be U.V. resistant (black in color) and cold crack resistant to minus 40 degrees F.

3. The material shall be manufactured in a minimum 12-ft seamless width. Labels on the rolls shall identify the thickness, length, width, and manufacturer's mark number. Material thickness shall be as specified in Paragraph 3.03.

C. Environmental Protection Procedures are included in Section 01110.

D. Control of Materials is included in Section 01601.

E. Earthwork is included in Section 02200.

F. Approved haul routes as defined in Paragraph 1.03 in Section 01601.

G. Erosion and sedimentation control is included in Section 02270.

1.03 SUBMITTALS

A. Submit a detailed operations and procedures plan for the acceptance, delivery, and placement of grading and shaping materials. This plan shall include but not be limited to management procedures of soil sources; on site weighing of delivered soil; tracking of delivered soil quantities; wheel wash installation and sediment transport controls; access road maintenance, monitoring of traffic routes; monitoring and inspection of delivered soils; management of soil source files; proposed signage; etc.

B. Submit to the Engineer for review, as a single submittal, all pertinent information relating to the transport of materials specified herein. No soils may be delivered to the site until the source site and quantity is approved by the Engineer. If soils are delivered prior to Engineer's acceptance, the Contractor may be responsible for removal and off-site disposal of un-approved material at no cost to Owner. The information submitted shall include, as a minimum:

1. Licensed Site Professional (LSP) statement that the soil meets the requirements of MassDEP Policy No. COMM-97-001.

2. Material Information:

a. Quantity.

b. Description of the source and type of release and the contaminants.

c. A description of the source current and former site usage.

d. Chemical characterization including laboratory analytical data used to support the determination.

e. Field screening analytical data used to support the determination.

f. Physical description of soil including the soil classification method used.

g. Statement from the Generator as to whether any other releases or spills have occurred in the vicinity of the site that may have affected the site, including the types of oils and hazardous material spilled/released.

h. Statement that the Generator has used due diligence, as described in MassDEP Policy No. HW93-01, in characterizing the soil and as to whether or not the soil contains a listed hazardous waste and/or is itself a characteristic hazardous waste.

i. Appropriate shipping documents (Material Shipping Record and Log (MSR) or Bill of Lading (BOL).

3. Transporter Information:

a. Name and address of common carrier transporters to be used on project.

b. Name and address of licensed hazardous waste transporters to be used on the project. Provide current licenses and permits to operate in all states affected by transport. Provide current EPA transporter license.

1.04 REGULATORY REQUIREMENTS

A. Massachusetts Department of Environmental Protection

1. Massachusetts General Law c. 21E

2. Massachusetts Contingency Plan, 310 CMR 40.0000

3. Massachusetts Hazardous Waste Regulations, 310 CMR 30.000

4. Solid Waste Management Facility Regulations, 310 CMR 19.000

5. Interim Remediation Waste Management Policy for Contaminated Soils, Policy No. WSC-94-001.

6. Reuse and Disposal of Contaminated Soils at Massachusetts Landfills, Policy No. COMM-97-001.

7. Interim Policy Regarding the Regulatory Status of Soils Contaminated with Waste Oil of Unknown Origin and/or Hazardous Constituents, Policy No. HW93-01.

B. United States Environmental Protection Agency (EPA)

1. Federal Hazardous Waste Regulations, 40 CFR 261-268.

PART 2 PRODUCTS

2.01 GENERAL

A. All materials used for shaping and grading shall meet the following requirements:

1. Granular and composed predominantly of inorganic materials to minimize settlement due to decomposition, gas generation, etc.

2. Easy to spread, compact to a high density, and not readily decompose over time.

3. Maximum nominal size of 12 inches.

4. Gradation where 50 percent of the material is 6-inches (nominal) or less.

5. Organic content less than 35 percent (by weight) on a material specific basis.

B. Materials that exceed 35 percent organic content shall be blended with other materials to achieve organic content less than 35 percent (by weight).

C. Contaminated soils shall comply with MassDEP Policy No. COMM-97-001 for Reuse and Disposal of Contaminated Soil at Massachusetts Landfills. In accordance with that policy, contaminants shall not exceed the following limits established for unlined landfills (in mg/kg unless stated otherwise):

1.	Total Arsenic	40
2.	Total Cadmium	30
3.	Total Chromium	1,000
4.	Total Lead	1,000
5.	Total Mercury	10
6.	Total Petroleum Hydrocarbons	2,500
7.	Total Polychlorinated Biphenyls	Less than 2
8	Total Semi-Volatile Organic Compounds	100
9	Total Volatile Organic Compounds	4
10.	Conductivity	4,000 ohms/cm
11.	Listed or Characteristic Hazardous Waste (TCLP)	NONE

D. Toxicity Characteristic Leaching Procedure (TCLP) testing shall be performed for metals or organic compounds when the total concentrations in the soil are above the theoretical levels at which the TCLP criteria may be exceeded.

PART 3 EXECUTION

3.01 SOIL TESTING

A. The Contractor shall be responsible for characterizing the soil prior to acceptance as a source.

B. Sampling of contaminated soil shall be done at sufficient and adequately distributed locations so that the concentrations of the chemical constituents are adequately characterized.

3.02 BILLS OF LADING AND MANIFESTS

A. All materials shall be accompanied by a bill of lading that shall include information about the source material, date of receipt at the site, weight of material, and type of material.

B. All contaminated soil shall additionally be accompanied by a LSP opinion letter, waste profile, and MassDEP Bill of Lading, Material Shipping Record, or Uniform Hazardous Waste Manifest.

C. The transportation of contaminated soil to the site shall be conducted in accordance with the Material Shipping Record procedures described in Policy No. COMM-97-001 or the 21E Bill of Lading provisions of 310 CMR 40.0030, if applicable.

D. Contaminated soil generated at out-of-state locations and transported to the site shall use a Material Shipping Record.

3.03 TRANSPORTATION

A. Transport material in accordance with all DOT, EPA, Commonwealth of Massachusetts, and or other applicable States' regulations.

B. The Hauler shall be licensed in all states along the transport route.

C. The Contractor shall be responsible for ensuring that free-liquid does not develop during transport. Should any free-liquid develop during transport, the Contractor shall be required to dispose of the liquid at no additional cost to the Owner.

D. Haul routes for soil deliveries shall be in accordance with approved truck routes and times presented in Section 01601.

3.04 SPREADING AND COMPACTING OF MATERIALS

A. Spread material in lifts not exceeding two feet in thickness.

B. Any blending of soil and other materials with higher organic content to achieve the 35 percent maximum organic content requirement shall be completed at the active work area.

C. Grade materials in cells constructed to the following criteria:

1. Access for unloading trucks shall be maintained as close to the active work area as possible.

2. Cells shall be placed to a height so as not to cause unstable slopes.

3. The active work area shall be as small as possible to allow for material unloading and compacting.

4. Cell length shall be established by material unloading area but shall generally be minimized.

D. Compact material by making a minimum of three passes over all unloaded material with suitable compaction equipment in accordance with Section 02200.

E. Depending on the nature of the material, daily cover may be required at the direction of the Engineer.

F. The Contractor shall be responsible for monitoring incoming soil deliveries to confirm delivered soils are consistent with the submittal data and approval packages, and that no soils are delivered with odors, free draining liquids or sheens, etc. The Engineer may inspect, reject, and/or conduct confirmatory sampling of any delivered soils that does not meet or appear to meet Policy # COMM 97-001, at no cost to Owner.

3.05 RECORDS

A. Final shipping records including weigh slips, delivery confirmation logs, etc. shall be provided to Engineer after all grading and shaping materials have been delivered and placed to complete the soil source file. Contractor is responsible for submitting complete soil source information to Engineer for inclusion in the EPA Administrative Record for the Landfill.

B. The Contractor shall be responsible for the weighing and tracking of incoming grading and shaping soils in order to comply with shipping regulations/requirements.

END OF SECTION

SECTION 02200

EARTHWORK

PART 1 GENERAL

1.00 STATUTORY REQUIREMENTS

A. All excavation, trenching, sheeting, bracing, etc shall comply with the requirements of OSHA excavation safety standards (29 CFR Part 1926.650 Subpart P) and to the Massachusetts Department of Labor and Workforce Development, Division of Industrial Safety "Rules and Regulations for the Prevention of Accidents in Construction Operations" (Chapter 454 CMR 10.00 et seq). Where conflict or inconsistency between OSHA, State, and local regulations exists, the most stringent requirements shall apply.

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and perform all excavation work and grading; waste relocation; place and compact backfill and fill; and dispose of unsuitable, waste and surplus materials as shown on the Drawings and as specified herein.

B. Provide the services of a licensed professional engineer registered in Massachusetts, to prepare any required temporary excavation support system designs and submittals.

C. Furnish and install temporary excavation support systems, including sheeting, shoring, and bracing, to insure the safety of personnel and protect adjacent structures, piping, etc, in accordance with Federal, State and local laws, regulations and requirements.

1.02 RELATED WORK

A. Site Preparation is included in Section 02100.

B. Granular Fill Material is included in Section 02230.

C. Sedimentation and Erosion Control are included in Section 02270.

D. Riprap is included in Section 02271.

E. Paving is included in Section 02575.

F. Topsoil and Hydroseeding are included in Section 02930.

G. Wetlands Restoration is included in Section 02955.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300, the proposed methods of construction, including excavation, excavation support systems designs, backfilling and filling and compaction for the various portions of the work. Excavation support system designs shall be prepared by a licensed professional engineer, registered in Massachusetts, having a minimum of 5 years of professional

experience in the design and construction of excavation support systems. Review will be for information only. Contractor shall remain responsible for adequacy and safety of construction means, methods, and techniques.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM D1557 - Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

A. At all structures, prior to the placement of bedding material, concrete work mats, structural fill or structural concrete, coordinate with the soils testing laboratory to verify the suitability of the existing subgrade soil and to perform in-place soil density tests as required to verify that the bearing capacity of the subgrade is sufficient.

B. Prior to and during the placement of backfill and fill coordinate with the soils testing laboratory to perform in-place soil density tests to verify that the backfill/fill material has been compacted in accordance with the compaction requirements specified elsewhere. The Engineer may designate areas to be tested.

1.06 DEFINITIONS

A. Where the phrase "in-the-dry" is used in this Section, it shall be defined to mean a soil condition such that the in-place moisture content of the soil at that time is no more than two percentage points above the optimum moisture content of that soil as determined by the laboratory test of the moisture-density relation appropriate to the specified level of compaction.

B. Where used in this Section "structures" refers to all buildings, wet wells, manholes and below grade vaults. Stormwater structures and duct banks are not considered structures in this context.

PART 2 PRODUCTS

2.01 GENERAL

A. Granular Fill Materials designated for use in this Section are specified in Section 02230.

PART 3 EXECUTION

3.01 PREPARATION

A. Test Pits

1. Perform exploratory excavation work (test pits) for the purpose of verifying the location of underground utilities and structures and to check for unknown utilities and structures, prior to commencing excavation work.

2. Test pits shall be backfilled as soon as the desired information has been obtained. Backfilled surfaces shall be stabilized in accordance with approved erosion and sedimentation control plans.

B. Dewatering and Drainage Systems

1. Temporary dewatering and drainage systems shall be in place and operational prior to beginning excavation work.

3.02 EXCAVATION SUPPORT

A. Furnish, install, monitor and maintain excavation support (e.g., shoring, sheeting, bracing, trench boxes, etc) as required by Federal, State or local laws, ordinances, regulations and safety requirements. Support the sides of excavation, to prevent any movement which could in any way reduce the width of the excavation below that necessary for proper construction and protect adjacent structures from undermining, settlement or other damage. Take care to prevent the formation of voids outside of sheeting. If voids occur behind sheeting, immediately backfill and compact the voids with common fill material. Voids in locations that cannot be properly compacted upon backfilling shall be filled with lean concrete.

B. Install excavation supports outside the neat lines of foundations. Supports shall be plumb and securely braced and tied in position. Excavation support shall be adequate to withstand all pressures to which the supports will be subjected. Any movement or bulging of supports shall be corrected to provide the necessary clearances, dimensions, and structural integrity.

C. Excavation Supports Left in Place

1. Excavation supports that are required to remain in place, if applicable, are indicated on the Drawings.

D. Excavation supports shall be carefully removed in such manner so as not to endanger the Work or other adjacent structures, utilities, or property. All voids left or caused by withdrawal of supports shall be immediately filled with sand and compacted.

3.03 STRUCTURAL EXCAVATION PROCEDURES

A. Excavations for structures shall be suitably wide for construction of the structures, including excavation supports, dewatering and drainage systems and working clearances.

B. Excavation shall be performed in-the-dry and shall be accomplished by methods which preserve the undisturbed state of subgrade soils. In no case shall the earth be plowed, scraped, or excavated by any means so near to the finished subgrade that would disturb the finished subgrade. Hand excavation of the final 3 to 6-in may be required to obtain a satisfactory, undisturbed subgrade. Subgrade soils which become soft, loose, "quick", or otherwise unsatisfactory for support of structures as a result of inadequate excavation, dewatering, or other construction methods shall be removed and replaced with lean concrete, compacted structural fill or suitable crushed rock, subject to prior approval by the Engineer, at no additional cost to the Owner.

C. Subgrade Preparation

1. All structures unless otherwise shown on the Drawings or otherwise specified herein:

   a. Compact the top 12-in of subgrade to a minimum of 95 percent modified proctor (ASTM D1557).

   b. Where structures are supported by piles, compact the top 12-in of subgrade to a minimum of 90 percent modified proctor (ASTM D1557).

2. Where existing subgrade contains a significant amount of clay or cohesive soils, over-excavate sufficiently below the bottom of structure for placement of a lean concrete working mat. Prior to placing the lean concrete working mat, compact the top 12-in of existing subgrade to a minimum of 95 percent modified proctor (ASTM D1557).

D. When excavations have reached the required subgrade, including any allowances for working mats or base materials, prior to the placement of working mats or base materials, notify the soils testing laboratory to verify the suitability of the existing subgrade soils for the anticipated foundation and structural loadings. If the existing subgrade soils are determined to be unsuitable, direction will be provided by the Engineer regarding removal and replacement with suitable materials. If Contractor believes that such direction would increase Contractor's cost and would thereby entitle Contractor to a change in Contract cost, Contractor shall notify the Engineer in accordance with the applicable article(s) in the General Conditions pertaining to changes in the work.

E. Over-excavation beyond the limits and depths required by the Contract Documents shall be replaced at no additional cost to the Owner by structural fill or other approved material subject to the prior approval of the Engineer.

3.04 GENERAL FILLING, WASTE CONSOLIDATION, AND BACKFILLING PROCEDURES

A. Fill, consolidated waste, and backfill materials shall be placed in lifts to suit the specified compaction requirements to the lines and grades required, making allowances for settlement and placement of cover materials (i.e. topsoil, sod, etc). Soft spots or uncompacted areas shall be corrected.

B. Fill and backfill materials shall not be placed on frozen surfaces, or surfaces covered by snow or ice. Fill and backfill material shall be free of snow, ice, and frozen earth.

C. Compaction in open areas may be accomplished by any of the following methods: compaction equipment, fully loaded ten-wheel trucks, tractor dozers weighing at least 30,000 lbs and operated at full speed, or heavy vibratory rollers. Compaction in confined areas (including areas within a 45 degree angle extending upward and outward from the base of a wall) and in areas where the use of large equipment is impractical, shall be accomplished by hand operated vibratory equipment or mechanical tampers. Lift thickness shall not exceed 6-in (measured before compaction) when hand operated equipment is used.

D. Fill and backfill shall not be placed and compacted when the materials are too wet to properly compact (i.e. the in-place moisture content of the soil at that time is no more than three percentage points above the optimum moisture content of that soil as determined by the laboratory test of the moisture-density relation appropriate to the specified level of compaction).

3.05 FILL AND BACKFILL PROCEDURES

A. Fill required beneath foundations or slabs on grade (except sidewalks) shall be structural fill. Place and compact structural fill in even lifts having a maximum thickness (measured before compaction) of 8-in.

B. Fill and backfill material placed immediately adjacent to and within 10-ft of all structures shall be select fill. All structure water-tightness tests and dampproofing/waterproofing shall be completed prior to placing fill or backfill around structures. Place and compact select fill in even lifts having a maximum thickness (measured before compaction) of 8-in uniformly around the structure.

C. Common fill may be used in areas beyond those designated for select fill unless shown or specified otherwise. Common fill shall be placed in even lifts having a maximum thickness (measured before compaction) of 12-in.

3.06 EMBANKMENT FILL PROCEDURES

A. Prior to placing embankment fill materials, all organic materials (including peat and loam) and loose inorganic silt material shall be removed from areas beneath the embankments. If the subgrade slopes are excessive, the subgrade shall be stepped to produce a stable, horizontal surface for the placement of embankment materials. The existing subgrade shall then be scarified to a depth of at least 6-in.

B. Embankment fill shall consist of common fill material and shall be placed and compacted in even lifts (measured before compaction) of 12-in.

C. Rock may be used in embankment fill only with prior, written approval of the Engineer.

3.07 IMPERVIOUS FILL

A. Impervious fill shall be placed in controlled, even lifts having a maximum thickness (measured before compaction) of 6-in. Compaction shall be sufficient to attain a permeability of less than $1x10^{-7}$ cm/sec.

B. Moisture content of impervious fill to be compacted shall be maintained at or near its optimum moisture content (minus 2 to plus 3 percent).

3.08 COMPACTION REQUIREMENTS

A. Beneath foundations and slabs on grade (except sidewalks): Compact the top 12-in of existing subgrade (and each layer of fill if applicable) to a minimum of 95 percent modified proctor (ASTM D1557) at or near its optimum moisture content (minus 2 to plus 3 percent).

B. 10-ft around structures: Compact the top 12-in of existing subgrade and each layer of fill or backfill to a minimum of 90 percent modified proctor (ASTM D1557) at or near its optimum moisture content (minus 2 to plus 3 percent).

C. Embankments (except under roadways), lawn or unimproved areas: Compact the top 6-in of existing subgrade and each layer of fill or backfill to a minimum of 90 percent modified proctor (ASTM D1557) at or near its optimum moisture content (minus 1 to plus 4 percent).

D. Sidewalks: Compact the top 6-in of existing subgrade (and each 6-in layer of fill if applicable) to a minimum of 95 percent modified proctor (ASTM D1557) at or near its optimum moisture content (minus 2 to plus 3 percent).

E. Roads, paved areas and roadway embankments: Compact the top 12-in of existing subgrade and each layer of fill or backfill to a minimum of 95 percent modified proctor (ASTM D1557) at or near its optimum moisture content (minus 2 to plus 3 percent).

3.09 DISPOSAL OF UNSUITABLE, WASTE AND/OR SURPLUS EXCAVATED MATERIAL

A. Unsuitable, waste, and surplus excavated material shall be relocated to areas of the landfill that will be capped. Materials may be temporarily stockpiled in an area within the limits of construction that does not disrupt construction activities, create any nuisances or health and safety hazards, or otherwise restrict access to the work site.

3.10 GRADING

A. Grading shall be performed to the lines and grades shown on the Drawings. All objectionable material encountered within the limits indicated shall be removed and disposed of. Subgrades shall be completely and continuously drained and dewatered throughout the grading process. Install temporary drains, drainage ditches, etc, to intercept or divert surface water which may affect the execution or condition of grading work.

B. If at the time of grading it is not possible to place any material in its proper section of the Work, it shall be stockpiled in approved areas for later use. No extra payment will be made for the stockpiling or double handling of excavated material.

C. Stones or rock fragments larger than 4-in in their greatest dimensions will not be permitted within the top 6-in of the finished grade of fills and embankments.

D. In cut areas, all loose or protruding rocks in slopes shall be removed to line or finished grade of the slope. All cut and fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown on the Drawings unless otherwise directed by the Engineer.

3.11 SLOPE STABILIZATION

A. Prior to installation of riprap, install erosion control blankets on slopes in accordance with manufacturer's instructions. The area to be covered shall be properly prepared, before the blanket is applied. When the blanket is unrolled, the netting shall be on top and the fibers in contact with the soil over the entire area. Blankets shall be butted snugly at the ends and side and stapled. Blankets shall be placed a minimum of three rows (of four foot) wide (total 12-ft width) and stapled together in accordance with manufacturer's instructions. Staples shall be driven vertically into the ground, spaced approximately two linear yards apart, on each side and one row in the center alternately spaced between each side. Adjoining blankets shall not be overlapped and shall utilize a common row of staples to attach.

END OF SECTION

SECTION 02230

GRANULAR FILL MATERIALS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and install granular fill materials as shown on the Drawings and as specified herein. Associated work includes testing, sample collection, excavation, loading, shipping, delivering, stockpiling, placement, and installation of granular fill materials.

1.02 RELATED WORK

A. Landfill Gas Extraction Wells are included in Section 02647.

B. Earthwork is included in Section 02200.

C. Riprap is included in Section 02271.

D. Geotextile Fabrics are included in Section 02273.

E. Drainage Nets are included in Section 02274.

F. PVC Pipe is included in Section 02622.

G. High Density Polyethylene (HDPE) Pipe is included in Section 02623 and Section 02624.

H. Linear Low Density Polyethylene (LLDPE) Liner is included in Section 02776.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300, and within 30 calendar days following the Effective Date of the Agreement and before furnishing and installing the granular fill material, the following information:

1. Identification of the granular fill supplier.

2. A signed certification from the supplier, listing permits (including types and permit numbers) demonstrating that the granular fill source is in full compliance with this specification and applicable standards and regulations, including MassDEP RCS-1 Soil Criteria.

3. Quality Control/Quality Assurance Testing (including source, conformance and in-place testing) showing the material meets requirements of Paragraph 2.01 and Paragraph 2.02 of this specification.

4. Three 10 lb samples for laboratory testing from each granular fill and coarse aggregate source to be used in this project.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM D422 - Standard Test Method for Particle-Size Analysis of Soils.

2. ASTM D698 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3))

3. ASTM D854 - Standard Test Method for Specific Gravity of Soils Solids by Water Pycnometer

4. ASTM D1556 – Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method

5. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3(2,700 kN-m/m3)).

6. ASTM D2216 - Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.

7. ASTM D2434 - Standard Test Method for Permeability of Granular Soils (Constant Head)

8. ASTM D2487 - Classification of Soils for Engineering Purposes (Unified Soil Classification System)

9. ASTM D2488 - Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).

10. ASTM D2937 – Standard Test Method for Density of Soil in Place by the Drive-Cylinder Method

11. ASTM D2974 - Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils.

12. ASTM D6938 – Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

13. ASTM C40 - Standard Test Method for Organic Impurities in Fine Aggregates for Concrete.

14. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

15. ASTM C289 - Standard Test Method for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method).

16. ASTM D75 - Standard Practice for Sampling Aggregates.

17. ASTM D3042 - Standard Test Method for Insoluble Residue in Carbonate Aggregates.

18. ASTM D4373 - Standard Test Method for Rapid Determination of Carbonate Content of Soils.

19. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soils and Soil-Aggregate by Nuclear Methods (Shallow Depth) (Replaces D2922).

20. ASTM D5321 - Standard Test Method for Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by the Direct Sheer Method.

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

A. The Quality Control and Quality Assurance consists of laboratory conformance testing of samples supplied from each granular fill and coarse aggregate source and quality control during installation.

B. The Contractor will retain an independent laboratory (QAL), as approved by the Owner/Engineer (refer to Section 01410 – Testing and Testing Laboratory Services), that has adequate equipment to perform permeability tests and provide results in a timely manner in accordance with this Section. Coordinate and schedule all tests as required by the Drawings and as specified herein.

C. Conformance testing requirements are specified in Paragraph 2.02 below. The purpose of conformance testing is to assure that the supplied granular fill materials from each source conform to this Section and specified permeability.

D. Field quality control requirements are specified in Part 3 below. The purpose of field quality control procedures is to assure that the cap layers have been installed in accordance with this Section.

1.06 QUALIFICATIONS

A. The work shall be performed by a firm that has experience in processing and installation of lateral drainage layers and protective soil cover on top of synthetic liners. The firm shall demonstrate proven experience by providing a minimum of five similar completed projects with the following information:

1. Type and thickness of installed material and permeability.

2. Name and purpose of facility, its location, and date of installation.

3. Name of Owner and design engineer. Name and telephone number of contact at the facility who can discuss the project.

B. The supplier shall show evidence of an adequate supply of material which is relatively homogenous within a designated mine area which is properly permitted by the appropriate Federal, State and local agencies.

1.07 DELIVERY, STORAGE, AND HANDLING

A. If granular fill materials are delivered to the site prior to placement approval, materials shall be stockpiled on site in areas as directed. Provision shall be implemented to minimize surface water impact on the stockpile. Removal and placement of granular fill material shall be done in a manner to minimize intrusion of soils adjacent to and beneath the stockpile.

PART 2 PRODUCTS

2.01 MATERIAL

A. Sand Material

1. Coarse Sand shall be of well-graded inorganic non-calcareous material, free from organic substance and other deleterious matter with a minimum permeability of 8×10^{-3} cm/sec or greater at 90% of the maximum density as determined by ASTM D1557. Coarse Sand shall be in particle size gradation within the following limits (ASTM D422) and have a Unified Soil Classification of SW per ASTM D2487.

Sieve Size	Percent Passing by Weight
No. 4	100
No 10	25 to 50
No. 20	5 to 15
No. 40	3 to 12
No. 200	0 to 5

2. Coarse Sand that will be in contact with geosynthetic liners shall have rounded to subrounded particle shapes per ASTM D2488 to avoid possible liner damage.

3. Coarse Sand shall have an organic content of no more than 0.1% (ASTM D2974).

4. Coarse Sand shall have a carbonate content of no more than 5% (ASTM D4373).

5. Coarse Sand shall contain no stones, shell fragments or deleterious material larger than 1/2 –inch in its largest dimension and is subject to testing at specified intervals.

6. Coarse Sand used above the liner shall not contain more than 5% by weight material finer than No. 200 mesh sieve.

B. Backfill and Fill materials shall be suitable excavated materials, natural or processed mineral soils obtained from off-site sources, or graded crushed stone or gravel. Backfill and Fill materials shall be free of all organic material, trash, snow, ice, frozen soil, or other objectionable materials which may be compressible or which cannot be properly compacted. Soft, wet, plastic soils which may be expansive, clay soils having a natural, in-place water content in excess of 30 percent, soils containing more than 5 percent (by weight) fibrous organic materials, and soils having a plasticity index greater than 30 shall be considered unsuitable for use as backfill and fill. Backfill and fill materials shall have a maximum of 1 percent expansion when testing is performed on a sample remolded to 95 percent of maximum dry density (per ASTM D698) at 2 percent below optimum moisture content under a 100 lbs/sq ft surcharge.

C. Structural Fill shall be gravel, sandy gravel, or gravelly sand. Material shall have a plasticity index of less than 15 and shall conform to the following gradation limits:

Sieve Size	Percent Finer By Weight
6-in	100
No. 4	20 to 70
No. 40	5 to 35
No. 200	0 to 7

D. Select Fill shall conform to the requirements of common fill except that the material shall not contain any materials larger than 2-in in largest dimension.

E. Common Fill shall not contain granite blocks, broken concrete, masonry rubble, asphalt pavement, or any material larger than 6-in in any dimension. Common Fill shall have a plasticity index of less than 15 and shall conform to the following gradation limits:

Sieve Size	Percent Finer By Weight
No. 40	75
No. 200	20

F. Crushed Stone shall conform to Section M2.01.4 of the Massachusetts Department of Public Works Standard Specifications for Highways and Bridges, current edition, and all addenda and supplements thereto.

G. Pea Gravel shall be screened, uniformly rounded stone, free from sand, loam, clay, excess fines and other deleterious materials. Pea Gravel shall conform to the following gradation limits:

Sieve Size	Percent Finer By Weight
1/2-in	100
3/8-in	90
No. 4	30
No. 8	10
No. 16	5

H. Screened Gravel shall be hard, durable, rounded, or sub-angular particles of proper size and gradation, and shall be free from sand, loam, clay, excess fines, and other deleterious materials. Screened gravel shall be graded within the following limits:

Sieve Size	Percent Finer by Weight
5/8-in	100
1/2-in	40 to 100
3/8-in	15 to 45
No. 10	0 to 5

I. Sand for concrete, grout, and masonry shall conform to ASTM C33 for fine aggregate. General purpose sand shall be Select Common Fill.

J. Lean Concrete shall be ready-mix, cast-in-place concrete conforming to the requirements of Section 03300. Minimum compressive strength shall be 2,000 psi after 7 days and 2,500 psi after 28 days.

2.02 TESTING

A. Sand Material

1. Source testing shall be performed by the QAL on samples from each proposed source of granular fill material to ensure compliance with this Section. The following summarizes the required source testing for granular fill materials listed:

Granular Fill Type	Geotechnical or Environmental Test Name	Methodology	Frequency
Sand (for gas vent and drainage layers)	Sieve Analysis (to the #200 sieve)	ASTM D422	1 per source site or change in material type
	Permeability	ASTM D2434	
	Moisture Density	ASTM D1557	
	RCRA 8 Metals, PAH	Methods 6010, 8270	
Backfill/Fill	Sieve Analysis Atterberg Limits	ASTM D422 ASTM 4318	
Select Fill			
Structural Fill			
Common Fill			
Crushed Stone	Sieve Analysis	ASTM D422	
Pea Gravel			
Screened Gravel			

2. Conformance testing shall be performed by the QAL on samples from each source of granular fill material previously approved through source testing as described in Paragraph 1.03, to assure compliance with this Section. The following tests shall be performed on the samples.

Geotechnical or Environmental Test Name	Methodology	Frequency
Sieve Analysis (to the #200 sieve)	ASTM D422	1/1,500 cy
Permeability	ASTM D2434	1/3,000 cy
Moisture Density	ASTM D1557	1/3,000 cy
Direct Shear	ASTM 5321	1/source

a. The results from the soil testing shall be furnished to the Engineer at least 15 calendar days prior to the delivery of such material to the Site.

b. The permeability tests for the sand materials shall be performed when the sample is compacted to 90 percent of its maximum dry density and set at its optimum water content as determined by ASTM D1557.

c. Contractor shall submit for approval results of direct shear testing on the interface between the coarse sand material and the textured LLDPE geomembrane in accordance with ASTM D5321. The tests shall consist of at least three separate shear tests run at normal stresses of 10, 25, and 50 psi. Shearing shall occur at horizontal displacement rates no greater than 0.04 in/min to ensure that drained conditions are established everywhere on the shear plane during shearing. The LLDPE/coarse sand interface shall have a friction angle of $\geq$ 25 degrees peak.

PART 3 EXECUTION

3.01 GAS VENTING SAND PLACEMENT

A. Gas vent sand shall be placed in one 6-inch lift, and compacted to 90% of the maximum density as determined by ASTM D1557. Thickness of this layer shall be measured and recorded in five (5) places per acre.

3.02 DRAINAGE SAND PLACEMENT

A. After installation completion and acceptance of the liner system and related work activities, place the drainage sand in one 12-inch lift, to thickness and in areas shown on the Drawings, and compact to 90% of the maximum density as determined by ASTM D1557.

B. During the placement of the drainage sand above the geomembrane, no construction equipment shall be allowed directly on the geomembrane, and any damage shall be repaired immediately in accordance with Section 02776. Contractor shall maintain the minimum thickness of cover as specified herein when using spreading, grading, or compaction equipment.

C. Care shall be taken to protect the geomembrane liner system. Sand ramps shall be provided at down slopes and in other heavily traveled areas. Only large radius turns by the loader and other equipment shall be permitted as sharp turns may damage the liner.

D. Drainage sand materials shall not be placed over a fold in the geomembrane.

E. The drainage sand layer above the geosynthetics shall be carefully placed in one lift a minimum of 12 inches, and compacted with a low ground pressure dozer or similar equipment that will achieve the specified density without damaging the leachate collection system or geosynthetic layers. The final grade shall be laid to elevations as shown on the Drawings. The drainage sand layer shall be compacted to a minimum of 90% of the maximum density as determined by ASTM D1557.

F. Drainage sand shall be placed on the side slopes starting at the toe of the slope and working toward the top of the berm.

G. Drainage sand layer material can only be spread when the geomembrane is taut or stretched evenly over the base of the landfill. The drainage sand material shall not be spread when the geomembrane is elongated due to higher daytime temperatures and exposure to sun. Provisions must be made to cover the geomembrane under non-elongated conditions.

H. The moisture content of the sand material shall be at or slightly above the optimum moisture content during the compaction and smoothing of the sand layer by the smooth drum roller. If, in the opinion of the Engineer, the sand is too dry for proper compaction, spray the sand with a

sufficient quantity of clean water to bring the sand layer to the proper moisture content. No compaction shall take place if the sand is excessively saturated.

I. No sand material shall be placed, spread, or compacted while the ground or sand is frozen or thawing or during unfavorable weather conditions. The sand surface must be made smooth and free from ruts or indentations at the end of any working day when significant precipitation is forecast and/or at the completion of the compaction operations in that area in order to prevent saturation of the sand material.

3.03 FIELD QUALITY CONTROL

A. Gas vent and drainage sand layer thickness shall be measured at five (5) locations per acre during construction to confirm that the thicknesses of the installed materials are in accordance with the Drawings.

B. Nuclear Density and Moisture Content per ASTM D6938 shall be measured at five locations per acre of each lift of installed material. Note that extreme care must be taken when measuring above a geomembrane system to avoid damage. Nuclear density gauge shall not be used until correlated at the jobsite with in place soil density as measured by ASTM D1556 (also taking care not to damage the geomembrane liner system) and every 40 measurements or every 2 weeks, whichever is more frequent, for each installed material and each nuclear test device utilized.

C. Any sample or area tested shall be rejected, removed, and replaced if it does not meet the requirements of the technical specifications. Reconstructed areas shall have feathered, overlapping edges that tie into adjacent fill material.

3.04 OTHER MATERIALS

A. Other materials shall be installed as indicated in Section 02200, Earthwork.

END OF SECTION

SECTION 02270

EROSION AND SEDIMENTATION CONTROL

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Work includes a requirement for the Contractor to prepare and implement an Erosion Control Plan (or Stormwater Pollution Prevention Plan/SWPPP) to prevent storm water and air pollution from project construction activities. The Plan shall at a minimum, meet the requirements of the National Pollutant Discharge Elimination System (NPDES) as required by the U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MassDEP).

1. All work shall be performed in accordance with all erosion control measures required by the Order of Conditions issued by the Conservation Commission.

2. Contractor shall become thoroughly familiar with regulations and permit conditions issued by the Haverhill Conservation Commission and shall comply with all requirements set forth therein.

3. Best management practices (BMP) shall be used to address storm water pollution prevention.

4. The Erosion Control Plan (SWPPP) shall be submitted to the Engineer for review and approval prior to commencing earth working activities on the site.

B. Contractor shall make every attempt to preserve the natural vegetation of the wetland resource areas and selected areas within the limit of work as shown on the Drawings. All earthwork, grading moving of equipment and other operations likely to cause disturbed soil conditions and erosion and siltation and tracking of sediments, shall be planned and performed in a sequence as to avoid or reduce pollution in adjacent wetland resource areas and roadways.

C. Furnish all labor, materials, equipment and incidentals required and perform all installation, maintenance, removal, and area cleanup related to sedimentation control work as shown on the Drawings and as specified herein. The work shall include, but not necessarily be limited to; installation of temporary staging areas, sediment fences, construction entrances, diversion berms, dust control, check dams, sediment removal and disposal, device maintenance, removal of temporary devices, temporary mulching, erosion control blanket installation and final cleanup.

1.02 RELATED WORK

A. Environmental Protection Procedures are included in Section 01110.

B. Earthwork is included in Section 02200.

C. Riprap is included in Section 02271.

D. Topsoil and Hydroseeding are included in Section 02930.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300, within 10 days after award of Contract, an Erosion and Sedimentation Control Plan complete with technical product literature for all commercial products to be used for erosion and sedimentation control.

B. At a minimum, the Erosion Control Plan shall include the following.

1. Project and site description with site map.

2. Schedule of construction milestones including anticipated start and end dates.

3. Sequence of construction activities.

4. Description of potential pollution sources.

5. Description of site planning.

6. Soil stabilization practices.

7. Erosion and sedimentation control and water quality control measures.

8. Best management practices to be used on-site to reduce pollution potential.

9. Description of equipment, procedures.

10. Schedule for street sweeping.

11. Copies of monitoring records and logs.

12. Locations of proposed storm water control measures including, but not limited to, sediment fence, haybales, construction entrance and staging area, diversion berms, check dams, sediment basins, and erosion control blanket.

13. Technical product literature for all commercial products to be used.

C. Prior to construction, the Contractor shall submit an Erosion Control Plan. The Erosion and Sedimentation Control drawings produced by the Contractor shall be illustrative of the overall intent to minimize or prevent erosion, control sediment movement, and stabilize exposed soils during construction. At his/her option, the Contractor may submit alternative materials and installation methods to the local jurisdictional permit review agencies for review and approval.

1. Performance requirements shall include performing periodic monitoring of the Erosion Control Plan to ensure work is in conformance with the following:

a. Provide on-site treatment as necessary to prevent the discharge of contaminated water into existing surface water areas and wetland resource areas caused by Contractor's operations, or contaminated water that passes through an erosion and sediment control system installed by the Contractor such that treatment systems are designed to remove particles 40 microns and larger with discharges not to exceed 15 NTU or 25 ppm TSS.

b. Delineation and brief description of the measures to be undertaken to retain sediment on the site, including, but not limited to designs and specifications for sediment detention basins and traps, and a schedule for their maintenance and upkeep.

c. Delineation and brief description of the surface runoff and erosion control measures to be implemented, including, but not limited to, materials and installation methods of applying mulches, and designs and specifications for diversions and drains and a schedule for their maintenance and upkeep.

d. Delineation and brief description of the vegetation measures to be used, including, but not limited to types of seeds and fertilizer and their application rates, the type, location and extent of pre-existing and undisturbed vegetation types, and a schedule for their maintenance and upkeep.

2. The Contractor may propose the use of any erosion and sediment control techniques in the Erosion Control Plan provided such materials and installation techniques are proven to be as or more effective than the equivalent practices contained herein.

1.04 QUALITY ASSURANCE

A. Be responsible for the timely installation and maintenance of all sedimentation control devices necessary to prevent the movement of sediment from the construction site to off site areas or into the surface waters and wetlands via surface runoff or underground drainage systems. Measures in addition to those shown on the Drawings necessary to prevent the movement of sediment off site shall be installed, maintained, removed, and cleaned up at the expense of the Contractor. No additional charges to the Owner will be considered.

B. Erosion and sedimentation control measures shall conform to the requirements outlined in the Haverhill Conservation Commission Order of Conditions and the U.S. EPA NPDES General Permit for Construction Activities appended to Section 01000.

C. Contractor shall keep road surfaces free of tracked mud and soil from Contractor's activities. Sweep and dispose of swept material on a weekly basis at a minimum, or more frequently, as directed by the Owner.

D. Adjacent property, public or private, which becomes muddied, silted, or contaminated by construction operations shall be promptly restored to its original condition to the full satisfaction of the property owner and all applicable regulatory agencies. In the event that the Owner receives verifiable and reasonable complaints covering accumulated silt or mud generated by construction related activities, the Contractor shall furnish additional siltation control measures as may be required to control mud or silt so generated.

1.05 REFERENCE SPECIFICATIONS

A. Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas by Franklin, Hampden, Hampshire Conservation Districts, Northampton, MA dated March 1997.

B. MassHighway Standards and Specifications for Highways and Bridges (MHSSHB) latest edition, including all addenda.

PART 2 PRODUCTS

2.01 MATERIALS

A. Crushed stone for sediment filtration devices, construction entrances, and staging areas shall conform to MHSSHB Section M2.01.3 and Section 02200.

B. Sediment Fence

1. Steel posts shall be a minimum of 5-ft in length, 2-1/2-in by 2-1/2-in by 1/4-in angle post with self-fastening tabs and a 5-in by 4-in (nominal) steel anchor plate at bottom.

2. Welded wire fabric shall be 4-in by 4-in mesh of 12 gauge by 12 gauge steel wire.

3. Sediment fence fabric shall be a woven, polypropylene, ultraviolet resistant material, selected to provide a barrier to transport of sediment laden water with fines and debris, yet provide the passage of runoff, such as Mirafi 100X by Mirafi Inc., Charlotte, NC or equal.

4. Tie wires for securing sediment fence fabric to wire mesh shall be light gauge metal clips (hog rings), or 1/32-in diameter soft aluminum wire.

5. Prefabricated commercial sediment fence may be substituted for built-in-field fence. Pre-fabricated silt fence shall be "Envirofence" by Mirafi Inc., Charlotte, NC or equal.

C. Hay bales shall consist of the straw of threshed oats, wheat, barley, rye, or natural hay and shall be utilized to control sediment runoff during construction activities. Each bale shall be securely bound with string or wire at two locations on each bale and securely anchored by at least two oak stakes, 2-in by 2-in by 4-ft long, driven through the bale and into the ground. Bales shall be chinked (filled by wedging) with hay to prevent water from escaping between bales.

D. Straw mulch shall be utilized on all newly graded areas to protect areas against washouts and erosion. Straw mulch shall be comprised of threshed straw of oats, wheat, barley, or rye that is free from noxious weeds, mold, or other objectionable material. The straw mulch shall contain at least 50 percent by weight of material to be 10-in or longer. Straw shall be in an air-dry condition and suitable for placement with blower equipment.

E. Tackifier material shall be a liquid spray applied mulch binder as directed and approved by the Engineer. The material shall be a commercially manufactured product, specifically made to bind mulch material. The tackifier shall be applied by pressure sprayer equipment. The material shall be an emulsified asphalt, synthetic, or organic based binder. Tackifiers shall consist of materials as follows:

1. Emulsified asphalt shall be in accordance with AASHTO M140, RS or CRS formulation classification to cure in less than 24 hours. It shall be used as an asphaltic tackifier, and only when temperatures are too low to allow the use of other tackifiers, an only with prior written approval from the Engineer.

2. Other tackifiers include an array of commercially available synthetic and organic binders. Synthetic binders made of materials such as acrylic polymers, polyacrylimites, surfactants, silicates, copolymers, or latex, are acceptable if used as recommended by the manufacturer. Organic binders made of non-toxic, biodegradable natural organics such as gum, guar,

starch or vegetable-based materials are acceptable if used as recommended by the manufacturer. Synthetic and organic binders shall not be applied during rain or in freezing weather. A 24 hour curing period, and soil temperature higher than 45 degrees F, is required.

F. Erosion control blanket shall be a porous, biodegradable geotextile matting specifically manufactured to retain soil moisture, to hold soil temperatures and to generally stabilize soils where stormwater flows in channels, swales or recently planted slopes greater than 4:1. Erosion control blanket shall be selected and installed to protect soil and seedlings where moving water is likely to wash out new plantings. Erosion control blanket shall be manufactured and constructed by weaving or bonding fibers made from synthetic and/or natural, biodegradable materials. Mulch matting is typically made of jute, straw, or wood fibers that are preformed into sheets of mulch and delivered to the site in rolls. Netting is typically made of jute, wood fiber, plastic, or cotton and used to hold the mulch matting together. Netting and matting shall be held to the ground with biodegradable staples or anchors as furnished and installed in accordance with blanket manufacturer's recommendations and as approved by the Owner's representative. Blanket shall be North American Green Model S150 100 percent straw blanket or equal.

G. Dust Control

1. Several materials may be used for dust control, including temporary mulch, spray on adhesives such as latex emulsions or resin in water sprayed onto mineral soil, sprinkling water, crushed stone or wind barrier in the form of sediment fence or snow fence. Do not use calcium chloride or spray on asphalt emulsions unless specifically approved by the Engineer.

3. Trucks hauling fill materials from the site shall be covered with a tarpaulin and equipped with refuse gates which prevent material from dropping while the vehicle is moving.

H. Riprap shall conform to Section 02271.

I. Sediment basins shall be of such a size to detain sediment laden runoff for a long enough time to allow sediment to settle out. Permanent basins may be used for this purpose.

J. Temporary Seeding

1. Materials shall conform to Paragraphs 2.05 of Section 02930 and shall consist of the following:

Species	Seeding rate lbs/acre	Seeding Dates
Annual Ryegrass	40	4/1 - 6/1 & 8/15 - 9/15
Foxtail Millet	30	5/1 - 6/30
Oats	80	4/1 - 7/1 & 8/15 - 9/15
Winter Rye	120	8/15 - 10/15

2. Apply 70 lbs/1000 sq ft ground limestone or according to soil test.

3. Apply uniformly 10-10-10 analysis fertilizer at the rate of 10 lbs/1000 sq ft or as indicated by soil test. 40 percent of Nitrogen shall be in organic form.

4. Work in lime and fertilizer to a depth of 4-in.

5. After seed application, apply straw mulch as specified herein.

PART 3 EXECUTION

3.01 GENERAL

A. The Contractor shall install and maintain all erosion and sedimentation control devices necessary to prevent the movement of sediment from the construction site to off site areas or into the surface water or wetland resource areas via surface runoff, wind blown dust or underground drainage systems. In addition, install and maintain all erosion and sedimentation control around stockpiled soils in 100-ft buffer zones. Measures in addition to those herein necessary to prevent the movement of sediment shall be installed, maintained, removed, and cleaned up at no additional cost to the Owner.

B. The Contractor shall submit the names, addresses, and telephone numbers of any and all contractors, subcontractors, or persons responsible for doing the land-disturbing and land filling activities and their respective tasks.

C. An on-site preconstruction meeting shall take place involving all concerned parties including Contractor's erosion control personnel at which time plans will be reviewed, schedules discussed and responsibilities assigned.

3.02 INSTALLATION

A. Sediment Fence Installation

1. Sediment fences shall be positioned as necessary to prevent off site movement of sediment produced by construction activities as directed by the Engineer.

2. Dig trench approximately 6-in wide and 6-in deep along proposed fence lines.

3. Drive metal-stakes, 8-ft on center (maximum) at back edge of trenches. Stakes shall be driven 2-ft (minimum) into ground.

4. Hang 4 by 4 woven wire mesh on posts, setting bottom of wire in bottom of trench. Secure wire to posts with self-fastening tabs.

5. Hang filter fabric on wire carrying to bottom of trench with about 4-in of fabric laid across bottom of trench. Stretch fabric fairly taut along fence length and secure with tie wires 12-in on center both ways.

6. Backfill trench with excavated material and tamp. Ensure filter fabric is secured in place by the backfill material so that sediment can <u>not</u> flow under the sediment fence.

7. Install pre-fabricated sediment fence according to manufacturer's instructions.

B. Stone Check Dams

1. Place stone check dams across ditches or channels just below excavated sumps. Face upstream side of stone check dam with crushed stone and in ditches and swales, install the top elevation, center section, of the dam at a lower elevation than the top elevation perimeter edges of the dam.

2. Where check dams are needed to be in place for 3 months or less, place hay bales across ditches or channels just below excavated sumps.

C. Staging areas and access ways shall be surfaced with a minimum depth of 4-in of crushed stone.

D. Hay Bale Installation

1. Bales shall be placed to form temporary water stops, dams, diversions, dikes, berms and for other uses connected with water pollution control. Bales shall be disposed of by the Contractor upon permanent stabilization of the site as directed by the Engineer.

2. Place hay bale check dams across swales with the top elevation, center section, of the dam at a lower elevation than the top elevation perimeter edges of the dam

3. Hay bales shall be placed continuously uphill of the sediment fence as shown on the Drawings in a 4-in (min) deep trench with none of the wire/twine binding in direct contact with the soil. Each bale shall abut tightly to the adjacent bale and be securely anchored by wooden stakes driven through each bale and into the ground at least 6-in. Rebar stakes may not be used.

4. Loose straw shall be tightly packed into any open paces existing between the bales. After bales are installed in the trench, backfill and compact upstream side of barrier with minimum 4-in material to prevent piping. In swales, install bales so that water is directed to flow over the top of the bales and not allowed to flow around the ends of the barrier.

E. Riprap at Pipes and Swales

1. Riprap shall conform to Section 02271 and installed in areas as indicated on the Drawings.

F. Erosion Control Blankets

1. Erosion control blankets shall be installed on all seeded slopes equal to and greater than 4:1, swales, and as shown on the Drawings and as directed by the Engineer in accordance with manufacturer's instructions. The area to be covered shall be properly prepared, fertilized, and seeded with permanent vegetation before the blanket is applied. When the blanket is unrolled, the netting shall be on top and the fibers in contact with the soil over the entire area. The blankets shall be applied in the direction of water flow and stapled. Blankets shall be placed a minimum of three rows (of 4-ft) wide (total approx. 12-ft width) within the drainage swale/ditch and stapled together in accordance with manufacturer's instructions. Side overlaps shall be 4-in minimum. The staples shall be made of wire, .091-in in diameter or greater, "U" shaped with legs 10-in in length and a 1-1/2-in crown. The staples shall be driven vertically into the ground, spaced approximately two linear feet apart, on each side, and one row in the center alternately spaced between each size. Upper and lower ends of the matting shall be buried to a depth of 4-in in a trench. Erosion stops shall be created every 25-ft by making a fold in the fabric and carrying the fold into a silt

trench across the full width of the blanket. The bottom of the fold shall be 4-in below the ground surface. Staple on both sides of fold. Where the blanket must be cut or more than one roll length is required, turn down upper end of downstream roll into a slit trench to a depth of 4-in. Overlap lower end of upstream roll 4-in past edge of downstream roll and staple.

2. To ensure full contact with soil surface, roll blanket with a roller weighing 100 lbs/ft of width perpendicular to flow direction after seeding, placing blanket, and stapling. Thoroughly inspect channel after completion. Correct any areas where blanket does not present a smooth surface in full contact with the soil below.

3. Replace damaged fabric, or patch with a 2-ft minimum overlap.

G. Surface Roughening

1. Roughen bare soil surfaces of slopes with horizontal grooves running across the slope, stair stepping, or tracking with construction equipment to aid the establishment of vegetative cover from seed, and to reduce velocity.

2. Perform this activity on bare soil surfaces prior to all forecasted storm events and before leaving the job site for more than 2 days. If roughening is washed away in a heavy storm, re-rough the surface and apply new seed. Final face shall not be bladed or scraped with a smooth, hard finish.

H. Temporary Seeding

1. Apply temporary seed and mulch in areas including, but not limited to, topsoil stockpiles and other disturbed areas where construction activity ceases for more than 21 days after the last construction activity in the area.

2. Apply in areas where diversion berms, sediment traps or basins, temporary banks and stockpile areas are constructed.

3. Topsoil is not necessary for temporary seeding, however, successful growth requires that the soil be loosened or tilled before seed is applied.

4. Apply seed in quantities to protect seed bed and encourage plant growth. Apply water as needed to ensure adequate moisture for germination and vegetation establishment and control amounts to prevent runoff.

5. Apply temporary seed with temporary mulch.

6. When newly graded subgrade areas cannot be loamed and seeded because of season or weather conditions and will remain exposed for more than 30 days, the Contractor shall protect those areas against erosion and washouts by whatever means necessary such as straw applied with a tackifier or other measures as approved by the Engineer. Prior to application of topsoil, any such materials applied for erosion control shall be thoroughly incorporated into the subgrade by discing. Fertilizer shall be applied prior to spreading of topsoil.

7. On slopes, the Contractor shall provide against washouts by an approved method. Any washout which occurs shall be regraded and reseeded at the Contractor's expense until a good turf is established.

8. Immediately after installation of seed mix, these areas shall receive a layer of straw mulch at a rate of 100 lbs/1000 square feet. Tackifier shall be immediately placed on top of straw mulch at a rate of 50 lbs/acre and 6 bales of wood fiber per acre or as recommended by manufacturer of tackifier. Apply straw and tackifier only on a calm day.

I. Temporary Mulching

1. Apply temporary mulch to areas where rough grading has been completed but final grading is not anticipated to begin within 30 days of the completion of rough grading

2. Straw mulch shall be applied at rate of 100 lbs/1000 sq ft and tackified.

3. Tackifier shall be applied immediately after mulch is spread, or may be sprayed into the mulch as it is being blown onto the soil. Application rates vary with the type of material applied as follows:

a. Emulsified asphalt shall be applied either over the top of straw or simultaneously with the straw blowing operation. Apply at a minimum rate of 200 gallons per acre on slopes 5:1 or steeper. Apply at a rate of 150 gallons per acre on slopes flatter than 5:1.

b. Other tackifiers shall be diluted with water at a ratio as recommended by the manufacturer, and applied at rates as recommended by the manufacturer.

c. Application rates shall be heaviest at the edges of mulched areas and at crests of ridges and banks. Apply uniformly to the remaining areas.

J. Dust Control

1. Control dust on haul roads, temporary access ways, construction routes, or other construction areas subject to surface dust movement and dust blowing (see Sections 01110 and 01562). Dust control shall include street sweeping, wetting exposed soils and other measures as required.

2. Respray areas as necessary to keep dust to a minimum. Do not apply excessive amounts of water, particularly in areas where soil has been compacted.

K. Stabilized Construction Entrance

1. Install stabilized construction entrance with materials specified herein and in area and to the dimensions indicated.

2. Maintain in a condition that will prevent tracking or flowing of sediment onto the public right of way. Topdress with additional stone to maintain surface. Replace when construction entrance becomes completely clogged.

3.03 MAINTENANCE AND INSPECTIONS

A. Inspections

1. Make a visual inspection of all sedimentation control devices and construction entrance not less than once per week and promptly before and after every 1/2-in or greater rainstorm, and daily during prolonged rainfall and after snow storm events, 1-in or greater. If such inspection reveals that additional measures are needed to prevent movement of sediment to pavements, surface water, or wetland resource areas, promptly install additional devices as needed. Sediment controls in need of maintenance shall be repaired promptly. All additional devices and repairs shall be at no additional cost to the Owner.

B. Device Maintenance

1. Silt Fences

   a. Remove accumulated sediment once it builds up to 1/2 of the height of the fabric.

   b. Replace damaged fabric, or patch with a 2-ft minimum overlap.

   c. Make other repairs as necessary to ensure that the fence is filtering all runoff directed to the fence.

   d. Immediately repair any gullying along the barrier and at the ends.

2. Stone Check Dams

   a. Muck out trapped silt when it has built up to within 6-in below the overflow elevation.

   b. Replace crushed stone filter when saturated with silt.

3. Add crushed stone to access ways and staging area as necessary to maintain a firm surface free of ruts and mudholes.

4. Hay Bales

   a. Remove accumulated sediment once it builds up to one-half of the height of the bales.

   b. Remove and replace all damaged bales.

   c. Add additional bales as necessary at the direction of the Engineer.

5. Sediment Basins

   a. Sediment basins, including the permanent basins, shall be maintained to be accessible for periodic maintenance and sediment removal. Set a stake at 1/2 the design depth that will serve as a visual mark for the "cleanout level" and remove sediment once it has reached 1/2 the design depth of the basin and dispose of off-site. Take care to not puncture landfill liner with stake. Inspect after each rainfall event and repair erosion and piping holes immediately. Clean or replace spillway crushed stone facing if clogged. Replace displaced materials and reseed and remulch if necessary.

6. Add additional riprap and erosion control blankets where erosion occurs after initial installation.

C. Washout Repair

1. Contractor shall repair washouts that have occurred to any placed soils within 72 hours of site inspection and identification.

2. Washouts shall be filled with specified topsoil layer, sand, fine graded, seeded, and remulched and tackified, as appropriate.

D. Notifications

1. Should major erosion and sedimentation control measures fail, the Contractor shall give immediate attention to correcting the failure and to rectifying adverse impacts from the failure, and shall immediately notify the Engineer of the failure.

3.04 REMOVAL AND FINAL CLEANUP

A. Once the site has been fully stabilized against erosion, and all sediment producing areas are stable, inspected, and approved by the Engineer, remove all accumulated silt and sediment control devices. Dispose of silt and waste materials in proper manner.

B. Regrade all areas disturbed during this process and stabilize against erosion with surfacing materials as shown on the Drawings.

END OF SECTION

SECTION 02271

RIPRAP

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and place riprap and appurtenances as shown on the Drawings and as specified herein.

1.02 RELATED WORK

A. Earthwork is included in Section 02200.

B. Trenching, backfill and compaction is included in Section 02221.

C. Granular fill materials are included in Section 02230.

D. Erosion and sediment control is included in Section 02270.

1.03 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM C33 - Standard Specification for Concrete Aggregates.

2. ASTM C91 - Standard Specification for Masonry Cement.

3. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar.

4. ASTM C150 - Standard Specification for Portland Cement.

5. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes.

B. Massachusetts Department of Transportation (MassDOT)

1. Standard Specification Handbook.

PART 2 PRODUCTS

2.01 MATERIALS

A. Riprap used for channel, outfall, and slope protection shall be hard, durable, angular in shape, resistant to weathering and may be naturally occurring particles or fragments of natural stone. Control of gradation shall be by visible inspection. Rounded stones, boulders, sandstone, or similar soft stone or relatively thin slabs will not be acceptable. Stone shall be free from overburden, spoil, shale, and organic material. Stone sizes shall be as follows:

1. Stone for riprap aprons for swales shall conform to MassDOT Standard Specification Handbook Section M2.02.3 Stone for Pipe Ends.

2. Stone for riprap downchutes shall be mortared in place. The stone shall conform to MassDOT Standard Specification Handbook M2.02.2 Dumped Riprap.

3. Stone for swales and landfill slope protection shall be well-graded mixtures of stone with a D50 equal to 9 inches. The maximum stone size shall be 12 inches and the D30 shall be equal to 6 inches.

4. Stone for riprap aprons for downchutes swales shall be well-graded mixtures of stone with a D50 equal to 24 inches. The maximum stone size shall be 36 inches and the D30 shall be equal to 18 inches.

B. The stone check dam for the sediment forebay shall be as follows:

1. The stone sections shall well-graded mixtures of stone with a D50 equal to 9 inches. The maximum stone size shall be 12 inches and the D30 shall be equal to 6 inches. The stone shall be hard, angular, and highly weather-resistant.

C. Screened gravel shall conform to the requirements of Section 02230.

D. Crushed stone shall conform to the requirements of Section 02230.

2.02 MORTAR MATERIALS

A. Portland cement shall conform to ASTM C150, Type II. Masonry cements shall NOT be used. For natural and cast stonework mortar, provide non-staining cement complying with staining requirements of ASTM C91 for not more than 0.03 percent water soluble alkali.

B. Lime for masonry mortar shall be hydrated, conforming to ASTM C207, Type S.

C. Sand shall be clean, durable particles, free from injurious amounts of organic matter. The sand shall conform to the limits of ASTM C144. Sand for grout shall conform to ASTM C144 or C33 as required.

D. Water shall be free from injurious amounts of oils, acids, alkalis or organic matter and shall be clean and fresh.

PART 3 EXECUTION

3.01 MORTAR

A. Mortar shall be machine mixed in an approved type of mixer in which the quantity of water can be accurately and uniformly controlled. The mixing time shall not be less than 5 minutes, approximately 2 minutes of which shall be for mixing the dry materials and not less than 3 minutes for continuing the mixing after the water has been added. Where hydrated lime is used for mortar requiring a lime content, there will be allowed the option of using the dry-mix method or first converting the hydrated lime into a putty. Where the dry-mix method is employed, the materials for each batch shall be well turned over together until the even color of

the mixed, dry materials indicates that the cementitious material has been thoroughly distributed throughout the mass, after which the water shall be gradually added until a thoroughly mixed mortar of the required plasticity is obtained.

B. Mortar boxes shall be cleaned out at the end of each day's work and all tools shall be kept clean. Mortar that has begun to set shall not be used.

3.02 INSTALLATION

A. A screened gravel sub-base shall be placed and graded to depths shown on the Drawings to obtain a continuous uninterrupted bed of the required thickness within the required limits. The construction methods, compaction equipment, and appurtenances for screened gravel shall be in accordance with Section 405, Gravel Base Course, from the Department of Public Works, Standard Specifications for Highways and Bridges at the Commonwealth of Massachusetts, dated 1973.

B. Place riprap and bank-run gravel base to the limits and grades shown on the Drawings.

C. Riprap shall be placed in conjunction with the construction of the embankment with only sufficient lag in the construction of the riprap protection as may be necessary to allow for proper construction of the portion of the embankment protected and to prevent mixture of embankment and riprap material. Bank run gravel shall be placed and graded to a depth of 6-in to obtain a continuous uninterrupted bed of the required thickness within the required limits. It shall be compacted by a minimum one coverage by a crawler-type tractor with a total weight, including blade and equipment, of not less than 30,000 lbs.

D. Mortared Riprap shall be placed and graded off in a manner to ensure that the larger rock fragments are uniformly distributed and that the smaller rock fragments serve to fill the spaces between the larger rock fragments in a manner that will result in a compact mass of stone of the specified thickness. Hand placing will be required only to the extent necessary to secure the results specified above.

E. Placed Riprap shall be placed, in a manner that does not cause segregation, on the compacted gravel bed. Stones shall be laid so that the maximum dimension is perpendicular to the bed. Stones shall be placed so that the weight of each stone is carried by the underlying material and not by the adjacent stones. Large stones shall be placed at the bottom of the slope. Spaces between stones shall be filled with spalls of suitable size to construct a solid, stable slope, free from large voids and defects which might not protect embankments against erosion.

F. A 6-in thick layer of 1/2 to 3/4 –inch crushed stone shall be placed on the inside face of stone check dams to reduce drainage flow rate.

G. No material which is frozen or covered with frost or snow shall be used in the construction and no antifreeze salts or ingredients shall be mixed with the mortar. Masonry shall not be laid at temperatures below 40 degrees F, without the approval of the Engineer and all work shall be done in such a manner as to ensure the proper and normal hardening of all mortar. All masonry work shall be so protected and heated that the temperature at the surface will not fall below 50 degrees F for a period of 72 hours after placing. Any completed work found to be affected by freezing shall be taken down and rebuilt at no additional cost to the Owner.

END OF SECTION

SECTION 02273

GEOTEXTILE FABRIC

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and install geotextile fabric complete as shown on the Drawings and as specified herein.

1.02 RELATED WORK

A. Site Preparation is included in Section 02100.

B. Earthwork is included in Section 02200.

C. Riprap is included in Section 02271.

D. Granular Fill Materials are included in Section 02230.

E. High Density Polyethylene (HDPE) Pipe is included in Section 02623.

F. High Density Polyethylene (HDPE) Liner is included in Section 02776.

1.03 SUBMITTALS

A. Within 30 calendar days following the Effective Date of the Agreement, submit the following information in accordance with Section 03100:

1. Manufacturer's background information.

2. List of material properties and samples of geotextile with attached certified test results.

3. Manufacturer's quality control program and manual including description of laboratory facilities.

4. Shop Drawing, including details of overlap and seaming of the geotextile, anchoring, connections and other construction details any variance or additional details that deviate from the Drawings.

5. Copy of quality control certificates in conformance with Paragraph 2.03 below.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM D5261 - Standard Test Method for Mass per Unit Area (Weight) of Fabric.

2. ASTM D3786 - Standard Test Method for Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics - Diaphragm Bursting Strength Tester Method.

3. ASTM D4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity.

4. ASTM D4533 - Standard Test Method for Trapezoid Tearing Strength of Geotextiles.

5. ASTM D4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.

6. ASTM D4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile.

7. ASTM D6241 - Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.

8. ASTM D5199 - Standard Test Method for Measuring Nominal Thickness of Geotextiles and Geomembranes.

9. ASTM D4355 - Standard Test Method for UV Resistance of Geotextiles.

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

A. The quality control and quality assurance consists of conformance testing of the material delivered to the site and field quality control during installation.

B. Conformance testing requirements are discussed in Paragraph 2.04 below. The purpose of conformance testing is to assure that the supplied material conforms to this Section and to the manufacturer's quality control certificates.

C. Field quality control requirements are discussed in Paragraph 3.03 below. The purpose of field quality control procedures is to assure that the geotextile material has been installed in accordance with this Section and manufacturer's recommendations.

1.06 DELIVERY, STORAGE, AND HANDLING

A. The geotextile shall be shipped, stored, and handled in accordance with manufacturer's recommendations and as specified herein.

B. No mechanical equipment shall be driven directly on top of the geotextile.

C. The geotextile shall be stored in such a way that it is protected from prolonged exposure to ultraviolet radiation and shall be elevated from the ground (a minimum of 3-in) to protect the geotextile from standing water.

1.07 MATERIAL WARRANTY

A. The geotextile manufacturer shall warrant the material against material degradation and manufacturing defects of the material and workmanship for a period of 20 years on a prorated basis from the date of Final Acceptance by Owner. The manufacturer shall replace, at no

expense to the Owner, any defective geotextile material, including labor, within the warranty period. The manufacturer shall furnish a written warranty covering the requirements of this Paragraph.

1.08 GUARANTEE

A. The Contractor shall guarantee the geotextile against defects in installation and workmanship for the period of 2 years commencing with the date of Final Acceptance. The guarantee shall include the services of qualified service technicians and all materials and labor required for the repairs at no expense to the Owner.

PART 2 PRODUCTS

2.01 GENERAL

A. The use of a manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration.

2.02 MATERIALS

A. Nonwoven Geotextile Fabric

1. The geotextile fabric shall be a nonwoven needle punched material consisting of filaments formed into a stable network. The material shall be nonbiodegradable, nonreactive within a pH range of three to eleven, resistant to ultraviolet light exposure and shall meet the following minimum average roll values:

GEOTEXTILE FABRIC PROPERTIES

			Typical Values			
Properties	Test Method	Unit	6 oz	7 oz	8 oz	10 oz
Fabric Weight	ASTM D3776	oz/sq yd	6.0	7.1	7.9	9.8
Thickness	ASTM D5199	mils	75	85	90	108
			Min. Avg. Roll Values			
Grab Strength	ASTM D4632	lbs	160	180	205	250
Grab Elongation	ASTM D4632	percent	50	50	50	50
Trapezoid Tear Strength	ASTM D4533	lbs	60	75	80	100
Puncture Strength	ASTM D4833	lbs	90	100	110	155
Mullen Burst Strength	ASTM D3786	psi	300	320	380	500

Water Flow Rate	ASTM D4491	gpm/sq ft	110	110	95	75
Permittivity	ASTM D4491	SEC^{-1}	1.2	1.4	1.2	1.0
Coef. of Permeability	ASTM D4491	cm/sec	0.2	0.2	0.2	0.2
Equivalent Opening Size	ASTM D4751	mm sieve	0.212 70	0.149 100	0.180 80	0.150 100
UV Resistance @ 500 hrs	ASTM D4355	% Stren. Retained	70	70	70	70

2. The values listed above are for the weaker principal direction.

3. Nonwoven geotextile fabric shall be manufactured by Mirafi; Trevira, Tenax, or by an approved manufacturer meeting the above physical properties.

2.03 QUALITY CONTROL DOCUMENTATION

A. Prior to installation commencement of any geotextile material, provide to the Owner the following information certified by the manufacturer for the delivered geotextile.

1. Each roll delivered to the site shall have the following identification information:

   a. Manufacturer's name

   b. Product identification

   c. Lot number

   d. Thickness

   e. Roll number

   f. Roll dimensions

2. Quality control certificates, signed by the manufacturer's quality assurance manager. Each certificate shall have roll identification number, sampling procedures, and frequency and test results. At a minimum the following test results shall be provided every 100,000 sq ft, or as otherwise noted, of manufactured geotextile in accordance with test requirements specified in Paragraph 2.02 above.

   a. Thickness

   b. Mass per unit area

   c. Trapezoid Tear Strength

   d. Puncture Strength

   e. Mullen Burst Strength

f. Grab Tensile Strength

g. Grab Elongation

h. Flow Rate (every 540,000 sf)

i. Apparent Opening Size (every 540,000 sf)

PART 3 EXECUTION

3.01 PREPARATION

A. General

1. Preparation of the subgrade shall be in accordance with Section 02200.

2. The subgrade shall be inspected by the Engineer prior to installation of the geotextile.

3.02 INSTALLATION

A. Panel Placement

1. The geotextile shall be installed as shown on the Drawings and in accordance with the Manufacturer's recommendations and approved shop drawings.

2. No mechanical equipment shall be driven directly on top of the geotextile.

3. Granular fill materials shall be installed in accordance with Section 02230.

4. HDPE Pipe shall be installed in accordance with Section 02623.

5. Soil cover shall be placed with mechanical equipment; however, no mechanical equipment shall be allowed directly on top of the geotextile material. Equipment shall be driven on pre-deposited material whose thickness is determined by the ground pressure exerted by the equipment in accordance with Section 02230. The sand shall be placed in such a manner as to prevent pushing or pulling the geotextile out of its installed location.

6. Soil cover shall be brought to the work area with earth-carrying equipment, deposited on the previously spread soil cover, and then pushed onto the uncovered portion of the geotextile. This operation shall be repeated until the total area is covered.

7. Soil cover for the side slopes of the geotextile shall be placed at the bottom and pushed up so as to reduce any tension on the geotextile.

8. Damage (including: tears, punctures, thinly stretched section or defects not previously identified) to the geotextile occurring during the placement of soil cover shall be repaired immediately at no additional expense to the Owner. Repair shall be made by overlaying another layer of geotextile over the damaged area with a 12-inch overlap all around. The patch shall be sewn to the fabric in accordance with Section 3.02.B.1.

9. All geotextile fabric installation shall be completely covered at the end of each work day unless otherwise approved by the Engineer.

10. The geotextile shall be cut with approved tools.

11. Geotextile fabric must be anchored when deployed on slopes.

12. The geotextile fabric shall be covered within (15) days of installation.

B. Field Seaming

1. The geotextile panels shall be sewn together. The thread used to sew the panels shall be of the same composition as the geotextile and as recommended by the Manufacturer. The amount of overlap and type of stitch used to join geotextile panels shall be as recommended by the Manufacturer and approved by the Engineer.

3.03 FIELD QUALITY CONTROL

A. Prior to placement of the soil cover, the geotextile installation and related work shall be inspected by the Engineer. All work in the system therein being inspected shall be complete, clean, and ready for use. All work shall meet the requirements as to line, grade, cleanliness, and workmanship, as determined by the Engineer.

B. All discrepancies shall be noted and repaired at no additional cost. Final acceptance of the system shall be contingent upon the approval of the Engineer.

3.04 DISPOSAL OF WASTE MATERIAL

A. Upon completion of installation, the Contractor shall remove and dispose in proper manner approved by the Engineer of all trash, waste material and equipment used in connection with the performed work and shall leave the premises in a neat and acceptable condition.

END OF SECTION

SECTION 02277

TEXTURED LINEAR LOW DENSITY POLYETHYLENE (LLDPE)
GEOMEMBRANE LINER

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall furnish all labor, materials, equipment and incidentals required and install Linear Low Density Polyethylene (LLDPE) geomembrane as shown on the Drawings and as specified herein.

1.02 RELATED WORK

A. Site Preparation is included in Section 02100.

B. Structural Excavation, Fill, and Grading are included in Section 02200.

D. Granular Fill is included in Section 02230.

E. Geotextile is included in Section 02273.

1.03 SUBMITTALS

A. In accordance with Section 01300, submit the following information and within 30 calendar days from the Notice to Proceed:

1. Submittals relating to liner manufacturer and liner:

a. Corporate Background

b. Manufacturing capabilities:

1) Information on factory size, equipment, personnel, number of shifts per day and production capacity per shift.

2) List of material properties and samples of liner with attached certified test results.

3) Manufacturer's quality control program and manual including description of laboratory facilities.

4) A list of ten completed facilities totaling a minimum of ten million square feet, for which the manufacturer has manufactured LLDPE geomembrane. The following information shall be provided for each facility.

a) Name and purpose of facility, its location, and date of installation.

b) Name of Owner, project manager, design engineer, and installer.

c) Geomembrane thickness and surface area.

d) Information on performance of the facility.

c. The origin of the resin to be used in the manufacturing of geomembrane including the suppliers name and production plant, as well as brand name and number.

d. Copy of quality control certificates in conformance with Paragraphs 2.01 and 2.02.

e. Certification that the LLDPE geomembrane and extrudate produced for this project have the same properties.

f. A "Sample Warranty" in accordance with Paragraph 1.08A.

2. Submittals relating to the installer

a. Background Information

b. Installation capabilities:

1) Information on equipment and personnel.

2) Anticipated average daily production.

c. A list of five completed facilities totaling two million square feet for which the Installer has installed LLDPE geomembrane. The following information shall be provided for each facility:

1) Name and purpose of facility, its location, and date of installation.

2) Name of Owner, design engineer, manufacturer and name and telephone number of contact at the facility who can discuss the project.

3) Thickness of geomembrane and surface area of the installed geomembrane.

4) Type of seaming, patching, and tacking equipment.

5) A copy of the manufacturer's certification or approval letter.

B. Within 45 days prior to liner installation submit the following:

1. Shop Drawings

a. Proposed panel layout showing the installation layout identifying field seams as well as any variance or additional details which deviate from the Drawings.

b. Details of seaming the geomembrane, anchoring, connections, penetrations and other construction details.

c. Installation Schedule.

1) A quality control manual that specifically defines the quality assurance program during installation. The manual shall include daily procedures, welding

techniques, field testing procedures, lab testing procedures, specific steps that are to be taken in the event of a failure or defect, personnel requirements, levels of authority and all other information necessary to ensure a high quality geomembrane installation.

2) Resume of the installation supervisor to be assigned to the project.

3) Resume of the master seamer to be assigned to the project.

4) A list of personnel performing field seaming operations along with pertinent experience information.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM D6693 - Test method for Tensile Properties of Plastics

2. ASTM D792 - Specific Gravity (Relative Density) and Density of Plastics by Displacement

3. ASTM D1004 - Test Method for Initial Tear Resistance of Plastics Film and Sheeting

4. ASTM D1238 - Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer

5. ASTM D1505 - Test Method for Density of Plastics by the Density-Gradient Technique

6. ASTM D1603 - Test Method for Carbon Black in Olefin Plastics

7. ASTM D3895 - Test Method for Oxidative Induction Time of Polyolefins by Thermal Analysis

8. ASTM D1603 - Test Method for Determination of Carbon Black Content in Polyethylene Compounds

9. ASTM D4218 - Test Method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique

10. ASTM D4833 - Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products

11. ASTM D5199 - Test Method for Measuring Nominal Thickness of Geotextiles and Geomembranes

12. ASTM D5323 - Practice for Determining of 2% Secant Modulus for Polyethylene Geomembranes

13. ASTM D5397 - Procedure to Perform a Single Point Notched Constat Tensile Load - Appendix (SP-NCTL) Test

14. ASTM D5596 - Test Method for Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics

15. ASTM D5617 - Test Method for Multi-Axial Tension Test for Geosynthetics

16. ASTM D5721 - Practice for Air-Oven Aging of Polyolefin Geomembranes

17. ASTM D5885 - Test Method for Oxidative Induction Time of Polyolefin Geosynthetics by High Pressure Differential Scanning Calorimetry

18. ASTM D6392 - Standard Test Method for Determining the Integrity of Non-reinforced Geomembranes Seams Produced Using Thermo-Fusion Methods

B. Geosynthetic Research Institute (GRI) Standards

1. GM10 Specification for the Stress Crack Resistance of Geomembrane Sheet

2. GM12 Measurements of the Asperity height of Textured Geomembranes Using Depth Gage

3. GM11 Accelerated Weathering of Geomembranes using a Fluorescent UVA-Condensation Exposure Devise

4. GM17 Test Properties, Testing Frequency and Recommended Warranty for Linear Low Density Polyethylene (LLDPE) Smooth and Textured Geomembranes

5. GM19 Seam Strength and Related Properties of Thermally Bonded Polyolefin Geomembranes

C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

A. In addition to manufacturer and installer requirements for qualifications and certification specified in Paragraph 1.03 the Quality Assurance consists of conformance testing of the material delivered to the site and field quality control during installation.

B. Conformance testing requirements are specified in Paragraph 2.03. The purpose of conformance testing is to assure that the supplied material conforms to this Section and to the manufacturer's quality control certificates.

C. Field quality control requirements are specified in Paragraph 3.06. The purpose of field quality control procedures is to assure that the geomembrane has been installed in accordance with the specifications and manufacturer's recommendations.

D. Quality Control Plan

1. The forms in Appendix B, forms for geomembrane quality control documentation, shall be used for field installation documentation. Alternative forms may be used for documentation as approved by the Resident Project Engineer (RPR).

E. Geomembrane Quality Control Documentation

1. Pre-installation Conference

   a. Prior to commencing work, a pre-installation conference shall be held and the following project personnel shall be identified by name and recorded in the project files:

      - o Owner's Representative
      - o Contractor's Representative
      - o Engineer's Field Representative
      - o Installation Supervisor
      - o Master Seamer
      - o Quality Assurance Laboratory
      - o Quality Assurance Technician

   b. Two duplicate project files shall be maintained. One shall be maintained by the Engineer's Field Representative (RPR) and the other shall be maintained by the Installer QC Technician. The installer shall provide the RPR with daily documentation by the end of the following work day. At the end of each work week the files shall be updated and checked to assure that copies of all pertinent project information is included in each file.

   c. Blank copies of the following project forms shall be available onsite throughout the duration of the project:

Form No.	Title
1	Subgrade Surface Acceptance
2	Daily QC Report
3	Material Receiving Log
4	Daily Panel Placement Log
5	Trial Weld Log
6	Daily Seaming Log
7	Seam Inspection Log-Air Pressure Test
8	Seam Inspection Log-Vacuum Test
9	Destructive Sample Log

1.06 QUALIFICATIONS

A. Manufacturer

1. The manufacturer of the lining material described hereunder shall have previously demonstrated his/her ability to produce this geomembrane by having at least 5 years continuous experience in the manufacturing of LLDPE geomembrane and successfully manufactured a minimum of 10 million square feet of similar liner material for hydraulic lining installations.

B. Installer

1. The installer shall be the manufacturer or an approved installer trained and certified to install the manufacturer's geomembrane. Installation shall be performed under the constant direction of a single field installation supervisor who shall remain on site and be in responsible charge, through the geomembrane installation, for geomembrane layout,

seaming, patching, testing, repairs, and all other activities required by the installer. The field installation supervisor shall have installed or supervised the installation and seaming of a minimum of two million square feet of LLDPE geomembrane liner.

1.07 DELIVERY, STORAGE, AND HANDLING

A. The geomembrane rolls shall be packaged and shipped by appropriate means to prevent damage of the geomembrane rolls. Off-loading and storage of the geomembrane is the responsibility of the Contractor. The Contractor shall be responsible for replacing any damaged or unacceptable material at no additional cost to the Owner.

B. No off-loading shall be performed unless the RPR is present. Damage during off-loading shall be documented by the RPR. All damaged rolls must be separated from the undamaged rolls until the proper disposition of that material has been determined by the RPR.

C. The geomembrane rolls shall be stored so as to be protected from puncture, dirt, grease, water, moisture, mud, mechanical abrasions and excessive heat that may damage the geomembrane material. The rolls shall be stored on a prepared surface (not wooden pallets) and shall not be stacked more than two rolls high.

1.08 MATERIAL WARRANTY

A. The LLDPE geomembrane manufacturer shall warrant the geomembrane against manufacturing defects and material degradation under outdoor exposure for a period of 20 years on a prorated basis from the date of final payment and acceptance in accordance with Section 00700 General Conditions, Paragraph -14.13. The manufacturer shall repair or replace, at no additional cost to the Owner, any material which fails from the above causes within the warranty period. The manufacturer shall furnish a written warranty covering the requirements of this Paragraph.

1.09 GUARANTEE

A. The Contractor shall guarantee the LLDPE geomembrane against defects in installation and workmanship for the period of 2 years commencing with the date of final payment and acceptance in accordance with Section 00700 General Conditions, Paragraph -14.13. The guarantee shall include the services of qualified service technicians and all materials required for the repairs at no additional cost to the Owner.

1.10 DEFINITIONS AND RESPONSIBILITIES

A. Contractor

1. The Contractor is the firm or corporation with whom the Owner has entered into agreement to construct the project. The Contractor is responsible for all submittals by the manufacturer and the installer as required by this Section. The Contractor is also responsible for scheduling and coordination of the required work with the manufacturer and the installer to complete the project.

B. Manufacturer

1. The manufacturer is the firm or corporation responsible for production of the geomembrane material to be used in the project. The manufacturer shall produce a consistent product

meeting the project specifications and shall provide quality control documentation for the product specified herein.

C. Installer

1. The installer is the firm or corporation responsible for installation of the geomembrane. The installer shall be the manufacturer or an approved installer trained and certified to install the manufacturer's geomembrane. The Installer shall be responsible for field handling, storing, placing, seaming, and all other aspects of the geomembrane installation.

PART 2 PRODUCTS

2.01 MATERIALS

A. General

1. The resin from which the geomembrane is made shall be new virgin resin, prime first-quality products designed and manufactured specifically for the purpose of capping landfills and be chemically resistant to leachate. Formulated sheet density shall be 0.939 g/ml or lower.

2. The blended resin shall contain two to three percent carbon black, anti-oxidants and heat stabilizer, but no fillers or extenders. No post-consumer resin of any type shall be added to the formulation.

3. The geomembrane material shall be so produced as to be free of holes, blisters, undispersed raw materials, or any sign of contamination by foreign matter.

4. The sheets shall be manufactured in a minimum 15-ft seamless width. Labels on the roll shall identify the thickness, length, width and manufacturer's roll and lot number.

B. Properties

1. The geomembrane rolls shall be 40-mil LLDPE and shall meet the specified physical, mechanical, and chemical property requirements listed in Appendix A, Tables A1.

C. Other Materials

1. Extrudate welding rods shall be of the same compound as the geomembrane and supplied by the manufacturer and shall be delivered in the original sealed containers. Each container shall have a label bearing the brand name, manufacturer's lot number and complete directions as to proper storage.

2. Boots and shrouds for pipe penetration shall fit snugly around the pipe. Prefabricated material shall be designed to fit site specific conditions for the intended slope and size of pipe.

2.02 QUALITY CONTROL DOCUMENTATION

A. Prior to installation commencement of any geomembrane material, the Contractor shall provide the following information certified by the manufacturer for the delivered geomembrane material.

1. Origin, identification and production of the resin (supplier's name, brand name and production plant).

2. Copies of quality control certificates issued by the resin supplier.

3. Manufacturer's certification verifying that the quality of the resin used to manufacture the geomembrane meets the requirements specified in Paragraph 2.01.

4. Each roll delivered to the project site shall have the following identification information:

   a. Manufacturer's name

   b. Product identification

   c. Thickness

   d. Roll number

   e. Roll dimensions

   f. Lot Number

5. Quality control certificates, signed by the manufacturer's quality assurance manager, shall be submitted for each roll delivered to the site. Each certificate shall have roll identification number, sampling procedures, frequency, and test results. At a minimum, test results shall be provided for each roll delivered to the site in accordance with test requirements specified in Appendix A, Table A1.

2.03 CONFORMANCE TESTING

A. Conformance testing shall be performed by an independent Quality Assurance Laboratory (QAL) approved by the Owner and provided and paid for by the Contractor. A qualified technician shall obtain the samples from the roll, mark the machine direction and identification number. The following conformance tests shall be conducted at the laboratory:

   1. Thickness
   2. Density
   3. Tensile properties
   4. Tear resistance
   5. Carbon black content
   6. Carbon black dispersion

B. These conformance tests shall be performed in accordance with Table A1, at a frequency of one sample per lot or one sample per 100,000 square feet, whichever is greater. All costs for conformance testing will be paid for by the Contractor.

C. All conformance test results shall be reviewed by the Engineer and accepted or rejected, prior to the placement of the geomembrane. All test result shall meet, or exceed, the property values listed in Appendix A. The course of action implemented for retesting failing tests shall be

approved by the Engineer. In case of failing test results, the manufacturer may request that another sample be retested by the independent laboratory with manufacturer's and Engineer's technical representative present during the testing procedures. This retesting shall be paid for by the Contractor. The manufacturer may also have the sample retested at two different laboratories approved by the Engineer. If both laboratories report passing results, the material shall be accepted. If both laboratories do not report passing results, all geomembrane material from the lot representing the failing sample will be considered out of specification and rejected.

PART 3 EXECUTION

3.01 SUBGRADE PREPARATION

A. Preparation of the subgrade shall be as specified in Section 02200.

B. The surface of the geomembrane base shall be smooth, uniform, free from sudden changes in grade (such as vehicular ruts), rocks, stones, debris, and deleterious materials. During actual placing and seaming of the geomembrane, the subgrade shall be kept free of all standing water. If the subgrade below the geomembrane becomes wet and unstable, it shall be dried and recompacted.

C. Before the geomembrane installation begins, the RPR, Contractor and Installer shall verify and sign off that the surface area to be lined has been properly prepared, free irregularities and abrupt changes in grade.

3.02 ANCHOR TRENCH

A. The anchor trench shall be constructed as shown on the Drawings and as specified herein.

B. The anchor trench shall be adequately drained to prevent water ponding and softening to adjacent soils. The anchor trench shall be backfilled with fill materials as shown on the Drawings and compacted to 90 percent of the standard proctor maximum dry density, ASTM D698.

C. The amount of trench open at any time shall be limited to one day of geomembrane installation capacity. Geosynthetic material in the anchor trench shall be temporary anchored with sandbags or other suitable materials.

D. Backfilling of the anchor trench shall be conducted when the geomembrane is in its most contracted (taut) state.

E. Care shall be taken when backfilling and compacting the trenches to prevent any damage to the lining materials.

3.03 GEOMEMBRANE PLACEMENT

A. Weather Conditions

1. Geomembrane placement shall not proceed at an ambient temperature below 32 degrees F or above 104 degrees F unless otherwise authorized, in writing, by the Engineer or his/her field representative. Geomembrane placement shall not be performed during precipitation,

excessive moisture, in an area of ponded water, or excessive winds that adversely affect the geomembrane placement.

B. Method of Placement

1. Each panel of the geomembrane shall be rolled out and installed in accordance with the approved shop drawings prepared by the Contractor. The layout shall be designed to keep field seams of the LLDPE geomembrane liner to a minimum and consistent with proper methods of LLDPE geomembrane installation. Panel layout and deployment shall be such that all seams run down slope on the perimeter berms (i.e., perpendicular to top of slope). Horizontal seams across the slope are not permitted.

2. Geomembrane rolls shall be placed using proper spreader and rolling bars so that the geomembrane would not be stretched during deployment. If a sheet must be replaced a distance greater than its width, a slip sheet shall be used.

3. The RPR shall inspect each panel, after placement and prior to seaming, for damage and/or defects. Defective or damaged panels shall be replaced or repaired, in accordance with Paragraph 3.07G.

4. The Installer shall avoid dragging the geomembrane sheets on rough soil subbase.

5. All geomembrane shall be anchored as shown on the Drawings and consistent with manufacturer's recommendations.

6. Personnel working on the geomembrane shall not smoke, wear damaging shoes or involve themselves in any activity that may damage the geomembrane.

7. All edges of the geomembrane shall be properly weighted to avoid uplift due to wind.

8. Vehicular traffic across the geomembrane shall not be allowed.

9. All damaged areas and destructive sample locations shall be recorded and located on the as-built drawings.

10. When tying into existing geomembrane, all excavation of previously installed liner shall be performed by hand to prevent damage.

11. The geomembrane shall be kept free of debris, unnecessary tools, and materials. In general, the geomembrane area shall remain neat in appearance.

12. Equipment necessary to perform the installation (generators, compressors, etc) shall have a scrap geomembrane sheet placed underneath to protect the installed geomembrane from possible damage.

13. No welder or testing equipment shall be allowed to remain on top of the installed geomembrane overnight. All equipment must be removed and stored away from the installed geomembrane.

14. No fueling of installer's equipment will be allowed on top of the installed geomembrane. No fuel containers shall be allowed on the geomembrane.

15. Any vehicle used prior to or after liner placement shall be first approved by the RPR. All vehicles are restricted from traveling on the liner material unless a temporary access is constructed.

16. The Installer is responsible for providing adequate temporary gas venting measures during installation to prevent geomembrane uplift due to possible gas pressure accumulations. The Installer shall repair any damaged geomembrane as a result of gas pressure accumulation at no additional cost to the Owner.

C. Liner Boots (Pipe Penetrations)

1. LLDPE boots or shrouds shall be furnished and installed where indicated on the Drawings. The boots shall be of the same material as the geomembrane.

2. The geomembrane end of the boots shall terminate in a skirt section suitable for welding to the geomembrane liner. The overlap between the boot and the geomembrane shall be approximately 18-in. The boot shall be welded to the geomembrane as previously specified herein.

3. Boots and shrouds shall fit snugly around the pipe. Prefabricated material shall be designed to fit site specific condition, for the intended slope and size of pipe.

4. A Neoprene rubber gasket shall be used between the boot or shroud and the pipe with a stainless steel clamp. An LLDPE sacrificial sheet shall be used between the boot or shroud and the clamp for protection.

5. For pipes larger than 4-in diameter, a second clamp shall be used. The fastener of the second clamp shall be located on the opposite side of the pipe from the first clamp, to compensate for uneven pressure and elongation.

3.04 FIELD SEAMS

A. Individual panels of geomembrane shall be laid out and overlapped by a minimum of 4-in prior to welding. The area to be welded shall be cleaned and prepared in accordance with the quality control welding procedures approved by the RPR.

B. Double track hot wedge fusion welds shall be used for straight welding.

C. Extrusion welds shall be used for patches, repairs, and penetration boots.

D. The welding equipment used shall be capable of continuously monitoring and controlling the temperatures in the zone of contact where the machine is actually fusing the geomembrane material so as to ensure that changes in environmental conditions will not affect the integrity of the weld.

E. No "fish mouths" will be allowed within the seam area. Where "fish mouths" occur, the material shall be cut, overlapped and a patch extrusion weld shall be applied. All welds upon completion of the work shall be tightly bonded. Any geomembrane area showing injury due to excessive scuffing, puncture, or distress from any cause shall be replaced or repaired with an additional piece of geomembrane. The number of patches per 100-ft length shall not exceed five. If more than five patches per 100-ft length are necessary, then the entire 100-ft length of

seam shall be removed. Further welding will cease at this time and the Engineer shall be notified.

F. All seams shall have a seam number that corresponds with the panel layout numbers. The numbering system shall be used in the development of the as-built drawings. Seam numbers shall be derived from the combination of the two panel numbers that are to be welded together.

G. All fusion welded "T" seams (i.e., the result of the geomembrane panels placed perpendicular to each other) shall be double welded where possible. The extrusion process shall be used for the second weld.

H. All extrudate shall be free of dirt, dry and protected from damage.

I. If an extrusion welder is stopped for longer than one minute, it shall be purged to remove heat-degraded extrudate. All purged extrudate shall be placed on a sacrificial sheet and disposed of.

J. All seams constructed on sloped surfaces shall perpendicular to the top and toe of the slope (vertical seams).

K. All panels placed on sloped surfaces shall extend 5-ft inward (on the flat) from the toe of slope or edge of trench.

L. All end seams shall be staggered a minimum of 5-ft in length between contiguous panels. No end seams are allowed on slopes 25 percent (4 horizontal and 1 vertical) or greater, unless otherwise approved by the Engineer.

M. To prevent moisture buildup during fusion welding, it may be necessary to place a movable protective layer of plastic (skid sheet) directly below each overlap of geomembrane that is to be seamed.

N. If required, a firm substrate shall be provided by using a flat board or similar hard surface directly under the seam overlap to achieve proper support.

O. All seam welds shall extend the full extent into the anchor trench.

P. All factory seams, field seams, and repair welds shall meet seam strength requirements specified in Appendix A, Table A2.

Q. All seams shall be "shingled" or "rain-lapped.

3.05 SEAMING WEATHER CONDITIONS

A. Normal Weather Conditions

1. The normal required weather conditions for seaming are:

a. Ambient temperature higher than 32 degrees F and lower than 104 degrees F.

b. No precipitation or other excessive moisture, such as fog or dew.

c. No excessive winds.

2. These weather conditions shall be fulfilled during seaming process.

B. Cold Weather Conditions

1. If the ambient air temperature is below 32 degrees F, the following procedures shall be implemented:

   a. Preheating the surface of the geomembrane to achieve normal temperature range.

   b. Preheating may be waived by the RPR if the Installer demonstrates that satisfactory welds of equivalent quality may be obtained without preheating at the expected temperature of installation.

   c. Preheating devices shall be approved by the manufacturer.

   d. Care shall be taken to assure that surface temperatures are not lowered below the minimum required surface temperature for welding due to winds.

   e. Additional destructive tests samples shall be taken at the discretion of the RPR

   f. Test seams, as described in Paragraph 3.06A, shall be performed under the same ambient temperature conditions as the actual seams.

C. Warm Weather Conditions

1. If the ambient air temperature is above 104 degrees F, no seaming of geomembrane shall be permitted unless the Installer can demonstrate to the satisfaction of the RPR that geomembrane seam quality is not adversely impacted.

2. Test seams shall be performed under the same ambient air temperature conditions as the actual seams.

3. Additional destructive tests shall be taken at the discretion of the RPR.

3.06 FIELD QUALITY CONTROL

A. Start-up Testing

1. A test weld 3-ft long from each welding machine shall be run upon the beginning of each shift and every four hours thereafter, under the same conditions as exist for the geomembrane welding. The test weld shall be marked with date, time of day, Seamer's initials, temperature and speed settings (for fusion welds) or temperature and preheat settings (for extrusion welds), and machine number. A tensiometer shall be required to be on-site before and during geomembrane installation for the purpose of testing samples. Six 1-in wide specimens shall be cut from the test weld and tested on-site at the presence of the RPR (three for peel and three for shear strength) in accordance with Appendix A, Table A2. No welder may start work until the sample weld has been approved by the RPR.

2. Test seams shall be performed under the same conditions as the actual seams and shall be at least 3-ft long and 1-ft wide after seaming. Material for test seams shall be cut out of the approved geomembrane rolls.

B. Nondestructive Seam Testing

1. The installer shall perform nondestructive test on all field seams over their full length. The purpose of this test is to assure continuity and integrity of the seams. Vacuum and air pressure tests shall be used for nondestructive testing. The vacuum test shall be used for extrusion welds. The air pressure test shall be used for double track hot wedge welds.

2. Vacuum Testing

   a. Equipment for testing single wedge fusion seams and extrusion seams shall be comprised of the following:

      1) A vacuum box assembly consisting of a rigid housing, a transparent viewing window, a soft rubber gasket attached to the bottom, port hole or valve assembly and a vacuum gauge.

      2) A vacuum tank and pump assembly equipped with a pressure controller and pipe connections.

      3) A rubber pressure/vacuum hose with fittings and connections.

      4) A plastic bucket and wide paint brush.

      5) A soapy solution.

   b. The following procedures shall be followed by the installer:

      1) Excess sheet overlap shall be trimmed away.

      2) Clean the window, gasket surfaces and check for leaks.

      3) Energize the vacuum pump and reduce the tank pressure to approximately 5 psi.

      4) Wet a strip of geomembrane approximately 12-in by 48-in (length of box) with the soapy solution.

      5) Place the box over the wetted area and compress.

      6) Close the bleed valve and open the vacuum valve.

      7) Ensure that a leak-tight seal is created.

      8) For a minimum period of 10 seconds, examine the geomembrane through the viewing window for the presence of soap bubbles.

      9) If no bubbles appear after 10 seconds, close the vacuum valve and open the bleed valve, move the box over the next adjoining area with a minimum of 3-in overlap and repeat the process.

      10) All areas where soap bubbles appear shall be marked and repaired in accordance with Paragraph 3.07G and then retested.

c. If the seam is not accessible to vacuum box equipment cannot be tested prior to final installation, the seaming operations shall be observed by the RPR for uniformity and completeness.

3. Air Pressure Testing (for double track fusion seams only).

a. The following procedures are applicable to those processes which produce a double seam with an enclosed space.

b. Equipment for testing double fusion seams shall be comprised of the following:

1) An air pump equipped with pressure gauge capable of generating and sustaining a pressure between 25 and 30 psi and mounted on a cushion to protect the geomembrane.

2) A manometer equipped with a sharp hollow needle, or other approved pressure feed device.

c. The following procedures shall be followed by the Installer:

1) Seal both ends of the seam to be tested. The length of seam shall not exceed 500-ft without approval by the RPR.

2) Insert needle or other approved pressure feed device into the tunnel created by the double wedge fusion weld.

3) Energize the air pump to a pressure between 25 and 30 psi. After allowing two minutes for relaxation, the pressure shall be monitored over a test period not less than five minutes.

4) If the loss of pressure exceeds 4-psi, or the pressure does not stabilize, the weld shall be considered faulty (unless the Installer can demonstrate that monitoring for an additional five minutes does not cause an additional loss in pressure in excess of 1 psi, and that the pressure stabilizes within the second monitoring period). Locate the faulty area, repair in accordance with Paragraph 3.07G and retest.

5) If the pressure loss is less than 4 psi after five minutes, cut the air channel on the opposite end the pressure device to confirm there is no blockage and verify the length of the seam tested. Remove needle of other approved pressured feed device and seal with an extrusion weld.

6) Remove needle or other approved pressure feed device and seal.

d. Destructive seam testing shall be performed in accordance with Paragraph 3.07 below.

3.07 DESTRUCTIVE SEAM TESTING

A. The purpose of the destructive testing is to evaluate seam strength properties. A minimum of one test sample shall be obtained per 500-ft of performed seam length. The location of samples shall be determined by the RPR. Selection of such locations may be prompted by suspicion of

overheating, contamination, or other potential cause that may adversely impact the welds. Location of samples shall not be revealed to Installer in advance. Samples shall be collected by the installer in the presence of the RPR. The samples should be forwarded by the RPR to the Owner approved laboratory for testing. Results of the testing shall be forwarded to the Engineer.

B. Sampling Procedures

1. Samples shall be cut by the installer at locations chosen by the RPR as the seaming progresses.

2. The seams shall not be covered by another material before they have been tested and accepted by RPR.

3. Upon obtaining each sample, assign a number to the sample and mark it accordingly.

4. Record sample location on layout drawing.

5. Record purpose of the sample, statistical routine or suspicious weld area.

6. Holes in the geomembrane resulting from destructive seam testing shall be immediately repaired in accordance with Paragraph 3.07G.

C. Size and Disposition of Samples

1. Two samples, 12-in wide by 18-in shall be taken for field testing. Each of these samples shall be cut with a 1-in wide die, with the seam centered parallel to the width. The distance between these two samples shall be 36-in. If all samples pass the field test described in Paragraph 3.07D, a sample for laboratory testing shall be taken.

2. The sample for laboratory testing shall be located between the samples for field testing. The sample for laboratory testing shall be 12-in wide by 36-in long with the seam centered lengthwise. The sample shall be cut into three parts and distributed as follows:

   a. One portion to the Installer for optional laboratory testing, 12-in by 12-in.

   b. One portion for geosynthetic laboratory quality assurance testing, 12-in by 12-in.

   c. One portion to the Engineer for archive storage, 12-in by 12-in.

D. Field Testing

1. The following shall be performed by the installer's qualified technician in the presence of the RPR:

   a. The installer shall cut six 1-in wide replicate specimens from the field testing samples to be tested for shear and peel strength, in accordance with the criteria set in Appendix A, Table A2.

   b. The installer shall test three specimens for shear seam strength and three for peel strength. All replicate test specimens shall pass for the seam to be acceptable.

c. Samples shall be tested with a tensiometer equipped with a drive/pull apparatus adjusted to a pull rate of 2-in per minute for both peel and sheer testing. Each sample shall be tested until film tearing bond (FTB) is achieved. At a minimum, the required pass criteria for peel shall be as specified in Appendix A, Table A2.

d. Any specimen that fails through the weld or through the fusion at the weld sheet interface is a non-FTB (Film Tearing Bond) break and shall be considered a failure even if it achieves the acceptable strengths.

E. Quality Assurance Laboratory Test

1. The RPR shall package and ship destructive test samples to the independent Quality Assurance Laboratory (QAL) approved by the Engineer by overnight delivery service.

2. Laboratory test shall include shear and peel strength tests performed in accordance with ASTM D638, Type IV. The minimum acceptable values obtained in these tests shall be in accordance with Appendix A, Table A2.

3. At least five specimen shall be tested each for shear and peel strength. A passing test shall meet the minimum required values in all five specimens tested for each method.

4. The QAL shall provide verbal test results to the RPR no more than 24 hours after they receive the samples. The RPR shall review the laboratory results as soon as they become available.

F. Procedures for Destructive Test Failure

1. The following procedures shall apply whenever a sample fails a destructive test, whether that test is conducted in the field or by the QAL. The Installer has two options.

a. The Installer can repair the seam between any two passing test locations in accordance with Paragraph 3.07G.

b. The Installer can retrace the welding path to an intermediate location a minimum of 10-ft on each side of the failed sample. The sample shall be tested in the field. Subsequent failure of test samples shall cause the testing to move further down the seam until the extent of faulty seam has been determined.

2. All acceptable repaired seams shall be bound by two conservative passing locations on each side of the original sample. In cases where repaired seam exceeds 150-ft, a sample taken from the zone in which the seam has been repaired must pass destructive testing. Repairs shall be made in accordance with Paragraph 3.07G.

3. The RPR shall document all actions taken in conjunction with destructive test failures.

G. Repair Procedures

1. Any portion of the geomembrane exhibiting signs of any kind of defect, or failing a destructive or a nondestructive test, shall be repaired. Several procedures exist for the repair of these areas. The final decision as to the appropriate repair procedure shall be made by the RPR.

2. The repair procedures available include:

   a. Patching, used to repair large holes, tears, undispersed raw materials and contamination by foreign matter.

   b. Spot welding or seaming used to repair small tears, pinholes, or other minor, localized defects.

   c. Capping, is used to repair large lengths of failed seams.

   d. Removing bad seam and replacing with a strip of new material welded in place.

3. For any repair method, the following provisions shall be satisfied:

   a. Surfaces of the geomembrane which are to be repaired using extrusion methods shall be abraded no more than one hour prior to the repair.

   b. All surfaces shall be clean and dry at the time of the repair.

   c. All seaming equipment used in repairing procedures shall be qualified.

   d. All patches and caps shall extend at least 4-in beyond the edge of the defect.

   e. All patches shall have rounded corners.

H. Repair Verification

1. Each repair shall be numbered and logged by the installer. Each repair shall be nondestructively tested using the methods described in Paragraph 3.06 as appropriate. Repairs, which pass the nondestructive test, shall be taken as an indication of an adequate repair. Repairs more than 150-ft long may be of sufficient length to require destructive test sampling at the discretion of the RPR. Failed test of the repaired section indicates that the repair shall be redone and retested until a passing test results are achieved. The RPR shall observe all nondestructive testing of repairs. The installer shall record the number of each repair, date and test outcome.

I. Wrinkles

1. Large wrinkles that remain in the sheet as result of temperature expansion or uneven surface preparation may need removal as determined by the RPR in consideration of applied loads on the wrinkle. Should the wrinkle need removing, the lower down-slope edge of the wrinkle shall be cut, overlapped and repaired as described in Paragraph 3.07G. Both ends of the wrinkle repair shall be patched. Caution must be taken in removing any wrinkles. Wrinkles are needed to allow for future contraction of the geomembrane liner, especially in cold weather.

J. Construction Equipment

1. Construction equipment or vehicles with steel tracks shall not be permitted on the geomembrane. Other equipment such as portable generators and power centers shall be permitted if the support apparatus is protected from damaging the liner, and if care is taken to prevent leaking lubricants from damaging the geomembrane.

3.08 DISPOSAL OF WASTE MATERIAL

A. Upon completion of installation, the Contractor shall properly remove and dispose of all trash, waste material and equipment used in connection with the performed work and shall leave the premises in a neat and acceptable condition.

3.09 AS-BUILT DRAWINGS

A. The Installer shall prepare and submit to the Engineer an as-built drawing reflecting the actual installation of geomembrane liner, including the location of all seams, the location of destructive samples, and the location of all repair work. The as-built drawing shall be submitted to the Engineer within seven days of job completion. In addition, a copy of the complete documentation package will accompany the as-built drawing.

END OF SECTION

APPENDIX A

TABLE A1
MATERIAL PROPERTIES
LINEAR LOW DENSITY POLYETHYLENE (LLDPE) GEOMEMBRANE
TEXTURD SHEET

Property	Unit	Value	Test Method[1]	Specified (Thickness mil)						Min. Testing Frequency
				30	40	60	80	100	120	
Thickness	mil	min. ave.	ASTM D5994							
-Nominal	mil			30	40	60	80	100	120	
- Lowest Individual	mil			27	36	54	72	90	100	per roll
Asperity Height	mil	min. ave.	GM 12	10	10	10	10	10	10	Every 2ed roll
Density	g/ml	max.	ASTM D1505/D792	0.939	0.939	0.939	0.939	0.939	0.939	200,000 lb
Tensile Properties	lb/in	min. ave.	ASTM D6693 Type IV							20,000 lb
- Break Strength	lb/in			45	60	90	120	150	180	
- Break Elongation	%			250	250	250	250	250	250	
2% Modulus	lb/in	Max.	ASTM D5323	1800	2400	3600	4800	6000	7200	per formulation
Tear Resistance	lb	min. ave.	ASTM D1004	16	22	33	44	55	66	45,000 lb
Puncture Resistance	lb	min. ave.	ASTM D4883	33	44	66	88	110	132	45,000 lb
Axi-Symmetric Break Resistance	%	min.	ASTM D5617	30	30	30	30	30	30	per formulation
Carbon Black Content	%	range	ASTM 1603	2-3	2-3	2-3	2-3	2-3	2-3	45,000 lb
Carbon Black Dispersion		category	ASTM D5596	9 in 1, or 2 and 1 in 3	9 in 1, or 2 and 1 in 3	9 in 1, or 2 and 1 in 3	9 in 1, or 2 and 1 in 3	9 in 1, or 2 and 1 in 3	9 in 1, or 2 and 1 in 3	45,000 lb
Oxidative Induction Time										200,000 lb
- Standard OIT, or	minutes	min. ave.	ASTM D3895	100	100	100	100	100	100	
- High Pressure OIT		min. ave.	ASTM D5885	400	400	400	400	400	400	
Oven Aging @ 85 C			ASTM D5721							
- Standard OIT, or	% retained after 90 days	min. ave.	ASTM D3895	35	35	35	35	35	35	per formulation
- High Pressure OIT	% retained after 90 days	min. ave.	ASTM D5885	60	60	60	60	60	60	
UV Resistance										
- High Pressure OIT	% retained after 1600 hrs	min. ave.	ASTM D5885	35	35	35	35	35	35	per formulation

[1]Testing methods and procedures shall be in accordance with GRI, GM17 document.

TABLE A2
SEAM STRENGTH PROPERTIES
LINEAR LOW DENSITY POLYETHYLENE (LLDPE) GEOMEMBRANE
TEXTURED SHEET

PROPERTY	UNIT	VALUE	TEST METHOD[1]	SPECIFIED THICKNESS (mil)					
				30	40	60	80	100	120
Shear Strength	psi	min.	ASTM D6392						
- Hot Wedge				1500	1500	1500	1500	1500	1500
- Extrusion				1500	1500	1500	1500	1500	1500
Peel Strength	psi	min.	ASTM D6392						
- Hot Wedge				1250	1250	1250	1250	1250	1250
- Extrusion				1100	1100	1100	1100	1100	1100

[1]Testing methods and procedures shall be in accordance with ASTM D 6392 and GRI, GM19 document.

APPENDIX B

The following forms are included and shall be completed by the responsible party as shown on the forms.

Form No.	Title
1.	Subgrade Surface Acceptance
2.	Daily CQC Report
3.	Material Receiving Log
4.	Daily Panel Placement Log
5.	Trial Weld Log
6.	Daily Seaming Log
7.	Seam Inspection Log - Air Pressure Testing
8.	Seam Inspection Log - Vacuum Testing
9.	Destructive Sample Log

SUBGRADE SURFACE ACCEPTANCE

DATE: _____ PROJECT NUMBER: _____

PROJECT NAME: _____

EARTH CONTRACTOR: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

SUPERINTENDENT OF PROJECT: _____ PHONE: _____

GEOMEMBRANE INSTALLER: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

SUPERINTENDENT OF PROJECT: _____ PHONE: _____

CERTIFICATE OF ACCEPTANCE OF SUBGRADE SOIL BY INSTALLER

I the undersigned, duly authorize representative of _____
do hereby accept the soil surface as being acceptable for placement of a geomembrane liner.

_____

Name Signature Title Date

Certificate Accepted by Inspector-Company: _____

_____

Name Signature Title Date

RPR: _____

CONTRACTOR'S REPRESENTATIVE: _____

INSTALLING SUPERVISOR: _____

Use back for comments.

FORM 1

DAILY CQC REPORT

PROJECT: CLASS 1 LANDFILL CELL LATERAL EXPANSION

DATE:_____ WEATHER:_____ TEMP.: AM___PM___

CONTRACTOR:_____

Log:_____

Deficiencies and Corrective Actions:_____

Outstanding Items:_____

Attachments:_____

QA/QC MANAGER:_____ DATE:_____

FORM 2

MATERIAL RECEIVING LOG

PROJECT NAME:_____

DATE: _____ **PROJECT NO.:**_____ **MATERIAL TYPE:**_____

BATCH/LOT NO.	FACTORY ROLL NO.	LENGTH	WIDTH	COMMENTS

TOTAL SQ. FT. DELIVERED TODAY: _____

TOTAL SQ. FT. DELIVERED TO DATE : _____

NOTE: BILLS OF LADING/SHIPPING STATEMENTS

DAILY PANEL PLACEMENT LOG

PROJECT NAME:_____

DATE: _____ **PROJECT NO.:**_____ **MATERIAL TYPE:**_____

PANEL NO.	FACTORY ROLL NO.	LENGTH	WIDTH	COMMENTS

TOTAL SQ. FT. DEPLOYED TODAY: _____

TRIAL WELD LOG

PROJECT NAME: _____

DATE: _____ **PROJECT NO.:** _____ **MATERIAL TYPE:** _____

SEAMER I.D.	MACHINE NUMBER	AMBIENT TEMPERATURE	AM/PM	EXTRUSION WELDS MACHINE TEMP/PREHEAT TEMP	FUSION WELDS WEDGE TEMP/SPEED SET	PEEL VALUES LBS/INCH	SHEAR VALUES LBS/INCH

Page _____ of _____

DAILY SEAMING LOG

PROJECT NAME: _____

DATE: _____ **PROJECT NO.:** _____

SEAMER I.D.	SEAM LENGTH	AM/PM	COMMENTS
TOTAL LINEAL FEET WELDED:			
TODAY _____ FUSION WELD _____ EXTRUSION WELD			

SEAM INSPECTION LOG
AIR PRESSURE TESTING

PROJECT NAME: _____

DATE: _____ **PROJECT NO.:** _____ **MATERIAL TYPE:** _____

SEAMER I.D. NO.	START TIME	END TIME	START PRESSURE	END PRESSURE	+/-	LENGTH TESTED	COMMENTS

Page _____ of _____

SEAM INSPECTION LOG
VACUUM TESTING

PROJECT NAME: _____

PRIMARY/SECONDARY: _____ **PROJECT NO:** _____ **MATERIAL TYPE:** _____

REPAIRER I.D. NO.	LOCATION	REASON FOR DAMAGE	TEST DATE	PASS/FAIL	RETEST DATE	PASS/FAIL	COMMENTS

DESTRUCTIVE SAMPLE LOG

PROJECT NAME: _____

DATE: _____ **PROJECT NO.:** _____ **MATERIAL NO.:** _____

SAMPLE I.D. NO.	LOCATION	MACHINE NUMBER	SEAMER I.D.	TYPE OF WELD	MACHINE TEMP. AND SETTING	FIELD PEEL VALUES LBS/INCH	FIELD SHEAR VALUES LBS/INCH	SENT TO LAB

Page _____ of _____

SECTION 02612

REINFORCED CONCRETE DRAIN PIPE

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and incidentals necessary and install and test reinforced concrete pipe for drains complete as shown on the Drawings and as specified herein.

1.02 RELATED WORK

A. Excavation and backfilling are included in Section 02221.

B. Granular materials are included in Section 02230.

C. Concrete is included in Division 3.

1.03 SUBMITTALS

A. Within 30 days of the Effective Date of the Agreement submit the name of the pipe and fitting supplier and a list of materials to be furnished.

B. Submit, in accordance with Section 01300, shop drawings showing layout and details of reinforcement, joint, method of manufacture and installation of pipe, specials and fittings, and a schedule of pipe lengths by diameter for the entire job.

C. Submit with the shop drawings certification from the manufacturer that the fine and course aggregates used in manufacture of the concrete pipe comply with the requirements of Paragraph 2.01C.

D. Prior to each shipment of pipe, submit the manufacturer's certification that the pipe for this Contract conforms to the ASTM Standards specified herein.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM C33 - Standard Specification for Concrete Aggregates.

2. ASTM C76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.

3. ASTM C150 - Standard Specification for Portland Cement.

4. ASTM C361 - Standard Specification for Reinforced Concrete Low-Head Pressure Pipe.

5. ASTM C443 - Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.

6. ASTM C924 - Standard Practice for Testing Concrete Pipe Sewer Lines by Low-Pressure Air Test Method.

7. ASTM E329 - Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

A. The manufacturer shall perform the acceptance tests specified in ASTM C76, Paragraph 5.1.2.

B. Inspection of the pipe will be made by the Engineer or other representatives of the Owner after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the requirements specified herein, even though pipes may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery shall be marked for identification and shall immediately be removed from the job.

PART 2 PRODUCTS

2.01 REINFORCED CONCRETE PIPE

A. Except as otherwise specified herein, pipe shall conform to ASTM C76, Class V. The pipe interior shall be smooth and even, free from roughness, projections, indentations, offsets, or irregularities of any kind. The concrete mass shall be dense and uniform. Minimum reinforcement and wall thickness for sizes not tabulated in ASTM C76 shall be designed by the manufacturer in accordance with Section 7.2 of ASTM C76.

B. Cement shall be non-air-entraining Portland Cement conforming to ASTM C150, Type II. The use of any admixture shall be subject to the specific approval of the Engineer.

C. Fine aggregate shall consist of washed inert natural sand conforming to the requirements of ASTM C33, except for gradation, with a maximum loss of 8 percent when subjected to 5 cycles of the soundness test using magnesium sulfate. Coarse aggregate shall consist of well-graded crushed stone or washed gravel conforming to the requirements of ASTM C33, except for gradation, with a maximum loss of 8 percent when subjected to 5 cycles of the soundness test using magnesium sulfate. Documentation that the aggregates to be used in the manufacture of reinforced concrete pipe meet these requirements shall be submitted to the Engineer as stated in Paragraph 1.03 above.

D. The 28-day compressive strength of the concrete, as indicated by cores cut from the pipe shall be equal to or greater than the design strength of the concrete. The concrete mass shall be dense and uniform. Reinforcement shall be circular for all concrete pipe. Quadrant steel shall not be used. Reinforcement shall be installed in both the bell and the spigot. At least one circumferential reinforcement wire shall be in both the bell and spigot area and reinforcement in the bell and spigot shall be adequate to prevent damage to concrete during shipping, handling and after installation. When cores indicate that reinforcing steel has less than 85 percent bond the pipe shall be subjected to a 3-edge bearing test to 13 psi to verify strength and water tightness.

E. Pipe may be rejected for any of the following reasons:

1. Exposure of any steel reinforcement in any surface of the pipe.

2. Transverse reinforcing steel found to be in excess of 1/4-in out of specified position after the pipe is molded.

3. Any shattering or flaking of concrete at a crack.

4. Voids, with the exception of a few minor bugholes, on the interior and exterior surfaces of the pipe exceeding 1/4-in in depth unless properly and soundly pointed with mortar or other approved material.

5. Unauthorized application of any wash coat of cement or grout. Any pipe dressing procedures shall be subject to approval of the Engineer.

6. A hollow spot (identified by tapping the internal surface of the pipe) which is greater than 30-in in length or wider than 3 times the specified wall thickness. Repair of such defective areas not exceeding these limitations may be made as specified in Paragraph 2.01R.

7. Defects that indicate imperfect molding of concrete; or any surface defect indicating honeycomb or open texture (rock pockets) greater in size than area equal to a square with a side dimension of 2-1/2 times the wall thickness or deeper than two times the maximum graded aggregate size; or local deficiency of cement resulting in loosely bonded concrete, the area of which exceeds in size the limits of area described in Paragraph 2.01E9 above when the defective concrete is removed. Repair of such defects not exceeding these limits may be made as specified in Paragraph 2.01R.

8. Any of the following:

   a. A crack having a width of 0.005 to 0.01-in throughout a continuous length of 36-in or more.

   b. A crack having a width of 0.0 to 0.03-in or more throughout a continuous length of 1-ft or more.

   c. Any crack greater than 0.005-in extending through the wall of the pipe and having a length in excess of the wall thickness.

   d. Any crack showing two visible lines of separation for a continuous length of 2-ft or more, or an interrupted length of 3-ft or more anywhere in evidence, both inside and outside.

   e. Cracks anywhere greater than 0.03-in in width.

F. The pipe shall be clearly marked as required by ASTM C76 in a manner acceptable to the Engineer. The markings may be at either end of the pipe for the convenience of the manufacturer, but for any one size shall always be at the same end of each pipe length. Pipe shall not be shipped until the compressive strength of the concrete has attained 4,000 psi.

G. Pipe shall have a minimum laying length of approximately 8-ft, except for closure and other special pieces as approved by the Engineer. Have available at the site of the work sufficient pipe of various lengths to affect closure at manholes or structures that cannot be located to

accommodate standard lengths. Short lengths of pipe made for closure etc., may be used in the pipeline at the end of construction if properly spaced. The length of the incoming and outgoing concrete pipe at each structure shall not exceed 4-ft, except where the joint is cast flush with the exterior wall of the structure, where steel wall fittings are provided or where otherwise noted on the Drawings. Maximum laying length shall not exceed 16-ft, but the installation of 16-ft lengths will depend upon the ability to handle such lengths of pipe in sheeted trenches, comply with trench width requirements, maintain the integrity of the sheeting and avoid disturbance to adjacent ground. If in the opinion of the Engineer the use of 16-ft lengths is impracticable, shorter lengths shall be used.

H. Each length of pipe shall be checked against the length noted on the shop drawings. Pipe more than 1-1/2-in longer than that shown on the shop drawings shall not be used on this project. Variations in length of the same pipe shall not exceed ASTM C76 requirements.

I. During manufacturing, measuring devices shall be used to assure joint assembly is within the tolerance of ASTM C76 and this Section.

J. The Engineer shall have the right to take samples of the concrete after it has been mixed or as it is being placed in the forms or molds and to make such inspection and tests thereof as he/she may wish.

K. At the start of the work, a set of test cylinders shall be taken each day on which pipe is manufactured for the project or more often if required. This may ultimately be reduced to one set of three specimens for every 50 cu yds of concrete placed, if the uniformity of results warrants and if approved by the Engineer. At the start of the work, a relationship shall be established between ultimate strength of test cylinders stored in a standard manner as compared to cylinders steam cured with the pipe and as compared to cores taken from the corresponding finished pipe. At least five sets of tests shall be made.

L. The Engineer shall have the right to cut cores from such pieces of the finished pipe as he/she selects for inspection and such tests as he/she may wish to apply. Holes left by the removal of cores shall be filled in an approved manner by and at the expense of the manufacturer. Core drilling shall be carried out by the pipe manufacturer at his/her expense. The number of cores shall not exceed the requirements of ASTM C76.

M. Test cores may be taken for every 500 linear feet of pipe manufactured, but not less than once each day on which pipe is manufactured for the project. Cores may be reduced to one set of two per week (or possibly fewer, but not less than one set for every 1,500 linear feet), if a satisfactory relationship is established between cores and cylinders made and cured in the standard manner. This relationship shall not vary by more than 10 percent more or less from the average ratio. Cores may be drilled in any manner which will provide a smooth core face. All pipe cylinders and cores shall be 4-in in diameter. Cores shall be carefully saw-trimmed and capped in a vertical position with a sulfur cap of minimum thickness, at least one day before being tested.

N. Core testing shall conform to Standard ASTM Methods.

O. At the time of inspection, the pipe will be carefully examined for compliance with the appropriate ASTM standard, as specified herein and shop drawings. All pipes shall be inspected for general appearance, dimension, "scratch-strength," blisters, cracks, roughness, soundness, etc. All pipes will be checked for soundness by being tapped and scratched at least once on every 50 sq in of pipe surface. The surface shall be dense and close-textured. Cores also shall

serve as a basis for rejection of pipe, particularly if lamination or poor bond of reinforcement is apparent.

P. The manufacturer shall use measuring devices to assure joint assembly is within tolerances of ASTM C76 and as specified herein. If, during construction, the pipes cannot be satisfactorily joined, the manufacturer shall pre-join the pipe at the plant.

Q. Unsatisfactory or damaged pipe will be either permanently rejected or returned for minor repairs. Only that pipe actually conforming to the specifications and accepted will be listed for approval, shipment, and payment. Approved pipe will be so stamped or stenciled on the inside before it is shipped. All pipe which has been damaged after delivery will be rejected and if such pipe already has been laid in the trench, it shall be acceptably repaired, if permitted, or removed and replaced, entirely at the Contractor's expense.

R. Pits, blisters, rough spots, breakage, and other imperfections may be repaired, subject to the approval of the Engineer, after demonstration by the manufacturer that strong and permanent repairs result. Repairs shall be carefully inspected before final approval. Non-shrink cement mortar used for repairs shall have a minimum compressive strength of 6,000 psi at the end of 7 days and 7,000 psi at the end of 28 days, when tested in 3-in cylinders stored in the standard manner. Epoxy mortar may be utilized for repairs subject to the approval of the Engineer.

2.02 JOINTS FOR CONCRETE PIPE

A. Joints [for concrete pipe less than 72-in in diameter] shall be concrete and rubber tongue and groove or bell and spigot type joint conforming to ASTM C361 with provisions for using a round rubber O-Ring gasket in a recess in the spigot end of the pipe. The bevel on the bell of the pipe shall be between 1-1/2 degrees and 2-1/2 degrees. The diameters of the joint surfaces which compress the gasket shall not vary from the true diameters by more than 1/16-in.

B. The round rubber O-Ring gaskets shall conform to ASTM C443 except as otherwise specified herein. Two gaskets shall be submitted to the Engineer for tests at least 30 days before joining any the pipe.

C. The gaskets shall be designed and manufactured so that the completed joint will withstand an internal water pressure in excess of 13 psi for a period of 10 minutes without showing any leakage by the gasket or displacement of it. The pipe manufacturer shall provide facilities for testing the effectiveness of the joints against leakage and one such test may be required for each 500-ft of pipe for each type of joint manufactured. Such tests shall be made by an internal or external pressure against the joint of at least 13 psi for a period of ten minutes in accordance with ASTM C443. The completed joint, when installed in place in the work, shall be capable of withstanding a groundwater pressure of 13 psi without exceeding the allowable leakage specified for the pipe testing.

D. The ends of the pipe shall be made true to form and dimension and the bell shall be made by casting against steel forms. The manufacturer shall inspect all pipe joint surfaces for out-of-roundness and pipe ends for squareness. The manufacturer shall furnish to the Engineer a notarized affidavit stating all pipe meets the requirements of ASTM C76, as specified herein and the joint design.

PART 3 EXECUTION

3.01 LAYING CONCRETE PIPE

A. Care shall be taken in loading, transporting and unloading to prevent injury to the pipe or fittings and the joint surfaces. Pipe or fittings shall not be dropped. All pipe or fittings shall be examined before laying and no piece shall be installed which is found to be defective.

B. As soon as the excavation is completed to the normal grade of the bottom of the trench, place screened gravel in the trench and the pipe shall be firmly bedded in this gravel to conform accurately to the lines and grades indicated on the Drawings. Screened gravel shall conform to the requirements of Section 02230. Blocking under the pipe will not be permitted.

C. Screened gravel shall be placed and compacted to give complete vertical and lateral support for the lower section of the pipe as indicated on the Drawings. A depression shall be left in the supporting gravel at the joint to prevent contamination of the rubber gasket immediately before being forced home. Before the pipe is lowered into the trench, the spigot and bell shall be cleaned and free from dirt. Gasket and bell shall be lubricated by a vegetable lubricant which is not soluble in water, furnished by the pipe manufacturer and harmless to the rubber gasket. The pipe shall be properly aligned in the trench to avoid any possibility of contact with the side of the trench and fouling the gasket. As soon as the spigot is centered in the bell of the previously laid pipe, it shall be forced home with jacks or come-alongs. After the gasket is compressed and before the pipe is brought fully home, each gasket shall be carefully checked for proper position around the full circumference of the joint. Steel inserts shall be used to prevent the pipe from going home until the feeler gauge is used to check the final position of the gasket. The jacks or come-alongs shall be anchored sufficiently back along the pipeline (a minimum of five lengths) so that the pulling force will not dislodge the pieces of pipe already in place. Only a jack or come-along shall be employed to force the pipe home smoothly and evenly and hold the pipe while backfilling is in progress. Under no circumstances shall crowbars be used nor shall any of the motor driven equipment be used.

D. As soon as the pipe is in place and before the come-along is released, backfill shall be placed as indicated on the Drawings and compacted for at least one-half the length of pipe. Not until this backfill is placed shall the come-along be released. If any motion at joints can be detected, a greater amount of backfill shall be placed before pressure is released. When pipe laying is not in progress, including lunchtime, the open ends of the pipe shall be closed by a watertight plug or other approved means.

E. Carefully regulate the equipment and construction operations such that the loading of the pipe does not exceed the loads for which the pipe is designed and manufactured. Any pipe damaged during construction operations shall promptly and satisfactorily be repaired or replaced at the Contractor's expense.

END OF SECTION

SECTION 02622

POLYVINYL CHLORIDE (PVC) PIPE

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and install polyvinyl chloride leachate pipe, fittings, and appurtenances as shown on the Drawings and as specified herein.

1.02 RELATED WORK

A. Granular Fill Materials are included in Section 02230.

B. High Density Polyethylene (HDPE) Geomembrane Liner is included in Section 02775.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300, and within 15 days following the Effective Date of the Agreement, the following:

1. A list of materials to be furnished, the names of the suppliers and the date of delivery of materials to the site.

2. The origin of the resin to be used in the manufacturing of the pipe including the suppliers name and production plant, as well as brand name and number.

3. Manufacturer quality control manual describing implementation of quality control procedures during pipe manufacturing process.

4. Manufacturer's certification of compliance with this Section.

5. Prior to commencing work, submit complete, detailed shop drawings of all PVC pipe, including the location of all fittings, joints and connections to structures.

6. Submit and comply with pipe manufacturer's recommendations for handling, storing and installing pipe and fittings.

7. Submit for each shipment of pipe a manufacturer's certification that the pipe was manufactured from the same resin identified in Section 1.03A1 above.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM D1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.

2. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120.

3. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).

4. ASTM D2466 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.

5. ASTM D2467 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.

6. ASTM D2564 - Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.

7. ASTM D2672 - Standard Specification for Joints for IPS PVC Pipe Using Solvent Cement.

8. ASTM D2774 - Standard Practice for Underground Installation of Thermoplastic Pressure Piping.

9. ASTM D2837 - Standard Test Method for Obtaining Hydrostatic Design Basis for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials.

10. ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.

11. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

12. ASTM F656 - Standard Specification for Primers for Use in Solvent Cement Joints of Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings.

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

A. Finished Product Evaluation

1. Each length of pipe produced shall be checked by the production staff for the items listed below. The results of all measurements shall be recorded on production sheets which become part of the manufacturer's permanent records.

   a. Pipe in process shall be checked visually, inside and out for cosmetic defects (grooves, pits, hollows, etc).

   b. Pipe outside diameter shall be measured using a suitable periphery tape to ensure conformance with ASTM D1785.

   c. Pipe wall thickness shall be measured at twelve equally spaced locations around the circumference at both ends of the pipe to ensure conformance with ASTM D1785.

   d. Pipe length shall be measured.

e. Pipe marking shall be examined and checked for accuracy.

f. Pipe ends shall be checked to ensure they are cut square and clean.

B. Stress Regression Testing

1. The PVC pipe manufacturer shall provide certification that stress regression testing has been performed on the specific PVC resin being utilized in the manufacture of this product. This stress regression testing shall have been done in accordance with Plastic Pipe Institute (PPI) and the manufacturer shall provide a product supplying a minimum Hydrostatic Design Basis (HDB) of 2000 psi as determined in accordance with PPI procedures.

1.06 WARRANTY

A. The pipe material manufacturer shall provide an unconditional extended warranty for the pipe covering the cost of materials for repair or replacement plus installation manpower should the pipe fail within the warranty period. The manufacturer's extended warranty shall be for 10 years after the final acceptance of the project by the Owner. The manufacturer shall guarantee that the pipe furnished is suitable for the purpose intended and free from defects of material and workmanship for the duration of the extended warranty. In the event the pipe fails to perform as specified, the pipe manufacturer shall promptly replace defective pipe at no additional cost to the Owner.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Care shall be taken in shipping, handling and laying to avoid damaging the pipe and fittings. Extra care will be necessary during cold weather construction. Any pipe damaged in shipment shall be replaced as directed by the Engineer.

B. Any pipe or fitting showing a crack or which has received a blow that may have caused an incipient fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work.

C. While stored, pipe shall be adequately supported from below at not more than 3-ft intervals to prevent deformation. Pipe shall not be stacked higher than 6-ft. Pipe and fittings shall be stored in a manner that will keep them at ambient outdoor temperatures. Temporary shading as required to meet this requirement shall be provided. Simple covering of the pipe and fittings which allows temperature buildup when exposed to direct sunlight will not be permitted. In the event the pipe fails to perform as specified, the pipe manufacturer shall promptly replace defective pipe at no additional cost to the Owner.

PART 2 PRODUCTS

2.01 POLYVINYL CHLORIDE (PVC) PIPE

A. Pipe and fittings shall be manufactured from a PVC compound that meets the requirements of Type 1, Grade 1, Polyvinyl Chloride as outlined in ASTM D1784. A Type 1, Grade 1 compound is characterized as having the highest requirements for mechanical properties and chemical resistance.

B. Polyvinyl chloride pipe (PVC) shall be Schedule 80 or as indicated on the Drawings. The pipes shall conform to the requirements of ASTM D1785 and shall have the nominal dimensions shown on the Drawings.

C. Fittings shall conform to the requirements of ASTM D2467 for socket type, joints.

D. Pipe shall be furnished in standard laying lengths according ASTM D3034.

2.02 JOINTS

A. The pipe shall be joined with gasketed, integral bell and spigot or double bell coupling with plain end spigot type joints except for restrained joint PVC pipe less than 4-in in diameter which shall be solvent cemented joints. Gasketed joints shall conform to ASTM D3139. Gaskets shall conform to ASTM F477. Solvent cement shall conform to ASTM D2564 and primer shall conform to ASTM F656.

2.03 IDENTIFICATION

A. Each length of pipe and each fitting shall be marked with the name of the manufacturer, size, and class. All gaskets shall be marked with name of manufacturer, size, and proper insertion direction.

2.04 PERFORATIONS

A. The leachate collection pipes inside the lined area, as shown on the Drawings, shall be perforated. The perforations shall be drilled into the pipe at the factory after manufacturing, as shown on the Drawings. The perforated pipe shall have two rows of holes 1/2-in in diameter on 6-in centers, with allowable tolerances 1/16-in on the diameter plus 1/4-in on the spacing and the rows shall be parallel to the axis of the pipe and 120 degrees (plus or minus 5 degrees) apart.

B. The perforation shall be covered with tape compatible to the pipe material upon delivery to prevent soil material from entering the pipe prior to installation.

PART 3 EXECUTION

3.01 INSTALLATION

A. Polyvinyl chloride pipe shall be installed in accordance with the instruction of the manufacturer, as shown on the Drawings and as specified herein.

B. Pipe shall be laid to lines and grade shown on the Drawings with bedding and backfill as shown on the Drawings. The tape covering the perforations shall be removed during installation. The pipe shall be installed such that perforations face the bottom of trench.

C. When laying is not in progress, including lunchtime, the open ends of the pipe shall be closed by fabricated plugs, or by other approved means. All plugs shall be OD fitting type plugs. No plugs will be allowed that require insertion of the plug into pipe.

D. Pipe shall be stored on clean level ground to prevent undue scratching or gouging. The handling of the pipe shall be in such a manner that the pipe is not damaged by dragging it over sharp and cutting objects. The maximum allowable depth of cuts, scratches, or gouges on the exterior of

the pipe is 10 percent of wall thickness. The interior pipe surface shall be free of cuts, gouges, or scratches.

E. Sections of pipe with cuts, scratches, or gouges deeper than allowed shall not be used.

F. The pipe shall be jointed as specified in Paragraph 2.02A above.

G. Mechanical connections of the PVC pipe to auxiliary equipment such as valves, pumps, and tanks shall be through flanged connections. Flange connections shall be provided with a full face neoprene gasket.

3.02 CLEANING

A. At the conclusion of the work, thoroughly clean all of the new pipelines to remove all dirt, stones, pieces of wood, or other material which may have entered during the construction period. Debris cleaned from the lines shall be removed from the job site. If, after this cleaning, any obstructions remain, they shall be removed.

END OF SECTION

SECTION 02623

CORRUGATED HIGH DENSITY POLYETHYLENE (HDPE) PIPE, AND FLAT PERFORATED PIPE AND FITTINGS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required to install the solid and perforated corrugated HDPE pipes and risers with their appurtenances, and flat perforated pipe as shown on the Drawings and as specified herein. Solid corrugated HDPE pipe shall be used for the outlet pipes in the stormwater basins and fore bays and for riser outlets in the stormwater basins as shown on the Drawings. Perforated corrugated HDPE pipe and appurtenances shall be used for the drainage pipe installed in drainage swales.

1.02 RELATED WORK

A. Site preparation is included in Section 02100.

B. Earthwork is included in Section 02200.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300, shop drawings showing details of pipe, fittings, joints, and construction methods.

1.04 REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials (AASHTO)

1. AASHTO M-294 - Standard Specification for Corrugated Polyethylene Pipe (12 to 36-in)

B. American Society for Testing and Materials (ASTM)

1. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity Flow Application.

2. ASTM F667 - Standard Specification for Large-Diameter Corrugated Polyethylene Tubing and Fittings

C. Where reference is made to one of the above standards the revision in effect at the time of bid opening shall apply.

1.05 QUALIFICATIONS

A. The polyethylene pipe shall be furnished by a manufacturer who is fully experienced, reputable, and qualified in the manufacture of the polyethylene pipe. The pipe shall be designed, constructed, and installed in accordance with the best practices and methods and shall comply with this Section.

PART 2 PRODUCTS

2.01 CORRUGATED HDPE PIPE AND FLARED END SECTIONS

A. Corrugated HDPE pipe shall have an annular corrugated exterior, smooth inner wall and built-in bell joints.

B. Corrugated pipe, flared end sections, appurtenances, and all couplings shall be high density polyethylene of the size and type as shown on the Drawings, all manufactured by the same company and shall meet or exceed the following specifications: AASHTO M-294; ASTM F667 and ASTM D2321.

C. Backfilling over the pipe shall be to the pipe manufacturer's specifications. Cover shall be compacted to at least 92 percent of its maximum dry density as determined by ASTM D1557, Method D.

D. Split ring couplings or equal shall be utilized, no spring-on couplings will be allowed. One-half inch wide self-adhesive neoprene foam strips shall be applied on each inner rib of the coupling prior to installation on pipes to minimize any water leakage out of the joints.

E. Split ring couplings shall be connected with a minimum of six-gauge aluminum ties.

F. The stormwater basin risers shall be a perforated corrugated HDPE tee as shown on the Drawings. The branch of the tee will be the discharge pipe exiting the basin and the run of the tee will be the vertical riser.

2.02 FLAT PIPE OR EQUIVALENT

A. Oblong corrugated perforated pipe, flared end sections, elbows, wyes, end section outlets, side section outlets, end caps, in-line couplings, and appurtenances shall be flat pipe (or equivalent) of the size and type as shown on the Drawings, manufactured all by the same company and shall meet or exceed the following specifications; ASTM D412, D618, D751, D1693, D2122, D2412, D2444, D3350, D4491, D4533, D4632, D4716, D4751, D6088, and F412.

B. Split ring couplings, compliant with manufacturer's flat pipe split ring couplings, shall be utilized, with no spring-on couplings being allowed.

C. Couplings shall be corrugated to match the corrugations of the oblong pipe and shall provide sufficient longitudinal strength to assure alignment and prevent separation at the joints.

D. Fittings shall not reduce the inside open flow area of the oblong pipe.

E. Perforations shall be cleanly cut and uniformly spaced along both sides of the oblong pipe unless specified by the Engineer. The perforation specifications are as follow:

Slot Length (Max.)	-	1.125-in (29mm)
Slot Width (Max)	-	0.150-in (4mm)
Water Inlet Area (Min)	-	15.0 sq. in/ft.

2.02 COUPLING FOR CORRUGATED HDPE PIPE

A. Flexible sleeve type couplings to connect different pipe types shall be of corrosion resistant rubber or PVC with Series 300 stainless steel clamp bands. Flexible sleeve type couplings shall be as manufactured by Fernco, Mission Rubber Company, Inc.; Calder, or equal. All stainless steel bands shall be coated with bitumastic.

PART 3 EXECUTION

3.01 INSTALLATION OF HDPE DRAINS AND FLARED END SECTION

A. All pipe shall be examined before laying and no piece shall be installed which is found to be defective.

B. If any defective pipe is discovered after it has been installed, it shall be removed and replaced with a sound pipe in a satisfactory manner at no additional cost to the Owner. All pipe and fittings shall be thoroughly cleaned before installation, shall be kept clean until used in the work and when laid, shall conform to the lines and grades required. HDPE pipe, flared end sections, and fittings shall be installed in accordance with requirements of the manufacturer, as specified herein or as shown on the Drawings.

C. As soon as the excavation is complete to normal grade of the bottom of the trench, screened gravel bedding (or sand in HDPE geomembrane cap areas) shall be placed, compacted, and graded to provide firm, uniform, and continuous support for the pipe. The pipe shall be laid accurately to the lines and grades shown on the Drawings. Blocking under the pipe will not be permitted. Bedding shall be placed evenly on each side of the pipe to mid-diameter and hand tools shall be used to force the bedding where needed to give firm continuous support for the pipe. Screened gravel shall then be placed to 12-in above the top of the pipe. The initial 3-ft of backfill above the bedding shall be placed in 1-ft layers and carefully compacted. Generally the compaction shall be done evenly on each side of the pipe and compaction equipment shall not be operated directly over the pipe until sufficient backfill has been placed to ensure that such compaction equipment will not have a damaging effect on the pipe. Equipment used in compacting the initial 3-ft of backfill shall be approved by the pipe manufacturer's representative prior to use.

D. All piping shall be sound and clean before installation. When installation is not in progress, including lunchtime, the open ends of the pipe shall be closed by watertight plug or other approved means. Good alignment shall be preserved during installation. The deflection at joints shall not exceed that recommended by manufacturer.

E. Any pipe having defective joint surfaces shall be rejected, marked as such and immediately removed from the job site.

F. Before any joint is made, the pipe shall be checked to assure that a close joint with the next adjoining pipe has been maintained and that the inverts are matched and conform to the required grade. The pipe shall not be driven down to grade by striking it.

G. Precautions shall be taken to prevent flotation of the pipe in the trench.

H. When moveable trench bracing such as trench boxes, moveable sheeting, shoring or plates are used to support the sides of the trench, care shall be taken in placing and moving the boxes or supporting bracing to prevent movement of the pipe, or disturbance of the pipe bedding and the backfill. Trench boxes, moveable sheeting, shoring, or plates shall not be allowed to extend below top of the pipe. If trench boxes, moveable sheeting, shoring, or plates have been installed

below the top of the pipe, they shall be moved slowly taking care not to disturb pipe, bedding, or backfill. As trench boxes, moveable sheeting, shoring, or plates are moved, pipe bedding shall be placed to fill any voids created and the backfill shall be recompacted to provide uniform side support for the pipe.

3.02 INSTALLATION OF FLAT DRAINAGE PIPE

A. Contractor's engineer shall locate on the grid system the exact location of the pipe slope drains. When flat pipe is to be installed above the HDPE membrane, no pipe shall be installed until the HDPE membrane within 10 feel of either side of the pipe has been approved by the Engineer.

B. Pipe shall be bedded directly on the HDPE membrane, except where indicated on the Drawings.

C. Bedding material will be as indicated on the Drawings.

D. All pipe shall be examined before laying and no piece shall be installed which is found to be defective.

E. Pipe slope drain placement shall commence at the outlet and proceed by section "uphill" unless otherwise directed by the Engineer.

F. The oblong corrugated pipe shall pass all ASTM specifications mentioned in section 2.02 A of this document and as specified in the manufacturer's specifications.

G. Flat drainage pipe shall transition to an end outlet fitting in accordance with the manufacturer's recommendations prior to discharge to mortared riprap downchute or riprap apron in vegetated swale as shown on the drawings.

H. A screen shall be installed at all inlet and outlet sections to prevent litter and animals from entering the pipe, unless other wise directed by the engineer. The screen shall be installed in conformance with manufacturer's recommendations.

I. All ends shall be cut squarely and cleanly so as not to adversely affect joining.

3.03 INSTALLATION OF CORRUGATED PIPE COUPLINGS

A. Existing pipe shall be excavated with care so no damage to the pipe or existing fittings is caused. Hand digging around the existing pipe may be required to provide a clear opening for repairing or removing and reinstalling new pipe as specified herein.

B. All couplings shall be examined before installation and none shall be installed which are found to be defective.

C. Installation of all couplings shall be in accordance with manufacturer's instructions and as specified herein.

D. Any damage to existing pipe or fittings other than pipe or fittings specifically intended to be removed, replaced, or abandoned as part of this Contract shall be repaired by the Contractor as directed by the Engineer. If the Contractor damages existing pipe or fittings through error or for his own convenience, he will be directed by the Engineer to repair all damages, in which case the repair work shall be performed at his own expense.

E. Flexible sleeve type couplings and donut type couplings shall be installed for connecting new PVC, RC or DI pipe and fittings to existing pipe or service connections made of any pipe material.

F. Flexible sleeve type couplings shall be installed over smooth spigot or cut ends of pipe. If cutting pipe is required, the cutting shall be done by machine or tool specifically intended for the purpose of cutting the type of pipe being worked on. All cutting of pipe shall be at right angles to the axis of the pipe and shall be performed so as to leave a smooth cut.

3.04 CLEANING

A. At the conclusion of the work, the Contractor shall thoroughly clean all of the new pipe lines by flushing with water or other means to remove all dirt, stones, pieces of wood or other material which may have entered during the construction period. Debris cleaned from the lines shall be removed from the lowest discharge point. If, after this cleaning, obstructions remain, they shall be removed. After the pipe lines are cleaned and if the groundwater level is above the pipe, or following a heavy rain, the Engineer will examine the pipe for leaks. If defective pipes or joints are discovered at this time, they shall be repaired by the Contractor.

END OF SECTION

SECTION 02624

HIGH DENSITY POLYETHYLENE (HDPE) PIPE

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required to install the high density polyethylene landfill gas collection pipe, fittings, and appurtenances as shown on the Drawings and as specified herein.

1.02 RELATED WORK

A. Testing gas headers is included in Section 01445

B. Earthwork is included in Section 02200.

1.03 SUBMITTALS

A. Submit to the Engineer, in accordance with Section 01300, the following:

1. List of materials to be furnished, the names of the suppliers and the date of delivery of materials to the site.

2. The origin of the resin to be used in the manufacturing of the pipe including the suppliers name and production plant, as well as brand name and number.

3. Documentation from the resin's manufacturer showing results of the following tests for resin identification:

a. Melt Flow Index ASTM D1238

b. Density ASTM D1505

4. Manufacturer quality control manual describing implementation of quality control procedures during pipe manufacturing process.

5. Pipe manufacturer's certification of compliance with this Section.

6. Complete, detailed shop drawings of all polyethylene pipe, including the location of all fittings, joints, and connections to structures.

7. Manufacturer's recommendations for handling, storing and installing pipe and fittings.

8. For each shipment of pipe a manufacturer's certification that the pipe was manufactured from the same resin identified in Paragraph 1.03A1 above.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM D1248 - Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable.

3. ASTM D1603 - Standard Test Method for Carbon Black in Olefin Plastics.

4. ASTM D2239 - Standard Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter.

5. ASTM D3350 - Standard Specification for Polyethylene Plastic Pipe and Fittings Materials.

7. ASTM F714 - Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

A. The polyethylene pipe shall be furnished by manufacturers who are fully experienced and qualified in the manufacture of the polyethylene pipe to be furnished. The pipe shall be designed constructed and installed in accordance with the best practices and methods and shall comply with these Specifications.

1.06 SYSTEM DESCRIPTION

A. The high density polyethylene pipe specified herein shall be suitable for landfill gas and condensate. The maximum temperature of the liquids will be 120 degrees F.

PART 2 PRODUCTS

2.01 MATERIALS

A. The pipe shall be made from High Density Polyethylene (HDPE) resin compound qualified as Type III, Category 5, Class C by ASTM D1248 with a minimum density of 0.955.

B. The polyethylene compound shall be suitably protected against degradation by ultraviolet light as required by ASTM D1603.

C. If rework compounds are required, only those generated in the manufacturer's own plant from resin compounds of the same class and type from the same raw material supplier shall be used.

D. Compliance with the above requirements must be certified by the pipe supplier.

2.02 DESIGN

A. The outside diameter shall conform to ASTM D2239 for outside diameter.

B. In no case shall the wall thickness of the pipe be less than 0.335-inch.

C. The polyethylene pipe including the polyethylene appurtenances at joints shall be Series 100 and shall be Driscopipe 1000 as manufactured by Phillips Products Co. Inc., Williamstown, KY or PolyPipe as manufactured by PolyPipe Industries, Gainesville, TX.

2.03 JOINTING METHODS

A. Lengths of pipe shall be assembled into suitable installation lengths by the butt-fusion process. All pipe so joined shall be made from the same class and type of raw material made by the same raw material supplier.

B. Installation lengths shall be joined by the use of stub ends. All stub ends for attachment to the polyethylene pipe shall be made from the same type and grade of polyethylene, from the same raw material supplier as the pipe and shall be butt-fused to the pipe ends.

C. The polyethylene stub ends at joints shall be backed up by epoxy coated steel flanges conforming to ANSI B16.1 and shaped as necessary to suit the outside dimensions of the pipe. The stub ends shall be connected with corrosion resisting bolts and nuts of Type 316 stainless steel as specified in ASTM A 726 and ASTM A307. Flat gaskets of 1/8-inch black reinforced rubber conforming to ANSI B16.21 shall be installed between the opposing ends of the stub ends.

D. In no case shall threaded male or female adapters of any plastic material be used for adapting polyethylene pipe to the systems, fitting or auxiliary equipment of other materials, or for joining the installation lengths to each other.

E. Termination to pipes, valves, or fitting made of other material shall be by the flanged joints outline in Paragraph C. The pipe adjacent to these joints and to the joints themselves must be rigidly supported for a distance of one pipe diameter beyond the flange.

PART 3 EXECUTION

3.01 HANDLING

A. Care shall be taken during transportation of the pipe such that it will not be cut, kinked, or otherwise damaged.

B. Ropes, fabric or rubber protected slings and straps shall be used when handling pipes. Chain, cables or hooks inserted into the pipe ends shall not be used. Two slings spread apart shall be used for lifting each length of pipe. Pipe or fittings shall not be dropped onto rocky or unprepared ground.

C. Pipes shall be stored on level ground, preferably turf or sand, free of sharp objects which could damage the pipe. Stacking of the pipe shall be limited to a height that will not cause excessive deformation of the bottom layers of pipes under anticipated temperature conditions. Where necessary due to ground conditions the pipe shall be stored on wooden sleepers, spaced suitably and of such width as not to allow deformation of the pipe at the point of contact with the sleeper or between supports.

D. The handling of the joined pipeline shall be in such a manner that the pipe is not damaged by dragging it over sharp and cutting objects. Slings for handling the pipeline shall not be

positioned at butt fused joints. Section of the pipes with deep cuts and gouges (greater than 1/8 of the pipe wall thickness) shall be removed and the ends of the pipeline rejoined.

3.02 LAYING PIPE

A. Butt-fusion of pipes and fittings shall be performed in accordance with the pipe manufacturer's recommendations as to equipment and technique. Depending on site conditions, butt-fusion joining shall be performed in or outside of the excavation.

3.03 CLEANING

A. As pipe laying progress and at the conclusion of the work, thoroughly clean all of the new pipe lines to remove all dirt, stones, pieces of wood or other material which may have entered during the construction period. Debris cleaned from the lines shall be removed from the job site. If, after this cleaning, any obstructions remain, they shall be removed.

END OF SECTION

SECTION 02647

LANDFILL GAS VENTS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and install 35 landfill gas vents complete, as shown on the Drawings and as specified herein.

1. Drilling equipment and tools shall be steam cleaned prior to being mobilized onto the site and before leaving the site.

2. Meet all health and safety requirements prior to the beginning work and for the duration of the project.

B. The vents shall be installed at the approximate locations shown on the Drawings. Exact vent locations shall be field verified in the presence of the Engineer.

C. These Specifications are intended to give a general description of what is required, but do not cover all variations that may occur during vent construction. The Specifications are intended to cover the successful completion of the vents as herein specified, whether every detail is specifically mentioned or not.

1.02 RELATED WORK

A. Granular materials are included in Section 02230.

B. Polyvinylchloride (PVC) pipe is included in Section 02622.

C. High Density Polyethylene (HDPE) pipe is included in Section 02624.

D. Landfill Gas Valves and Appurtenances are included in Section 02641.

1.03 SUBMITTALS

A. Within 30 days following the Effective Date of the Agreement, submit the following information in accordance with Section 01300:

1. A complete list of construction material and supplies as specified herein, including the name of the manufacturer, for the items listed below.

a. Non-perforated pipe

b. Perforated pipe

c. Caps, collars, and tees

d. Stone

e. Bentonite

2. The source and location of potable water supply, written authorization of the suppliers, method of transporting and containing the potable water, if necessary.

3. Material samples of the washed gravel.

4. Health and Safety Plan.

B. During all gas vent drilling, a daily detailed driller's report shall be maintained and submitted as requested by the Engineer including, but not necessarily limited to the presence of groundwater and/or leachate. The report shall give a complete description of all subsurface material encountered, number of feet drilled, number of hours on the job, shutdown due to breakdown, feet of screen and casing set and other pertinent data requested by the Engineer.

C. During drilling of each borehole, maintain at the vent site a complete log setting forth the following:

1. The reference point of all depth measurements.

2. The depth of which each change of material occurs.

3. The identification of the material.

4. The depth of interval of the material.

5. The results of work space monitoring requiring by the Health and Safety Plan.

6. Other pertinent data requested by the Engineer.

D. Upon completion of each gas vent, submit to the Engineer a report to include the following:

1. The name and location of the job.

2. The date of the borehole drilling (start and finish).

3. Gas vent number and coordinates, if known.

4. Surface elevation.

5. Sampling numbers and depths and a description of refuse encountered while drilling.

6. Thickness of similar strata and apparent changes with depth.

7. The depth of location of any lost drilling materials, or tools.

8. The depth, diameter, and description of the gas vent casing and screen.

9. The total depth of the completed gas vent.

10. The nominal hole diameter of the borehole.

11. Amount and size description of washed gravel and bentonite used.

12. The amount of grout (number of bags) used.

13. Other pertinent data requested by the Engineer.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM D2513 - Standard Specification for Thermoplastic Gas Pressure Pipe, Tubing, and Fittings.

2. ASTM D3350 - Standard Specification for Polyethylene Plastic Pipe and Fittings Materials.

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 SITE DESCRIPTION

A. The locations of the gas vents are shown on the Drawings. The gas vents shall be installed in the landfill which may contain hazardous or toxic vapors. Possible hazardous vapors that could be released during trenching and drilling operations include, but are not limited to the following: methane, carbon dioxide, carbon monoxide, hydrogen sulfide, polyvinyl chloride, toluene, and benzene.

B. The landfill may be undergoing continuous settling and compaction due to the various subsurface waste conditions typical of a municipal solid waste landfill.

C. The Contractor shall be responsible for providing electrical generating equipment, if needed.

1.06 DELIVERY, STORAGE, AND HANDLING

A. All parts and materials shall be properly protected so that no damage, deterioration, or contamination shall occur from time of shipment until installation is completed.

B. If in the opinion of the Engineer, parts and materials are damaged, deteriorated, or contaminated before acceptance of the gas vent, the material and/or the gas vent will be rejected. Replace the labor, parts, and materials at no additional cost to the Owner.

C. Materials shall be stored to ensure preservation of their quality and fitness for work. When deemed necessary, they shall be placed on wooden platforms or other hard clean surfaces and not on the ground. Stored materials shall be located so as to facilitate prompt inspection.

1.07 PROJECT/SITE REQUIREMENTS

A. Typical subsurface conditions to be encountered at the landfill may include sand, sludge, compost, municipal refuse, and obstructions such as large buried items.

B. The Contractor shall be aware that unfavorable subsurface geologic conditions may exist at the site selected for the gas vents such as loss of circulation and collapse of the formation. If in the opinion of the Contractor the encountered subsurface conditions are unfavorable for the

installation of an individual gas vent due to composition of the refuse, promptly notify the Engineer verbally and in writing, of such conditions.

C. The information concerning the subsurface conditions and problems of which the Contractor is advised is for the sole purpose of assisting in the preparation of his/her bid. The Owner, Engineer, and their consultants do not guarantee the accuracy and the conditions and concerns stated above. These conditions and concerns may not be indicative of the conditions at the site.

D. In the event subsurface conditions are found to be substantially different from what has been indicated, promptly and before such conditions are disturbed, notify the Engineer verbally and in writing of such conditions.

E. Take necessary precautions to prevent damage to any above- or below-ground existing structures. Notify the Engineer of any damaged underground structures and make repairs or replacements before backfilling.

F. During the progress of construction, it is expected that minor relocations of the work will be necessary. Such relocations shall be made only by direction of the Engineer. If obstructions are encountered during drilling, notify the Engineer verbally and in writing before continuing with the construction in order that the Engineer may make such field revisions as are necessary. If the Contractor shall fail to so notify the Engineer when an obstruction is encountered and shall proceed with the construction despite this interference, he/she shall do so at his/her own risk. The Contractor shall receive no payment for any footage drilled in an abandoned borehole where relocation has not been directed by the Engineer.

1.08 PERMITS

A. Obtain any Federal, State, or local permits required for constructing the gas vents, discharging material from the site, or clearing of the site for work or access.

B. Do not perform any work on the gas vents until these permits are obtained.

C. Furnish separate copies of all permits to the Owner and the Engineer as the permits are received. Copies of all permits shall be furnished to the Engineer ten days prior to drilling.

1.09 QUALIFICATIONS

A. The Contractor responsible for constructing gas vents shall be licensed in the Commonwealth of Massachusetts as a licensed driller, employing only competent workers for the execution of this work and all such work shall be performed under the direct supervision of an experienced driller satisfactory to the Engineer.

B. The driller shall be capable of identifying subsurface conditions and maintaining complete and current logs and daily notes for the gas vent completion reports.

C. The Engineer and Owner may make any other investigations deemed necessary to determine the ability of the Contractor to perform the work and the Contractor shall furnish to the Engineer all such information and data for this purpose as the Engineer may request.

D. Complete the work described in accordance with applicable portions of the requirements of the Federal, State, or local authorities as well as per 29 CFR 1910, OSHA Standards for Hazardous Waste site workers.

E. The driller and the installation crew shall be trained and experienced as required by OSHA for hazardous waste site workers.

F. Furnish a list of all personnel who will be involved in the project and their corresponding qualifications and experience.

1.10 NOTIFICATION

A. Submit to the Engineer in writing, 10 days prior to start of work, the proposed work schedule, including the following:

1. The starting date of the gas vent construction.

2. The dates and order of gas vent drilling.

3. The completion date of gas vent drilling.

4. Any anticipated work interruptions of duration greater than 24 hours with exception of weekends and holidays.

B. The Contractor shall notify the Engineer in writing, prior to start of work, the number of drilling rigs and personnel to be used on the project. Any change in the number of rigs and personnel shall require written notification of the Engineer, 48 hours prior to the change.

C. The Contractor shall notify the Engineer 24 hours prior to the start or restart of any drilling activities.

D. No work shall be performed without completing the notification requirements specified above.

1.11 GAS VENT ACCEPTANCE CRITERIA

A. Each of the new gas vents shall be approved based on the following criteria, in the opinion of the Engineer:

1. The vent is structurally sound in conformance with the Specification.

2. The borehole is drilled plumb and true to line.

B. All caps, pipes, gravel packs, and cap shall be set to the depths shown on the Drawings or as directed by the Engineer.

1.12 HEALTH AND SAFETY PROGRAM

A. The work to be performed at this site involves, but is not necessarily limited to, the following possible conditions and hazards:

1. Typical subsurface conditions at the landfill may include sand, sludge, compost, rock, municipal refuse, and obstructions such as large buried items. Precautions will be necessary to address excavation safety.

2. There is a potential for a health hazard exposure to an explosive atmosphere to occur.

B. Develop and implement a health and safety plan. The plan shall be consistent with the requirements of the following:

1. OSHA Safety and Health Standards 29 CFR 1910 (General Industry), US Department of Labor, Occupational Safety and Health Administration, 1984. Hereafter referred as "29 CFR 1910." Available by calling 513-533-8236.

2. OSHA Safety and Health Standards 29 CFR 1926/1910 (Construction Industry), US Department of Labor, Occupational Safety and Health Administration, 1985. Hereafter referred to as "CFR 1926/1910."

3. Standard Operating Safety Guidelines, US Environmental Response Branch, Hazardous Response Support Division, Office of Emergency and Remedial Response, November 1984. Hereafter referred to as "EPA Guidelines."

C. The plan shall include but not necessarily be limited to, the following components, as appropriate.

1. Characterization and Evaluation

2. Safe Work Practices

3. Engineering Safeguards

4. Medical Surveillance

5. Environmental and Personnel Monitoring

6. Personnel Protective Equipment

7. Training

8. Standard Operating Procedures

9. Control and Decontamination

10. Emergency and Contingency Planning

11. Logs and Reports

12. Hazard Communication Reports

13. Material Handling and Disposal

14. Sanitation

15. Excavation

D. Determination of the appropriate level of worker safety equipment and procedures shall be the responsibility of the Contractor as a result of initial site survey, review of existing data and

continued safety and health monitoring program performed in accordance with the requirements specified herein.

E. The plan shall be approved by signature of a designated representative of the Contracting firm, stating that the plan is in compliance with 29 CFR 1910 and 29 CFR 1926/1910. The signed plan shall be furnished to the Owner and Engineer prior to commencing site work activities as evidence of compliance.

F. Should the Contractor seek relief from, or substitution for, any portion or provision of the plan, such relief or substitution shall be at the sole risk of the Contractor and shall be preceded by notification of the Engineer in writing. The requested modification shall not be implemented until receipt of notification of change is confirmed in writing by the Engineer.

G. Should the Contractor modify any portion or provision of the plan, notify the Engineer in writing of such modifications.

H. Any disregard for the provision of these Health and Safety requirements shall be deemed just and sufficient cause for termination of the Contract without compromise or prejudice to the rights of the Contractor.

1.13 TRAINING

A. The Contractor shall be required to certify that all his/her personnel performing site activity that may require an upgrade to respiratory protection, have received appropriate safety training in accordance with 29 CFR 1910.134 provided by the Contractor. Documentation of such training shall be submitted to the Engineer before any employees will be allowed to work.

B. Instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to the work environment to control or eliminate any hazards or other exposure to illness or injury.

C. All employees required to enter into a confined or enclosed space shall be instructed as to the nature of the hazards involved, the necessary precautions to be taken and in the use of protective and emergency equipment required. Comply with any specific regulations that apply to work in dangerous or potentially dangerous areas.

D. Additionally, the Contractor shall be responsible for and shall guarantee that, personnel not successfully completing the required training are not permitted to perform work that required upgrade to respiratory protection.

1.14 MEDICAL SURVEILLANCE

A. Persons shall not be assigned to tasks requiring the use of respirators unless it has been determined that they are physically able to perform the work and use the equipment. The respirator user's medical status shall be reviewed annually.

1.15 PERSONAL PROTECTIVE EQUIPMENT

A. Furnish all onsite personnel with appropriate personal safety equipment and protective clothing and ensure that all safety equipment and protective clothing is kept clean and well maintained. Protocols formally changing the level of protection shall be described in the health and safety plan. In addition, the following items shall be addressed.

1. All prescription eyeglasses in use on the site shall be safety glasses. Prescription lens inserts shall be provided for full face respirators.

2. Footwear used onsite shall be steel-toed, steel shank safety shoes or boots.

3. A written respiratory protection program addressing site-specific respiratory usage shall be developed and submitted to the Engineer. Programs for respiratory protection shall conform to 29 CFR 1910.134.

4. All onsite personnel shall wear a hard hat when engaging in construction or drilling activities.

5. All personal protective equipment work onsite shall be decontaminated or properly disposed of at the end of the work day.

6. Each respirator shall be individually assigned and not interchanged between workers without cleaning and sanitizing. A procedure for assuring periodic cleaning and maintenance shall be furnished and addressed in the health and safety plan.

1.16 PERSONAL HYGIENE AND DECONTAMINATION

A. A discussion of personnel decontamination protocols to be followed by site workers shall be submitted as part of the health and safety plan. In addition, the following conditions and procedures shall be followed:

1. Smoking and chewing shall be prohibited except in a designated Contractor provided smoking area.

2. Eating and drinking shall be prohibited except in a designated Contractor provided lunch or break area.

3. All outerwear shall be removed prior to entering lunch area or smoking area and prior to cleansing hands.

4. Contractor personnel shall be required to thoroughly cleanse their hands and other exposed areas before entering the smoking or lunch areas.

1.17 EMERGENCY EQUIPMENT AND FIRST AID REQUIREMENTS

A. Develop contingency plans including evacuation procedures and routes to places of refuge or safe distances from the danger area, for the following potential emergencies: chemical exposure, personal injury, potential or actual fire or explosion, environmental accident (spill or release). In the event of any emergency, without delay: take diligent action to remove or otherwise minimize the cause of the emergency; alert the Engineer and Owner whatever measures might be

necessary to prevent any repetition of the conditions or actions leading to, or resulting in, the emergency.

B. Emergency medical care services shall be prearranged at a nearby medical facility with established emergency routes. The staff at the facility shall be advised of the potential medical emergencies that might result.

C. Establish emergency communications with health and emergency services. The name of this facility, name of contact, emergency routes, and emergency communications arrangement shall be provided in the health and safety plan. In addition furnish the following equipment.

1. At least one first aid kit shall be provided and maintained fully stocked at a first aid station which is in proximity to the work.

2. 2A-10 B:C type dry chemical fire extinguisher shall be provided at the site office.

D. Should any unforeseen or safety-related factor, hazard, or condition become evident during the performance of work at this site, it shall be the Contractor's responsibility to bring such to the attention of the Engineer both verbally and in writing as quickly as possible, for resolution. In the interim, take prudent action to establish and maintain safe working conditions and to safeguard employees, the public and the environment in accordance with the Health and Safety Plan.

E. Should the Contractor seek relief from, or substitution for, any portion or provision of the plan, such relief or substitution shall be requested of the Engineer in writing. The requested modification will not be implemented until authorized in writing by the Engineer.

F. Should the Contractor modify any portion or provision of the plan, notify the Engineer in writing of such modifications.

G. Any disregard for the provision of these Health and Safety requirements shall be deemed just and sufficient cause for termination of the Contract without compromise or prejudice to the rights of the Contractor.

PART 2 PRODUCTS

2.01 PIPE CASING

A. PVC Pipe

1. All gas vent casings shall be new, non-perforated, Schedule 80, flush coupled, square threaded, UV-resistant, PVC pipe in accordance with ASTM D1784 and ASTM D1785 and as manufactured by Celanese Piping Systems, Chemical Division; Cabot Company or equal. Casing shall have nominal diameter as shown on the Drawings.

2. Fittings shall be flush coupled, square threaded, UV-resistant as designated in ASTM, D2467 or D2466, as shown on the Drawings and as designated in ASTM D2464 and shall be compatible with the pipe where installed.

3. Pipe shall be furnished perforated, as shown on the Drawings, in the locations shown. Each pipe length shall be marked with the manufacturer's name or trademark, size, material code and pressure class.

2.02 SLOTTED PIPE

A. Gas Vent Screen

1. The slots shall be cut into the pipe at the factory after manufacture. The slotted pipe shall have six rows of .080 slots on 1/4-in centers along the length of the pipe.

2.03 STONE PACK

A. A stone pack shall be used around the perforated and/or slotted pipe for both the vertical vents and the horizontal gas collectors. The stone pack material shall be washed rounded river rock, or washed crushed granite with a minimum diameter of 1-in and a maximum diameter of 1-1/2-in. The stone pack shall be placed around and below the pipe and will vary in length as dependent on each gas vent's completion. The material should be free of roots, trash, and other deleterious material.

2.04 FILL MATERIAL

A. The fill material shall consist of common fill as specified in Section 02230.

2.05 SAND/BENTONITE MIXTURE

A. Bentonite shall be granular bentonite as manufactured by Federal Bentonite; Baroid Benseal or equal. Bentonite pellets shall not be used as a substitute material. The sand shall be natural, classified as non-contaminated, free of roots, trash and other deleterious material and shall have passed through a No.16 sieve.

B. The sand/bentonite mixture shall be a blend of one part sand to one part granular bentonite, mixed dry and hydrated immediately prior to placement in the annular space. The slump range for sand/bentonite mixture shall be 1-2-in. For each sand/bentonite mixture batch mixed, a slump test shall be performed.

2.06 CAPS

A. The bottom of each gas vent casing shall be fitted with a cap as shown on the Drawings. A 1-in diameter hole shall be drilled through the center of the cap and the cap shall be cemented to the pipe.

PART 3 EXECUTION

3.01 VENT PIPE INSTALLATION

A. The 6-in diameter vent pipe shall be secured approximately 6-in above the bottom of the borehole to allow the stone pack to form beneath the perforations as shown on the Drawings. The perforations shall extend to within 1-ft of the bottom of the vent.

B. Fittings shall be flush coupled and square threaded. The use of cement or glue shall not be permitted.

C. Every effort shall be made on the part of the Contractor to assure pipe plumbness and centralization. The Contractor shall use spacers at the perforated section of the vent to assure the

pipe is maintained within the center of the borehole. The Engineer shall approve the spacer design prior to its use.

D. The installation of pipe shall be strictly in accordance with the manufacturer's technical data and printed instructions.

3.02 BOREHOLE DRILLING

A. A 36 in diameter borehole shall be drilled at each site for a landfill gas extraction vent to a depth as shown on the Drawings.

B. Drill the boreholes for the landfill gas vents using an open bucket auger method. Material removed from this landfill as a result of borehole drilling shall be disposed at the landfill as directed by Engineer.

3.03 STONE PACK, COMMON FILL, AND SAND/BENTONITE INSTALLATION

A. All gravel pack installation shall be performed in the presence of the Engineer. The stone pack shall be installed in the annular space by a method approved by the Engineer that will avoid bridging. The stone pack shall be installed from the base of the borehole to 1-ft above the perforated portion of the casing.

B. The sand and bentonite mixture shall be installed on top of the common fill, as shown on the Drawing, in the presence of the Engineer. The installation shall be by a method approved by the Engineer. The sand/bentonite mixture shall be placed from the top of the common fill to existing grade with the total depth of 2 feet. The sand and bentonite mixture shall be permitted to dry for at least one hour after installation.

C. All installation of stone pack, fill material, and sand/bentonite shall be performed in the presence of the Engineer.

3.04 GAS VENT ABANDONMENT

A. If the Contractor fails to meet the Gas Vent Acceptance Criteria as stated above, or abandons the gas vent because of loss of tools, casing collapse, or other causes related to vent construction operations, Contractor shall abandon the gas vent. Under these conditions, the Contractor shall receive no payment for time, materials, or work for abandonment and shall receive no compensation for the abandoned gas vent and shall replace the abandoned gas vent at the unit prices bid on Bid Form.

B. Notify the Engineer immediately if any obstruction is encountered during drilling for a gas vent. If directed by the Engineer to abandon a borehole, fill the borehole with common fill, or another gravel approved by the Engineer to a depth which is within 10 ft of the top of the landfill at the site. Fill in remaining upper borehole internal with a sand/bentonite mixture approved by the Engineer.

C. If borehole abandonment is directed by the Engineer, the Contractor shall be paid for footage drilled at the abandoned borehole.

3.05 PROTECTION AND SITE CLEAN-UP

A. At all times during the progress of the site work, use all reasonable precautions to prevent either tampering with the landfill gas vents or the entrance of foreign material.

B. All landfill gas vents shall be protected by the provision of temporary supports or other means of protection approved by the Engineer. The Contractor shall replace any landfill vent that is damaged by construction operations at the Contractor's expense.

C. Immediately upon completion of site work, remove all of the equipment, materials and supplies from the site of the work, remove all surplus materials and debris, fill in all holes or excavations and restore any disturbed areas to their original condition. Properly dispose of the refuse and material removed from the borehole.

END OF SECTION

SECTION 02670

MONITORING WELLS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and other facilities and incidentals required to construct / replace monitoring wells as shown on the Drawings and as specified herein.

B. The work also includes the furnishing of all labor, materials, equipment and all other facilities and incidentals necessary and install, develop and test the well.

C. In general, the overall well construction procedures shall be as follows:

1. Equipment cleanup.

2. Drilling, sampling, and logging the borehole.

3. Setting and sealing the well casing and screen.

4. Developing and completing the well.

5. Site cleanup.

1.02 SUBMITTALS

A. Submit, in accordance with Section 01300, copies of all materials required to establish compliance with the Section.

B. During drilling of the well, maintain at the well site a complete log setting forth the following:

1. The reference point for all depth measurements.

2. The depth at which each change of formation occurs.

3. The identification of the material of which each stratum is composed.

4. The depth interval from which formation samples were taken.

5. The depth at which hole diameters (bit sizes) change.

6. Other pertinent data requested by the Engineer.

C. During drilling of the well, a daily detailed driller's report shall be maintained and submitted as requested by the Engineer. The report shall give a complete description of all formations encountered, number of feet drilled, number of hours on the job, shutdown due to breakdown, feet of casing set and other pertinent data requested by the Engineer.

D. During drilling of the well, formation samples shall be collected and preserved immediately after retrieval in a manner approved by the Engineer. Samples shall be clearly and indelibly labeled with the following information:

1. Location of the well.

2. Name or number of the well.

3. Depth interval represented by the sample.

4. Date taken.

E. Upon completion of the well, submit to the Engineer a report to include the following:

1. The total depth of the completed well.

2. The depth of location of any lost drilling fluid, drilling materials or tools.

3. The depth of any steel surface casing.

4. The nominal hole diameter of the well bore above and below the casing.

5. The number of bags used for the seals.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

2. ASTM D1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.

3. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series.)

B. American Petroleum Institute (API)

1. API 13A - Specification for Drilling-Fluid Materials.

C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

A. All work shall be performed under the direct supervision of an experienced well driller satisfactory to the Engineer.

B. The well driller shall be capable of identifying geologic formation, maintaining complete and current well logs and daily notes for the well completion report and developing and testing the well.

C. The Engineer may make any other investigations deemed necessary to determine the ability of the Contractor to perform the work and furnish to the Engineer all such information and data for this purpose as the Engineer may request.

D. Furnish satisfactory evidence upon request that all materials to be furnished in performing the work are new and all equipment to be used is in good working order.

1.06 SYSTEM DESCRIPTION

A. The approximate locations of the wells are shown on the Drawings. Be responsible for construction of any access that is required in order to move equipment on the well site.

1.07 DELIVERY, STORAGE, AND HANDLING

A. All equipment, parts, and materials shall be properly protected so that no damage or deterioration will occur during a prolonged delay from time of shipment until installation is completed and the units and equipment are ready for operation.

B. All equipment, parts, and materials shall be properly protected against damage during a prolonged period at the site. Any equipment, parts, and materials damaged, or deemed unacceptable by the Engineer shall be removed from the site and replaced with new like equipment, parts, at no additional cost to the Owner.

1.08 CLEANUP

A. During the course of the work, keep the site of the operations in as clean and neat a condition as is possible. Dispose of all residues resulting from the construction work and at the conclusion of the work, remove and haul away any surplus excavation, broken pavement, lumber, equipment, temporary structures, and any other refuse remaining from the construction operations and shall leave the entire site of the work in a neat and orderly condition.

1.09 WATER FOR CONSTRUCTION PURPOSES

A. In locations where public water supply is available, the use of water without charge for construction purposes may be allowed.

B. The express approval of the Engineer shall be obtained before water is used. Waste of water shall be sufficient cause for withdrawing the privilege of unrestricted use. Hydrants shall only be operated under the supervision of the Owner's personnel.

C. All water used in the drilling operation shall be provided by the Contractor. Transport and storage of all water will be the responsibility of the Contractor. All water used for drilling and cleaning must be potable and as approved by the Engineer.

PART 2 PRODUCTS

2.01 MATERIALS

A. Polyvinyl chloride (PVC) pipe shall be Schedule 80, PVC 1120, SDR 21 conforming to ASTM D2241. PVC compound shall be Class 12454-B as defined in ASTM D1784. Ends shall be threaded for flush joints.

B. Well screen shall be PVC conforming to the requirements specified above. Schedule 40 PVC slotted wellscreen.

1. 2-in diameter, 0.01-in slots, flush-joint threaded.

C. Bentonite shall be untreated, pellet form, premium grade, sodium montmorillonite conforming to the applicable standards of the API 13A. The bentonite shall have a minimum barrel yield of 91 barrels per ton. Furnish with the Bid the brand of bentonite to be used and a statement from the supplier detailing the properties and composition of the product.

D. Silica sand shall be Ottawa sand, commercially processed silica sand having a gradation range of 0.84 to 0.59 mm and a uniformity coefficient of approximately 1.1.

E. Cement grout

F. Casing pipe shall be Schedule 80 galvanized steel, conforming to ASTM A53, threaded one end, with cap and locking device.

G. Valve boxes shall be cast iron, of heavy pattern, adjustable type provided with a bolted cast iron cover plate. The upper section shall have a bottom flange of sufficient bearing to prevent settling.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install an Ottawa sand filter below the proposed base of the well screen approximately 1-ft thick by pouring sand down the borehole while withdrawing the casing 1-ft. Measure and record the depth of the sand cushion.

B. Assemble and install the observation well pipe and screen. Well tip must be fitted with a threaded or slip-on plug. All pipe sections shall be connected by dry threading of the joints. No glue, solvents, or lubricating compound shall be used to make up the connections. The well pipe assembly must be carefully lowered into the borehole to ensure centering of the well in the hole. After installation, the contracting officer and the drilling contractor will carefully measure the depth to the well tip and record the measurement of the well log.

C. Install a sand filter around the wellscreen to at least 2-ft above the screen. Grain size of the sand shall be appropriate for the slot size of the screen (normally 0.01-in).

D. Withdraw the casing and install a bentonite clay seal approximately 2-ft thick above the sand filter.

E. Insert a tremie pipe and backfill the remainder of the hole with bentonite-cement grout until it flows at the surface.

F. Square cut the well pipe stick-up at 1-ft-10-in above grade.

G. Install a 5-ft section of metal pipe (3 or 4-in diameter) equipped with a threaded, lockable cap, 3-ft into the borehole. Complete the installation by constructing a concrete surface pad around the steel guard pipe. The concrete pad shall be a minimum of 2-ft deep and 1.5-ft in diameter.

H. If well head completions must be flush with the ground surface, a street box or lockable valve gate box may be installed in lieu of the metal pipe. Installation consists of square-cutting the riser pipe 2-in below grade and cement grouting the box in place.

I. Paint the well protective pipe or box to inhibit rust formation and increase visibility. Paint the well number in 1-in block numerals of a contrasting color.

J. Metal protective pipe or valve gate boxes shall be stream cleaned prior to installation to remove cutting oil or other residue. To assist in removal for sampling, the cap threads may be lubricated with a small amount of non-petroleum based material (vegetable oil or Crisco).

K. If well is to be installed above the base of the borehole, care must be taken to ensure any underlying strata are properly sealed to preclude the possibility of cross contamination. Seals can be constructed using either cement bentonite grout or bentonite pellets.

L. Grout backfill above bentonite seal may be omitted under certain stratigraphic conditions. In those cases, hole should be backfilled with native materials with occasional thin bentonite seals. Completed installation must have a vertical permeability less than that of the natural strata encountered.

3.02 RECORDS AND DOCUMENTATION

A. Well installations will be recorded on the drilling log for the hole. Installation details to be recorded include total well depth, screen depth and length, filter and seal depths and thicknesses, wellhead completion type and any other details or measurements deemed necessary by the field engineer. All measurements should be made from ground surface.

END OF SECTION

SECTION 02830

CHAIN LINK FENCES

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and incidentals necessary and install the chain link fence and gates, as shown on the Drawings and as specified herein.

1.02 RELATED WORK

A. Earthwork is included in Section 02200.

B. Concrete is included in Section 03301.

1.03 SUBMITTALS

A. Submit to the Engineer, in accordance with shop drawings showing layout and details of construction and erection of fence, gates, and accessories required.

B. Samples of fence posts, fabric, and appurtenances.

1.04 REFERENCE SPECIFICATIONS

A. Where reference is made to one of the following standards, the revision in effect at the time of the bid opening shall apply. References herein to any technical society, organization, group or body are made in accordance with the following:

1. ASTM American Society for Testing and Materials

a. A53–Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

b. A123-Zinc-Coated (Hot-Dip Galvanized) coatings on Iron and Steel Products

c. A153-Zinc Coating (Hot-Dip) on Iron and Steel Hardware

d. A370-Mechanical testing of Steel Products

e. A392-Zinc Coated Steel Chain Link Fence Fabric

f. A552-Terminology Relating to Chain Link fabric

g. A570-Hot Rolled Sheet and strip, Structural quality

h. A641-Zinc-Coated (Galvanized) Carbon Steel Wire.

i. A817-Metallic-Coated Steel Wire for Chain Link fence Fabric

j. A824-Metallic-Coated Steel Marcelled Tension Wire for Use with Chain Link Fence

k. C387-Packaged, Dry Combined Materials for Mortar and Concrete.

l. F567-Installation of Chain Link Fence

m. F626-Fence Fittings

n. F668-Polyvinyl Chloride (PVC)-coated Steel Chain Link Fence Fabric

o. F900-Industrial and Commercial Swing Gates

p. F934 Standard Colors for Polymer Coated chain Link Fence Materials

q. F1043-Specifications for Strength and Protective Coatings on Metal Industrial Chain Link Fence Framework

r. F1083-Pipe, Steel, Hot-dipped Zinc Coated welded for Fence Structures

PART 2 PRODUCTS

2.01 CHAIN LINK FENCE AND GATES (BLACK PVC)

A. Furnish fence materials and accessories with Class 2b polyvinyl chloride (PVC) coating as defined by ASTM F668 fused and adhered to a primer that is thermally cured onto wire of metallic coated steel, black color, in areas as shown on the Drawings. ***Painted fittings and accessories are not acceptable unless specifically approved, prior to installation by Engineer.***

B. Posts, rails, and braces shall also be hot-dipped galvanized steel prior to PVC coating. Pipe materials shall be Type I round, hot-dipped galvanized with a minimum average zinc (Grade E) coating of 1.8 oz/sq ft meeting ASTM F1083 for standard weight (Schedule 40) galvanized pipe. Dimensions shall conform to the following:

1. Fence Posts and Rails

a. Posts shall be of sufficient length to allow for installation depth of approximately 18-in below finish grade over liner and 48-in below finish grade in all other areas and shall be spaced in the line of fence not further apart than 10-ft on center.

b. All fences shall have a continuous top rail with length not greater than 18-ft and fitted with hot-dipped galvanized steel PVC coated sleeves or couplings for connecting the lengths into a continuous run. Coupling shall not be less than 6-in long with 0.070-in min wall thickness and shall allow for expansion and contraction of the rail.

c. Boulevard socket-type clamps or other approved means shall be provided for attaching the top rail to each gate, corner, pull, and end post.

d. Bottom rails shall be provided between all posts with means for attaching rail to each post. Center rails shall be provided at approximately mid-height of the fabric on corner, end, pull and gate posts where fabric is 6-ft or higher. Each corner, pull and end post shall also have a truss consisting of a rod not less than 5/16-in nominal diameter from the line post back to the gate, corner, pull or end post, with a turnbuckle or other equivalent provision for adjustment.

e. Sizes:

Corner, Pull and Terminal Posts:
6-ft high fence - (2.875 in OD) at 5.79 lb/lf
48-in high fence - (2.375 in OD) at 5.79 lb/lf

Line Posts:
6-ft high fence - (2.375 in OD) at 3.65 lb/lf
48-in high fence - (1.905 in OD) at 3.65 lb/lf

Top, Center and Bottom Rails and Braces:
6-ft high fence** - (1.66 in OD) at 2.27 lb/lf
48-in high fence *** - (1.66 in OD) at 2.27 lb/lf

** no center rail required at line posts, but is required at other posts
*** no center rail required

2. Fence fabric

a. Fence fabric shall be one single continuous unit of specified dimension as shown on the Drawings. Fabric shall be furnished complete with vinyl (PVC) coating color black. Fabric shall be steel chain link conforming to ASTM A392, A817, and F552 and height of fabric shall have a permissible variation of plus or minus one inch.

b. 2-in mesh with zinc coating (Class 2) weight of not less than 2.00 oz/sf of uncoated wire surface hot-dipped galvanized after fabrication and prior to PVC coating.

1) Sizes shall be standard Heavy Industrial Grade 6 gauge (0.192-in) coated steel for all fencing as shown on the Drawings.

c. Polyvinylchloride (PVC) finish: Comply with ASTM F934, with core wire diameter (gauge) measured prior to application of PVC coating.

d. Wire shall be factory coated with a min 0.02-in thick coating of plasticized polyvinyl chloride applied by the fusion method over a thermoset plastic bonding agent. The bond shall exhibit equal or greater strength than the cohesive strength of the vinyl. All cut ends shall be coated with vinyl at the factory.

e. Fabric shall have top and bottom selvage knuckled.

f. Each roll shall be clearly identified as to the type and class of metallic coating, the size of mesh, the coated wire diameter, the class of PVC coating, the height and length of fabric in each roll, and the name of the manufacturer.

3. Fence accessories

a. Tension bars shall be 3/16-in by 3/4-in galvanized steel and not less than 2-in shorter than height of fabric to which they are attached, conforming to ASTM A123. Provide one tension bar for each end and gate post and two bars for each corner and pull post.

b. Tension Bands of galvanized steel per ASTM F626 shall be provided for attaching fabric and stretcher bars to all terminal posts at intervals not exceeding 12-in. Bands shall have a minimum thickness after galvanizing of 0.078-in and minimum width of 3/4-in for posts 4-in o.d. or less and 0.108-in thick by 7/8-in for posts larger than 4-in. Attachment bolts shall be 5/16-in by 1-1/4-in galvanized carriage bolts with nuts.

c. Fittings shall be steel conforming to ASTM A370 and galvanized in conformance with ASTM A123.

d. All line posts shall be permanently fitted with a cast malleable iron top loop, constructed to fit securely over the post and encircle the top rail. End posts and corner posts shall be permanently fitted with a cast malleable iron top cap with permanent boulevard type socket fitting to accommodate rail. The base of each post cap shall carry an apron around the outside of the post.

e. All fences shall have top and bottom rails. On 6-ft high fences, middle rails shall be placed on all corner, end, gate, and pull posts. Sleeves shall be installed to allow for expansion and contraction of rails, nuts and bolts, and shall be galvanized steel conforming to ASTM A123.

f. Fence fabric shall be fastened to top, bottom and center rails with 9 gauge galvanized steel tie wires, PVC coated black to match fabric color in accordance with ASTM F668 class 2b. Aluminum wire ties are not acceptable for fence fabric fastenings. Ties shall attach the fabric securely to all line posts at intervals not exceeding 15-in. Tie fasteners shall be attached securely to the top rail at intervals not exceeding 18-in.

g. Tension wire shall be No. 7 gauge conforming to ASTM A824 with zinc-coating Class 2, 1.20 oz/sf.

C. Gates

1. Swing gates shall conform to ASTM F900. Base materials of the gate frame shall be round tubular members, welded at all corners or assembled with corner fittings. Corner fittings shall have adjustable truss rods 5/16-in minimum diameter on panels 5-ft wide or wider. And constructed of the same base metal and finish as the frame. Interior bracing, when needed, shall be the same metal and shape tubular material and finish as the frame, but need not be the same size. Leaves shall have vertical interior bracing at maximum intervals of 8-ft.

2. Frame shall be zinc-coated steel in accordance with ASTM F1043 and F1083 and shall match adjoining fence framework.

3. Gate fabric shall be the same type as used in fence construction and attached securely to the frame with ties at intervals not exceeding 15-in.

4. Size of the gate opening shall be measured from the inside face to inside face of gate posts.

5. Outer members shall not sag in excess of the lesser of 1 percent of the gate leaf width or 2-in.

6. Hinges, latches, stops and keepers shall be hot-dipped galvanized in accordance with ASTM A153 and be PVC coated to match fabric.

7. Hinges shall be pressed steel or malleable iron, sized to suit gate, non-lift-off type and offset to permit 180 degree gate opening. Provide one pair of hinges for each leaf.

8. Latch shall be forked type to permit operation from either side of gate. Provide padlock eye as integral part of latch and padlock. Lock shall be Town of Brookline Standard Department of Public Works Master Lock with 3 keys furnished to the Owner. Lock and key shall match other Town facilities.

9. Keeper shall automatically engage the gate leaf and hold it in the open position until manually released.

D. Concrete: Portland cement, 1-in maximum size aggregate and potable water producing concrete with a 3 in slump and a 28 day compressive strength of at least 3000 psi. Packaged Concrete Mix: Mix dry packaged normal weight concrete conforming to ASTM C387 with clean water to obtain a 2 in to 3 in slump.

E. Grout for Fence Posts

1. Grout shall be "Sikadure 32 HiMod" as manufactured by Sika Corporation, Lyndhurst, NJ or equal. Grout shall be in accordance with the following:

a. Compressive Properties (ASTM D695) at 28 days.

b. Tensile Properties (ASTM D638) at 14 days.

c. Flexural Properties (ASTM D790) at 14 days.

d. Shear Strength (ASTM D732) at 14 days: 5,000 PSI minimum.

e. Total Water Absorption (ASTM D570) at 7 days: 1.0 percent maximum (2 hour boil).

f. Bond Strength (ASTM C882) Hardened Concrete to Hardened Concrete.

1) 2 day (dry cure): 2700 PSI minimum.
2) 14 day (moist cure) 2200 PSI minimum.

g. Deflection Temperature (ASTM D648) at 14 days: 102 degrees F minimum (fiber stress loading = 264 PSI).

h. Pull-out Strength: In 5000 PSI minimum concrete, using Grade 60 steel rebar, embedded 10 bar diameters, in a properly prepared hole having a diameter of the rebar plus 1/4-in maximum. Tensile Stress: 90,000 PSI minimum. (rebar fracture).

i. The epoxy resin adhesive shall be approved by the US Department of Agriculture.

PART 3 EXECUTION

3.01 INSTALLATION

A. Post spacing shall be uniform with maximum spacing of 10-ft in fences erected along straight lines. All posts shall be placed plumb and centered in the concrete foundations.

B. Concrete footings for fence posts shall be 4,000 psi concrete cylinders with a minimum diameter of 24-in and depth of 21-in over liner and in all other areas. Crown top of footings to shed water. Outside edge of top of footing shall be flush with finish grade.

C. A change in direction of the fence line of 20 degrees or more shall be considered corners. Pull posts shall be used at any abrupt change in grade.

D. The top rails of chain link fences shall extend through all line posts in a looped top cap to form a continuous brace from end to end of each stretch of fence, be securely fastened at the end of each run, and have joints made with expansion sleeve couplings not less than 6-in long. Bottom and center rails shall be connected to boulevard type socket fittings.

E. There shall be no loose connections or sloppy fits in the fence framework. The fence framework shall withstand all wind and other forces due to weather.

F. Chain link fence fabric shall be stretched taut and tied to posts and rails. The fence fabric shall be installed on the athletic field or park side of the fence and shall be anchored to the framework so that the fabric remains in tension after pulling force is released. The fence fabric shall be attached to top, bottom and center rails with fabric bands spaced at not more than 12 inch intervals. The fabric shall be securely fastened to all terminal posts with stretcher bars with steel tension bands spaced approximately 12 in apart.

G. All PVC coated surfaces, which are damaged, shall be repaired as approved by the Landscape Architect/Engineer, using an approved PVC patching compound. Remove damaged material back to sound coating by wire brushing and in accordance with SSPC-SP-2 Hand Tool Cleaning. Touch up with three coats of patching compound in accordance with manufacturer's instructions.

H. Contractor shall stake in the field the center line location of all fences for review and approval by Landscape Architect/Engineer.

3.02 SETTING POSTS

A. Center and align posts in holes 4-in above bottom of excavation. Space posts not more than 10-ft on center. Align posts vertically and align tops. Extend center top of concrete footing 6-in below grade and trowel to a crown to shed water.

3.03 TOP RAILS

A. Run top rail on all fences continuously through line post caps with expansion couplings placed maximum 18-ft on center.

3.04 BRACE ASSEMBLIES

A. Install braces at end and gate posts and at both sides of corner and pull posts so posts are plumb when diagonal rod is under proper tension.

3.05 GATES

A. Install gates to meet the requirements of ASTM F567 and according to manufacturer's instructions, plumb, level and secure for full 180 degree opening without interference.

B. Hinges shall be constructed to allow the gate to open and close without binding.

C. Gate posts shall be set in concrete footings 12-in diameter, 48 in deep on liner and in all other areas.

END OF SECTION

SECTION 02833

SWING GATES

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and incidentals necessary to fabricate and install swing gate as shown on the Drawings and as specified herein.

1.02 RELATED WORK

A. Earthwork is included in Section 02200.

B. Concrete is included in Section 03301.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300, shop drawings showing layout and details of construction and erection of swing gate and all accessories required.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM A36 - Standard Specification for Carbon Structural Steel.

2. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

3. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

4. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.

B. American Welding Society (AWS)

1. AWS D1.1 - Structural Welding Code Steel.

C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

PART 2 PRODUCTS

2.01 MATERIAL

A. Steel plate and pipe shall conform to ASTM A36

B. Steel pipe shall be Schedule 40 with 36000 psf minimum yield point.

C. Lock pin bolt for gate lock shall conform to ASTM A307.

D. One extra lock pin bolt shall be supplied with each gate installation or replacement.

E. All fittings, tie bars, anchor staples, etc, shall be in conformance with applicable ASTM standards. All shall be galvanized.

F. Reflective bands shall be commercial grade pressure sensitive reflective sheeting tape 12-in width with alternating bands of black and white as recommended in the "Manual on Uniform Traffic Control Devices".

G. Weld connections shall be continuous 1/4-in or 3/16-in fillet welds along all exposed joints of all steel. Electrodes E60XX or E70XX shield metal arc weld.

H. Concrete shall be air-entrained 3500 psi compression strength in accordance with ASTM Standards.

I. All steel shall be hot-dipped galvanized after fabrication in conformance with ASTM A123 or A153 as applicable.

J. Pivot pin shall be as shown on the Drawings and shall be suitable for the intended use.

K. Provide tie back post for each vehicular control gate arm in locations as shown on the Drawings and as approved by the Engineer.

L. Lock Box shall be 4-in wide x 5-in high x 3-in deep, 1/4-in cast alloy steel box with manufacturer applied black finish, furnished complete with all hardware and continuous weld, permanent attachment onto vehicle control gate in location as shown on the Drawings and as approved by the Engineer and the Owner. Provide a minimum of 3 keys for lock box. Lock Box shall be model SupraSafe 2 by Easton Electronics, Inc. Pequot Way Canton, MA Tel No. 617-828-1955 or equal.

M. Furnish dual locking mechanism with 2 padlocks, for each single leaf swing gate. Two locks shall be keyed alike. Padlocks shall be MasterLock or equal.

PART 3 EXECUTION

3.01 INSTALLATION

A. Welding and qualification of welders shall be in accordance with AWS D1.1.

B. Cement Concrete footing shall be constructed in accordance with ASTM Standards and as detailed.

C. Thoroughly grease all contact moving surfaces with water resisting automotive lithium-based grease.

D. Install all members accurately in alignment and plumb. It is vital that gates be plumb and heights of gates and lock posts match exactly.

E. All exposed nuts including the turn buckle assembly shall be made vandal resistant by peening the ends of the bolt or punch pricking. All peened or pricked bolt ends shall be touched up with zinc-rich cold galvanized paint.

F. After installation of the gates, shop-applied paint shall be touched up with matching enamel.

G. Install reflective sheeting tape as indicated on the Drawings.

H. Restore area excavated and backfilled and/or disturbed by construction of its original condition.

I. All excavation required for the installation of the gates shall be included under the unit price bid for these items of work and shall include the removal of any type of material encountered. All surplus material shall be removed from the site and disposed of as directed by the Engineer.

J. Cement concrete for footings shall completely fill the excavated area and shall conform to the dimensions and details shown on the Drawings. All vertical hinge posts and lock posts shall be completely filled with cement concrete as shown on the Drawings.

K. All extra work and materials for extra size concrete bases shall be included for payment under these four items.

L. All metals incorporated into gate construction shall be galvanized after fabrication in accordance with standards specified herein. All welds shall be thoroughly cleaned after fabrication in preparation for galvanizing.

M. It is essential that all posts be installed perfectly plumb within the concrete footings. The Drawings reflect perfectly level site conditions in order that the operation of the gates may be shown.

N. Determine the actual field elevations and establishing same to ensure proper gate operation. Gates shall not be permanently installed on the hinge post until the entire projecting surface of the hinge post has been thoroughly greased, keys supplied to personnel as required and each lock be installed, closed and left permanently attached.

O. The design of the single leaf gates permits a limited amount of vertical movement at the extreme end of the crossbar. Determine the exact location of the lock housing to ensure a minimum force is expended to operate the gate and that the padlock may be easily attached without pressure being exerted when the gate is in a locking position.

P. After galvanizing, all exposed surfaces of the gate assembly shall be painted with one prime coat and two finish coats of approved paint. Succeeding coats shall not be applied before the previous coat has dried throughout the full thickness of the paint film and in no case shall it be applied in less than 2 days after the preceding coat. No paint shall be applied when the air temperature is below 40 degrees F, or when, in the Engineers' judgment conditions are unsatisfactory for painting. All surfaces shall be cleaned of all foreign materials which may have formed before the following coat of paint is applied. Each coat of paint shall be applied to obtain a minimum wet film thickness of 1.5 mils (0.0015-in). All paint shall be hand brushed and applied by mechanics skilled in their trade. Each coat of paint shall be smoothly and evenly applied, without runs or sags, provide full coverage and be approved by the Engineer before additional paint is applied. The preparation of galvanized surfaces for painting shall conform to the approved paint manufacturer's recommendations. Any surface improperly prepared, painted

with unauthorized paint or otherwise not conforming to this Section shall be completely cleaned of paint and properly repainted without additional cost to the Owner.

Q. At all gate installations where the length of the leaf of the single or double leaf gate installation is greater than the standard 14-ft length, increase the amount of concrete at any part of the gate installation to the satisfaction of the Engineer.

R. Also, any gate installation which must have the deadman and the turnbuckle assembly to it deleted due to field obstruction conditions will have the concrete at its swivel post increased by at least 100 percent or to the satisfaction of the Engineer. The cost for all extra concrete and work shall be included in the bid price for those closure gate installation items.

S. Lock Box shall be installed at the shop where vehicle control gate is fabricated per manufacturer's instructions. Install lock box onto one terminal sleeve post in a manner approved by the Owner.

3.02 CERTIFICATION

A. Furnish certification that all materials meet all provisions of this Section including certification from the galvanizer.

END OF SECTION

SECTION 02901

MISCELLANEOUS WORK AND CLEANUP

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and perform the miscellaneous work not specified in other Sections but obviously necessary for the proper completion of the work as shown on the Drawings.

B. When applicable, perform the work in accordance with other related Sections. When no applicable specification exists, perform the work in accordance with the best modern practice and/or as directed by the Engineer.

C. The work of this Section includes, but is not limited to, the following:

1. Restoring Driveways and Fences

2. Cleaning Up

3. Incidental Work

5. Restoring Private Property, Easements, and Rights-of-Way

1.02 RELATED WORK

A. Safety, Health, and Emergency Response Requirements are included in Section 01102.

B. Temporary Facilities are included in Section 01500.

C. Environmental Protection Procedures including odor and dust controls are included in Section 01110.

D. Earthwork including grading and restoration of disturbed areas is included in Section 02200.

1.03 REMOVAL OF DRAINAGE LINE TO BASIN NO. 2

A. Remove drainage pipes from Southern Mound to existing Basin No. 2, located in 40' wide drainage easement on National Grid Property, once the basin is no longer needed to control stormwater runoff from the Southern Mound

1. Submit schedule for constructing new drainage controls and removing drainage pipes to Basin No. 2 for to engineer for approval

2. Backfill pipe excavation in accordance with Section 02200a and restore easement to its original condtion.

1.04 RESTORING DRIVEWAYS AND FENCES

A. Existing public and private driveways disturbed by the construction shall be replaced. Gravel dirt roads and drives shall be replaced and regraded in kind.

B. Fences in the vicinity of the work shall be protected from damage under this item. If damaged, fences shall be replaced in condition equal to that prior to being damaged and the work shall be satisfactory to the Engineer.

1.05 CLEANING UP

A. Remove all construction material, excess excavation, buildings, equipment, and other debris remaining on the job as a result of construction operations and restore the site of the work to a neat and orderly condition.

1.06 INCIDENTAL WORK

A. Do all incidental work not otherwise specified, but obviously necessary to the proper completion of the work as shown on the Drawings and as specified herein.

1.07 RESTORING THE EASEMENTS AND RIGHTS-OF-WAY

A. Portions of the work are within easements through private property. Be responsible for all damage to private property due to the operations. Protect from injury all walls, fences, cultivated shrubbery and vegetables, fruit trees, pavement, underground facilities, such as water pipe, or other utilities that may be encountered along the easement. If removal and replacement are required, it shall be done in a workmanlike manner so that replacement is equivalent to that which existed prior to construction.

B. Existing lawn and sod surfaces damaged by construction in easements shall be replaced. Cut and replace the lawn and sod, restore the areas with an equivalent depth and quality of loam, seeded and fertilized as specified in Section 02930. These areas shall be maintained and reseeded, if necessary, until all work under this Contract has been completed and accepted. Perform any additional work required to restore easements to their original condition.

END OF SECTION

SECTION 02930

TOPSOIL AND HYDROSEEDING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required, provide erosion control and place topsoil, finish grade, apply lime and fertilizer, hydraulically apply seed and mulch and maintain all seeded areas as shown on the Drawings and as specified herein, including all areas disturbed.

1.02 RELATED WORK

A. Site preparation including clearing, grubbing, and stripping is included in Section 02100.

B. Earthwork including excavation, backfill, fill, and grading including the stockpiling of topsoil is included in Section 02200.

C. Erosion and sedimentation control is included in Section 02270.

D. Wetlands restoration is included in Section 02955.

1.03 SUBMITTALS

A. Samples of all materials shall be submitted for inspection and acceptance upon Engineer's request.

B. Contractor shall be responsible for implementing a Topsoil Sampling Program as specified in 2.04. He/she shall obtain samples of topsoil and submit them for testing to ensure that topsoil conforms to specifications as stated herein. All costs shall be paid for by the Contractor.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM D422 – Standard Test Method for Particle-Size Analysis of Soils.

2. ASTM D4972 – Standard Test Method for pH of Soils.

3. ASTM D2974 – Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils.

B. United States Environmental Protection Agency Test Methods

1. Method 6010 – Metals by ICP

2. Method 8260 – VOCs by GC/MS

C. Massachusetts Department of Environmental Protection (MassDEP) Compendium of Analytical Methods

1. EPH -04-1 – EPH fractions and target analytes by MassDEP method

PART 2 PRODUCTS

2.01 MATERIALS

A. Topsoil

1. Topsoil shall be fertile, friable, and typical of topsoil of the locality and shall be obtained from a well drained site that is free of flooding. It shall be without admixture of subsoil or slag and free of stones, lumps, plants or their roots, sticks, clay, peat and other extraneous matter and shall not be delivered to the site or used while in a frozen or muddy condition.

Sieve Size (Particle Size)	Percentage Finer
1-inch	100
#10	97 to 100
#20	94 to 100
#40	81 to 93
#100	40 to 55
#200	22 to 39
0.002 mm	7 to 18

2. Tests shall be combined hydrometer and wet sieving in compliance with ASTM D422 after destruction of organic matter by ignition at a frequency at 1 test/1,000 cy.

3. The organic matter content shall be between 8.0 and 10.0 percent by weight as determined by loss on ignition of moisture free test samples oven dried to a constant weight at a temperature of 100 degrees, Centigrade. To adjust organic matter content, the topsoil may be amended, by the addition of leaf compost or peat moss. Use of organic amendments is acceptable only if random sampling indicates thorough incorporation. The pH value of finished topsoil shall be between pH 5.5 and pH 7.0. It shall contain no toxic materials. Soluble salts shall not be greater than 75 parts per million. Add soil amendments if required at no additional cost to the Owner.

4. Fertilizer shall be commercial mixed free flowing granules or pelleted fertilizer, 10-20-10 (N-P2O5-K2O) grade for lawn and naturalized areas. Fertilizer shall be delivered to the site in original unopened containers each showing the manufacturer's guaranteed analysis conforming to applicable state fertilizer laws. At least 40 percent of the nitrogen in the fertilizer used shall be in slowly available (organic) form. Fertilizer to be used on landfill only, not in wetland restoration areas.

5. Lime shall be ground limestone containing not less than 85 percent calcium and magnesium carbonates and be ground to such fineness that at least 50 percent shall pass a 100-mesh sieve and at least 90 percent shall pass a 20-mesh sieve.

6. Topsoil shall not contain metals at concentrations above MassDEP Reportable Concentrations for category RCS-1. Topsoil shall not contain VOCs or EPH fractions or target analytes at concentrations above laboratory reporting limits.

2.02 TOPSOIL AMENDMENTS

A. Organic Amendments for Topsoil

1. Compost material may be used as an organic amendment. The compost shall be a stable, humus-like material produced from the aerobic decomposition of organic residues. The residues may include biosolids as well as yard wastes, and agricultural wastes. The compost shall be of a dark brown to black color and be capable of supporting plant growth in conjunction with addition of fertilizers and other amendments. The composted material shall have been stabilized so as not to have an unpleasant odor. An organic amendment not stabilized as specified herein and having an objectionable odor may be rejected at the discretion of the Engineer.

   a. The compost moisture content shall be such that no visible free water or dust is produced when handling it and the carbon/nitrogen ration shall be in the range of 11/1 to 15/1.

   b. Stability must be assessed by a CO_2 evolution test. Protocols for the test are specified in the final Model Procurement Guidelines for Source Separated Compost (CONED 1996) guidelines. For the CO_2 test, the compost respiration shall be no more than 5mg CO_2-C/gBVS day. Compost which does not meet the criteria shall not be used.

   c. Pathogens/Metals/Vector attraction reduction: Compost shall meet: (1) 40 CFR Part 503 Class A criteria and Table 3 metals limits, and; (2) Commonwealth of Massachusetts 310 CMR 32.00 Type I criteria. For Type I compost material, the Contractor shall supply to the CM the DEP approval letter.

   d. The compost shall contain at least 40 percent organic matter (Dry weight) and 100 percent of the material should pass a 3/8-in (or smaller) sieve. Debris such as metal, glass, plastic, wood (other than residual chips), asphalt, or masonry shall not be visible and should not exceed 1 percent dry weight.

2. The pH shall be between 5.5 and 7.5 and soluble salts shall not exceed 160 ppm.

2.03 SEED MIXTURES

A. Seed shall be labeled in accordance with USDA Rules and Regulations under the Federal Seed Act and applicable State seed laws. Seed shall be furnished in sealed bags or containers bearing the date of the last germination, which date shall be within a period of six months prior to commencement of planting operations. Seed shall be from same or previous year's crop; each variety of seed shall have a purity of not less than 85 percent, a percentage of germination not less than 90 percent, shall have a weed content of not more than 1 percent and contain no noxious weeds. The seed mixtures shall consist of seed proportioned by weight as follows:

1. Natural Area Seed Mix (For all slopes and disturbed areas not otherwise indicated)

Botanical Name	Common Name	Percentage
Festuca arudinacea	Clemfine, Rebel II or Tribute Tall Fescue	40 percent
Festuca rubra	Jamestown Chewings Fescue	10 percent
Festuca longifolia	Reliant Hard Fescue	10 percent
Lolium perenne	Palmer II Perennial Ryegrass	15 percent
Lotus corniculatus	Birds Foot Trefoil (Arvenis Variety)	10 percent
Panicum virgatum	Switchgrass	5 percent

Trifolium repens	White Clover	5 percent
Agrostis alba	Redtop (Streaker Variety)	5 percent

2. Wetland Seed Mixture

Seeding and/or planting shall be done in accordance with the Drawings.

B. The seed shall be furnished and delivered premixed in the proportions specified above. A manufacturer's certificate of compliance to the specified mixes shall be submitted by the manufacturers for each seed type. These certificates shall include the guaranteed percentages of purity, weed content, and germination of the seed and also the net weight and date of shipment. No seed may be sown until the certificates have been submitted.

C. Seed shall be delivered in sealed containers bearing the dealer's guaranteed analysis.

D. Mulch shall be a specially processed 100 percent Virgin wood fiber mulch containing no growth or germination-inhibiting factors. Wood fiber mulch shall be "Second Nature Regenerated wood fiber" as manufactured by Central Fiber Corporation, Wellsville, KS or equal. It shall be manufactured in such a manner that after addition and agitation in slurry tanks with water, the fibers in the material become uniformly suspended to form a homogeneous slurry. When sprayed on the ground, the material shall allow absorption and percolation of moisture. Each package of the wood fiber shall be marked by the manufacturer to show the air dry weight content and not contain in excess of 10 percent moisture.

E. Erosion control blanket is specified in Section 02270.

F. Tackifier is specified in Section 02270.

2.04 TOPSOIL SAMPLING PROGRAM

A. At this site, Contractor shall submit at least 1 test sample of new topsoil for every 1000 cubic yards of topsoil delivered for installation. Samples from topsoil delivered shall be taken and submitted to the approved testing laboratory before topsoil has been placed on site. Contractor shall deliver samples to the QAL testing laboratory, have the testing report submitted to the Engineer, and shall pay all costs. Based on the test results, the Contractor shall amend soils to meet the specification and if deemed necessary by the Engineer, amended samples shall be submitted for testing. Contractor shall be responsible for screening topsoil and providing additional amendments and topsoil as required at the Contractor's expense.

B. Reports shall be submitted at least one month before any topsoil is to be placed. Soil samples shall be tested for Nitrogen supplying capacity, Phosphorus, Potassium, Soluble Salts, and pH in accordance with the current "standards" of the Association of Official Agricultural Chemists. Testing frequency is summarized below:

Geotechnical or Environmental Test Name	Methodology	Frequency
Sieve Analysis (to the #200 sieve w/hydrometer)	ASTM D422	1/1,000 cy
pH	ASTM D4972	1/1,000 cy
Organic Content	ASTM D2974	1/1,000 cy
Nitrogen supplying capacity, phosphorus, potassium, soluble salts	-	1/source
RCRA 8 Metals, VOC, EPH	Methods 6010, 8270,	1/source

PART 3 EXECUTION

3.01 APPLICATION

A. Topsoil shall be placed to a minimum compacted depth of 8-inches on all areas receiving the final cap. Topsoil shall be placed to a minimum compacted depth of 4-inches on those disturbed areas of the site not covered with structures, pavement, or existing woodland.

B. For all areas to be seeded:

1. Lime shall be applied at the rate of fifty pounds per 1,000 square feet or as determined by the soil test to bring topsoil pH to a range of 5.5 to 7.0.

2. Fertilizer (10-20-10) with a 50% slow release shall be applied at the rate of twenty pounds per 1,000 square feet or as determined by the soil test.

3. Seed shall be applied at the rate of six pounds per 1,000 square feet.

4. Fiber mulch shall be applied at the rate of forty-five pounds per 1,000 square feet.

5. Erosion Control Blanket shall be installed on all slopes greater than 4H:1V (4 vertical to 1 horizontal), in grassed swales and in the proposed sedimentation basin, per manufacturer's instructions.

C. If possible, limestone shall be applied two to three months before the application of fertilizer. Limestone may not be mixed with fertilizer for application and shall be applied a minimum of two weeks prior to fertilizer application.

D. After the topsoil is placed and before it is raked to true lines and rolled, limestone shall be spread evenly over the topsoil surface and thoroughly incorporated by heavy raking to at least one half the depth of topsoil.

E. The application of fertilizer may be performed hydraulically in one operation with hydroseeding and fiber mulching. Clean all structures and paved areas of unwanted deposits of the hydroseeded mixture.

F. Straw Mulch and Tackifier shall be applied immediately following seeding operations (same day) unless otherwise approved by the Engineer.

3.02 INSTALLATION

A. Previously established grades, as shown on Drawings shall be maintained in a true and even condition.

B. Topsoil shall be placed over approved areas to a depth sufficiently greater than required so that after natural settlement and light rolling, the complete work will conform to the lines, grades and elevations indicated. No topsoil shall be spread in water or while frozen or muddy.

C. After topsoil has been spread, it shall be carefully prepared by scarifying or harrowing and hand raking, if necessary. All stiff clods, lumps, roots, litter, and other foreign material shall be removed from the loamed area and disposed of. The areas shall also be free of smaller stones, in excessive quantities, as determine by the Engineer.

D. Seeding, mulching and conditioning shall only be performed during those periods within the seasons which are normal for such work as determined by the weather and locally accepted practice, as approved by the Engineer. Hydroseed and straw mulch only when wind speeds are less than five (5) miles per hour.

E. Schedules for seeding and fertilizing must be submitted to the Engineer for approval prior to the work. Seeding as specified herein shall be accomplished between the period of April 1 to June 1 or August 15 to October 1. Seeding during the period from October 2 to March 31 shall only be undertaken upon approval of the Engineer. Seeding during the period from June 1 to August 14 shall only be performed if irrigation is provided.

F. Seed shall be applied hydraulically at the rates and percentages indicated. The spraying equipment and mixture shall be so designed that when the mixture is sprayed over an area, the grass seed and mulch shall be equal in quantity to the specified rates. Prior to the start of work, furnish the Engineer with a certified statement as to the number of pounds of materials to be used per 100 gallons of water. This statement shall also specify the number of square feet of seeding that can be covered with the quantity of solution in the hydroseeder. Upon completion of seeding operations, furnish the Engineer with a certified statement on the actual quantity of solution applied.

G. In order to prevent unnecessary erosion of newly topsoiled and graded slopes and unnecessary siltation of drainageways, carry out seeding and mulching no later than two days after unit or portion of the project has been satisfactorily completed. For the purpose of this project a unit is defined as 10,000 square feet. When protection of newly loamed and graded areas is necessary at a time which is outside of the normal seeding season, protect those areas by what ever means necessary as approved by the Engineer and be responsible for prevention of siltation in the areas beyond the limit of work.

H. Erosion control blankets shall be installed on all slopes greater than 4H:1V, in the proposed sedimentation basin and in all drainage swales and ditches as shown on the Drawings and as directed by the Engineer in accordance with manufacturer's instructions. The area to be covered shall be properly prepared, fertilized, and seeded before the blanket is applied. When the blanket is unrolled, the netting shall be on top and the fibers in contact with the soil over the entire area. The blankets shall be applied in the direction of water flow, butted snugly at the ends and side, and stapled. Blankets shall be placed a minimum of three rows (of four foot) wide (total 12-ft width) within the drainage swale/ditch and stapled together in accordance with manufacturer's instructions. The staples shall be made of wire, .091-in in diameter or greater, "U" shaped with legs 6-in in length and a 1-in crown. The staples shall be driven vertically into the ground, spaced approximately two linear yards apart, on each side and one row in the center alternately spaced between each side. Adjoining shall not be overlapped and shall utilize a common row of staples to attach.

I. When newly graded subgrade areas cannot be topsoiled and seeded because of season or weather conditions and will remain exposed for more than 30 days, protect those areas against erosion and washouts by whatever means necessary such as straw applied with a tar tack or by other measures as approved by the Engineer. Prior to application of topsoil, any such materials

applied for erosion control shall be thoroughly incorporated into the subgrade by discing. Fertilizer shall be applied prior to spreading of topsoil.

J. On slopes in addition to straw mulch and tackifier, provide protection against washouts by an approved method. Any washout which occurs shall be regraded and reseeded at the Contractor's expense until a good turf is established.

3.03 FIELD QUALITY CONTROL

A. Topsoil layer thickness after compaction, shall be measured at five (5) locations per acre during construction to confirm that the thickness of the installed materials are in accordance with the Drawings.

B. Any area tested that is below the required depth of 8-inches shall be re-graded with additional topsoil to achieve the required thickness and re-tested to confirm compliance.

3.04 MAINTENANCE AND PROVISIONAL ACCEPTANCE

A. Keep all seeded areas watered and mowed and in good condition, reseeding all seeded areas if and when necessary until a good, healthy, uniform growth is established over the entire area seeded and maintain all seeded areas in an approved condition until provisional acceptance. Mowing shall occur a minimum of two times over the course of 12 months.

B. The Engineer will inspect all work for provisional acceptance at the end of the maintenance period, upon the written request received at least ten days before the anticipated date of inspection. The maintenance period must occur during the growing season between April 1 and October 30 and shall include a minimum of one mowing prior to provisional acceptance as approved by Engineer.

C. A satisfactory turf will be defined as:

1. No bare spots larger than three square feet.

2. No more than ten percent of total area with bare spots larger than one square foot.

3. Not more than fifteen percent of total area with bare spots larger than 6-in square.

D. After the inspection has occurred but prior to provisional acceptance, a soil test by an approved laboratory shall be performed to determine soil fertilization requirements. Additional fertilizer not to exceed 10 lbs per 1000 sq ft of 20-10-10 (with 50% slow release) shall be applied as directed by the Engineer.

E. Furnish full and complete written instructions for maintenance of the seeded areas to the Owner at the time of provisional acceptance.

F. The inspection by the Engineer will determine whether maintenance shall continue. Contractor shall continue maintenance of entire site until all areas of the site meet the minimum requirements specified above.

G. After all necessary corrective work and clean-up has been completed, and maintenance instructions have been received by the Owner, the Engineer will certify in writing the

provisional acceptance of the turf areas. Maintenance of all turf areas shall cease on receipt of provisional acceptance.

3.05 GUARANTEE PERIOD AND FINAL ACCEPTANCE

A. All seeded areas shall be guaranteed for not less than one full year from the time of provisional acceptance.

B. At the end of the guarantee period, inspection will be made by the Engineer upon written request submitted at least ten days before the substantial completion. Seeded areas not demonstrating satisfactory stands as outlined above, as determined by the Engineer, shall be renovated, reseeded and maintained meeting all requirements as specified herein.

C. After all necessary corrective work has been completed, the Engineer shall certify in writing the final acceptance of the seeded areas.

END OF SECTION

SECTION 02955

WETLANDS RESTORATION

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Wetland Restoration is required for wetlands altered by construction activities, and if the Contractor infringes upon wetland areas.

B. Furnish all labor, materials, equipment and incidentals required and install erosion control measures, perform all clearing, stripping of contaminated soils, grading, planting and wetland seeding in the wetland area(s) delineated on the Drawings and as specified herein for the wetlands restoration.

C. Engage the services of a qualified Certified Professional Wetland Scientist (CPWS) to develop a wetlands restoration work plan and schedule and perform work specified herein.

D. Restore all wetland areas which are indicated to be restored or are temporarily altered by construction activities including contaminated soil removal, excavation, and clearing of wetlands during the course of construction to equal or better than that condition which existed previous to construction. If wetland areas cannot be restored as a result of Contractor's activities, provide replication areas as approved by the Engineer. All restoration work shall be as indicated. All additional restoration work resulting from the Contractor's activities shall be at no additional cost to the City.

E. The Work includes:

1. Supply organic rich loam as specified in Paragraph 2.01A herein for wetland restoration area.

2. Excavate planting pits.

3. Furnish and plant trees and shrubs.

4. Prune plant materials as specified.

5. Maintenance.

6. Final cleanup and all other Work required to complete the requirements of this Section.

1.02 RELATED WORK

A. Earthwork, including production of topsoils is included in Section 02200.

B. Sedimentation and erosion control is included in Section 02270.

C. Loaming and Hydroseeding is included in Section 02930.

1.03 SUBMITTALS

A. Copies of all documentation required to establish compliance with the Contract Documents shall be submitted in accordance with the provisions of Section 01300. Submittals shall include at least the following:

1. A work plan shall be submitted to the Haverhill Conservation Commission and Engineer for review and approval before any restoration begins.

2. As-built grading plans for wetland restoration areas shall be submitted to the Engineer for review and approval before planting and seeding of the wetland restoration areas.

3. Submit schedules to Engineer for approval 30 days prior to planting, seeding and fertilizing. Seeding, as specified herein, shall be accomplished between the period of April 15 to June 1 or August 15 to October 1. Planting shall not be done between June 2 and August 14. Provide irrigation for all planting. Hydroseed and straw mulch shall not be applied when weather conditions prevent installation at specified coverages.

4. Prior to ordering of materials, submit names, addresses, and references of all suppliers and sources of materials for review and approval by the Engineer.

5. Documentation showing the certification of the proposed Certified Professional Wetland Scientist (CPWS).

6. Documentation showing that the landscaping contractor performing the work has successfully completed at least two projects of this scope within the last two years and showing that their main business is landscaping.

7. Complete written instructions for maintenance of the materials for use by the City after the maintenance period specified in Paragraph 3.08 furnished in this Section.

1.04 QUALITY ASSURANCE

A. All work shall comply with and be subject to the permits and approvals issued by the U.S. Army Corps of Engineers, the Massachusetts Department of Environmental Protection (MassDEP) and the Haverhill Conservation Commission.

1.05 DEFINITIONS

A. Wetland Restoration occurs where construction activities have altered or will temporarily alter an existing wetland area. This requires restoration of topography, soil structure, and vegetation to pre-construction conditions.

B. Installation Inspection: The CPWS will inspect all Work performed under this Section at the completion of installation, upon the written request of the Contractor received at least 10 days before the anticipated date of inspection. The CPWS will inspect said Work for compliance with the plans and specifications specifically with regard to number of plants, plant sizes, species, and location. Any and all corrective Work identified during the inspection shall be performed at no additional cost to the City.

C. Final Inspection: The CPWS will inspect all Work performed under this section at the completion of 2 complete growing seasons, approximately April 15 to approximately October 15, following Installation Inspection. The Engineer will inspect all areas for compliance with the plans and specifications.

1.06 REFERENCE STANDARDS

A. American Standard for Nursery Stock, ANSI Z60.1.

B. Tree and Shrub Transplanting Manual by the International Society of Arboriculture (ISA).

1.07 WARRANTY

A. For a period of two years from the date of Substantial Completion, the Contractor warrants to the City that the wetland restoration area conforms to these specifications and is free from defects in materials and workmanship. The Contractor shall provide maintenance during the warranty period in accordance with Paragraph 3.08. The Contractor shall inspect the work at the beginning and end of each growing season and shall replace, at no additional cost to the City, any work found to be defective within said warranty period. Such replacement shall include the cost of removal and reinstallation.

PART 2 PRODUCTS

2.01 MATERIALS

A. Organic rich loam for wetland restoration area shall be friable and capable of promoting and supporting healthy plant growth when mixed with soil conditioners as specified. Organic rich loam shall be manufactured by mixing loam and organic amendments for loam, as specified, to raise the organic content to between 8% and 10%.

1. Loam shall be free of slag, stones 1-in or greater in largest dimension, plants or their roots, sticks, clay clods, toxic substances, or any material harmful to plant growth. Organic rich loam shall be classified as a sandy loam, loam, or sandy clay loam, using the following USDA textural classification system based on the percentage of clay (<0.002mm), silt (0.05 to 0.002mm) and sand (2mm-0.05mm) in the fine earth fraction (<2mm). In addition, the gravel (>2mm) content shall be less than 10 percent.

Texture	Sand	Silt	Clay
Sandy Loam	43-70	0-50	0-20
Loam	23-52	28-50	7-27
Sandy Clay Loam	45-80	0-28	20-35

2. Organic rich loam shall contain between 8 and 10 percent organic matter. The organic matter content for organic rich loam shall be by weight as determined by loss on ignition of moisture free test samples oven dried to a constant weight at a temperature of 100 degrees Centigrade. To adjust organic matter content, the loam may be amended with organic amendments.

3. Organic rich loam shall have a pH between 5.5 and 7.0.

4. Soluble salts shall not be greater than 160 parts per million (ppm).

5. Nutrients application for fertilizer and soil conditioners shall be as per recommendations by independent soil test laboratory.

B. Organic Amendments for Loam

1. Compost material may be used as an organic amendment. The compost shall be a stable, humus-like material produced from the aerobic decomposition of organic residues. The residues may include biosolids as well as yard wastes, and agricultural wastes. The compost shall be of a dark brown to black color and be capable of supporting plant growth in conjunction with addition of fertilizers and other amendments. The composted material shall have been stabilized so as not to have an unpleasant odor. An organic amendment not stabilized as specified herein and having an objectionable odor may be rejected at the discretion of the Engineer.

   a. The compost moisture content shall be such that no visible free water or dust is produced when handling it and the carbon/nitrogen ratio shall be in the range of 11/1 to 15/1.

   b. Stability must be assessed by a CO2 evolution test. Protocols for the test are specified in the final Model Procurement Guidelines for Source Separated Compost (CONED 1996) guidelines. For the CO2 test, the compost respiration shall be no more than 5mg CO2-C/gBVS day. Compost which does not meet the criteria shall not be used.

   c. Pathogens/Metals/Vector attraction reduction: Compost shall meet: (1) 40 CFR Part 503 Class A criteria and Table 3 metals limits, and; (2) Commonwealth of Massachusetts 310 CMR 32.00 Type I criteria. For Type I compost material, the Contractor shall supply to the CM the MassDEP approval letter.

   d. The compost shall contain at least 40 percent organic matter (Dry weight) and 100 percent of the material should pass a 3/8-in (or smaller) sieve. Debris such as metal, glass, plastic, wood (other than residual chips), asphalt, or masonry shall not be visible and should not exceed 1 percent dry weight.

2. The pH shall be between 5.5 and 7.5 and soluble salts shall not exceed 160 ppm.

C. Seed shall be received in the manufacturer's original unopened container bearing the date of the last germination test, which date shall be within a period of six months prior to commencement of seeding operations. Seed shall be from same or previous year's crop; each variety of seed shall have a purity of not less than 85 percent, a percentage of germination not less than 90 percent, shall have a weed content of not more than 1 percent and contain no noxious weeds. The wetland seed mixture (WSM) for wetland restoration area shall be the New England WetMix manufactured by New England Wetland Plants Inc. or approved equal, as follows:

1. Wetland Seed Mix (WSM)

   Fox Sedge (*Carex vulpinoidea*)
   Hop Sedge (*Carex lupulina*)
   Water Plantain (*Alisma plantago-aquatica*)
   Bristly/Cosmos Sedge (*Carex comosa*)

Nodding Bur-marigold (*Bidens cernua*)
Soft Rush (*Juncus effusus*)
Green Bulrush (*Scirpus atrovirens*)
Sensitive Fern (*Onoclea sensibilis*)
Soft stem Bulrush (*Scirpus validus*)
Lurid Sedge (*Carex lurida*)
Joe-Pye Weed (*Eupatoriadelphus maculatum*)
Woolgrass (*Scirpus cyperinus*)
Boneset (*Eupatorium perfoliatum*)
Blue Vervain (Verbena hastata)
Blue Flag (Iris vercicolor)
Swamp Milkweed (Asclepias incarnata)
Square-stemmed Monkeyflower (Mimulus ringens)
New York Aster (Aster novi-belgii)
Fowl Mannagrass (Glyceria striata)
Rattlesnake Grass (Glyceria canadensis)
Blunt Broom Sedge (Carex scoparia)
Fringed Sedge (Carex crinita)

The seed mix shall contain none of the following:

Reed Canarygrass (*Phalaris arundinacea*)
Common Reed (*Phragmites australis*)
Purple Loosestrife (*Lythrum salicaria*)

D. The seed shall be furnished and delivered premixed. A manufacturer's certificate of compliance to the specified mixes shall be submitted by the manufacturer for each seed type. These certificates shall include the guaranteed percentages of purity, weed content, and germination of the seed and also the net weight and date of shipment. No seed may be sown until the certificates have been submitted and approved.

E. Fertilizer shall be a slow release formula commercial fixed free flowing granules or pelletized fertilizer, 10-10-10 (nitrogen-phosphorus-potassium) grade for trees, shrubs, lawns, and naturalized areas. Fertilizer shall be delivered to the site in original unopened containers each showing the manufacturer's guaranteed analysis conforming to applicable fertilizer laws. At least 40 percent on the nitrogen in the fertilizer used shall be in slowly available (organic) form.

1. Fertilizer shall be a complete fertilizer, the elements of which are derived from organic sources. Fertilizer shall be a standard product complying with Federal and State fertilizer laws.

2. Fertilizer shall contain 10 percent nitrogen, 10 percent phosphorus, and 10 percent potassium by weight. At least 50 percent of the total nitrogen shall contain no less than 3 percent water-insoluble nitrogen.

3. Fertilizer shall be delivered to the site, mixed as specified, in the original unopened standard size bags showing weight, analysis, and name of manufacturer. Containers shall bear the manufacturer's certificate of compliance.

F. Lime stone shall be as specified in Section 02930.

G. Mulch shall be as specified in Section 02930.

H. Erosion control blanket as specified in Section 02270.

I. Straw mulch as specified in Section 02270.

J. Tackifier as specified in Section 02270.

K. Water used in this Work shall be provided by the Contractor and shall be free from ingredients harmful to plant life. Water, hose, and other watering equipment required for the Work shall be furnished by the Contractor.

2.02. PLANT MATERIALS

A. Trees and shrubs shall be as indicated on the contract drawings. Plants shall be nursery grown under climatic conditions similar to those in the locality of the worksite and shall conform to the variety and sizes indicated. Plants shall conform also to the indicated botanical names and standards of size, culture and quality for the highest grades and standards as adopted in the American Standard for Nursery Stock.

B. All plants shall be freshly dug for this project. No heeled in plants or plants from cold storage shall be used. Plants shall be healthy and vigorous, well branched and densely foliated when in leaf; shall be free of disease, insect pests, eggs or larvae and shall have healthy, well developed root systems. All parts of woody plant stock shall be moist and shall show active green cambium when cut to demonstrate plants are healthy and vigorous.

C. The height of the trees, measured from the crown of the roots to the top of the top branch, shall not be less than the minimum size designated on the wetland planting plan. The trunk of each tree shall be a single trunk growing from a single unmutilated crown of roots. No part of the trunk shall be conspicuously crooked as compared with normal trees of the same variety. The trunk shall be free from sun scald, frost cracks, or wounds resulting from abrasions, fire, or other causes. No pruning wounds shall be present having a diameter of more than 2-in and such wounds must show vigorous bark on all edges.

D. Container-Grown Stock shall have been grown in a container long enough for the root system to have developed sufficiently to hold its soil together, firm, and whole. No plants shall be loose in the container.

E. Balled and burlapped stock shall be dug with a firm natural ball of earth in which the stock is grown and then wrapped and tied according to ANSI Z60.1. Balls shall be drum laced for sizes 30-in or greater. Ball size shall be in accordance with ANSI Z.60.1 for the tree type and size.

F. If larger plants are used, the spread of roots or ball of earth shall be increased in proportion to the size of the plant.

2.03 INSPECTION OF PLANT MATERIALS

A. Inspection of plants before digging shall be at the opinion of the Engineer. Be present, if requested by Engineer, for inspection of plants at nursery.

B. Plants shall be subjected to inspection and approved upon delivery for conformity to specified requirements as to quality, size, and variety. Such approval shall not impair the right of inspection and rejection during the progress of the work.

C. Plants shall be accompanied by State Nursery inspection certificates.

D. No plants will be accepted with plastic burlap or if the ball is cracked or broken.

PART 3 EXECUTION

3.01 WETLAND RESTORATION

A. Restore all existing wetland areas where contaminated soils have been excavated and relocated. Provide erosion control; place organic rich loam; establish finish grade; apply soil amendments; plant balled and burlapped, potted and bare root plant stock; apply seed; and maintain the wetlands restoration area. Restoration shall proceed as follows:

1. During site clearing activities the Contractor shall save tree stumps that are a minimum of 12-inches in diameter for use in the wetland restoration area.

2. During site clearing activities the Contractor shall also save tree trunks 12 inches or greater in diameter and cut into lengths of no less than 8 feet long, for use in the wetland restoration area.

3. Contractor shall excavate the top 1-foot of contaminated soils in the wetland restoration area and disposed of the contaminated soils underneath the landfill cap.

4. After contaminated soil removal is completed, restore subgrades with clean fill to 1-foot below final grades if necessary.

5. The finished grade shall be established using organic rich loam as specified in Paragraph 2.01A above. The areas shall be rolled with a hand roller weighing not more than 100 pounds per foot of width and raked smooth. The finish grades shall match preconstruction grades and transition smoothly to the surrounding undisturbed wetland contours. The surface shall then be scarified or power raked.

6. Lime shall be applied at the rate of fifty pounds per 1,000 square feet or as determined by a soil test to bring topsoil pH to a range of 5.5 to 6.5. The soil test shall be performed by the Contractor's Independent Testing Laboratory as described in Section 02930.

7. After finish grades are established randomly place at least 7 tree trunks at least 8 feet long throughout the restoration area at a density no less than 1 per 1,000 square feet and place 3 tree stumps (min. 12-inch in diameter) as shown on Sheet C-13: Wetland Restoration Plan.

8. After final grades are established plant trees and shrubs, as indicated on the Drawings.

9. After planting is completed the altered area shall be stabilized with Wet Area Seed Mix. The seed shall meet all standards of purity and packaging requirements as specified above. Seed shall be spread at the rate of 1 lbs/2,500 sq. ft., or as indicated by supplier.

B. An as-build survey of the restored grades within the wetland restoration areas shall be submitted to the Engineer for review and approval. Grades shall be adjusted as necessary before planting and seeding of wetland restoration areas.

C. Limestone shall be applied a minimum of 5 days before the application of fertilizer. Limestone may not be mixed with fertilizer for application. Limestone shall be spread evenly over the soil surface and thoroughly incorporated by heavy raking to at least one half the depth of loam.

D. Straw mulch and tackifier shall be applied the same day as seeding operations. Tar tackifier shall not be used.

E. Sedimentation and erosion control measures shall be implemented during construction as specified in Section 02270.

F. Responsible care shall be taken in all work performed within existing wetlands in order to keep disturbances to a minimum. Protect against siltation and destruction of vegetation during construction.

G. Erosion control blanket shall be installed on all slopes greater than 24 percent (4 horizontal to 1 vertical) and as shown on the Plans per manufacturer's instructions and as specified in Section 02270.

3.02 INSTALLATION

A. Previously established grades, as indicated, shall be maintained in a true and even condition.

B. Organic rich loam shall be placed over prepared areas so that after natural settlement and light rolling, the complete Work shall conform to the lines, grades and elevations indicated. No loam shall be spread in water or while frozen or muddy.

C. After organic loam has been spread, it shall be prepared by scarifying or harrowing and hand raking. Remove and dispose of all stiff clods, lumps, roots, litter, and other foreign material. The area shall also be free of stones greater than 2-in in diameter.

D. Submit schedules to Engineer for approval 30 days prior to planting and seeding. Seeding, as specified herein, shall be accomplished between the period of April 15 to June 1 or August 31 to October 15. Planting shall not be done between June 2 and August 30. Provide irrigation for all planting. Hydroseed and straw mulch shall not be applied when weather conditions prevent installation at specified coverages.

E. Planting or seeding shall be done within ten days following soil preparation, in accordance with all requirements specified in Section 02930.

F. If the wetland restoration area(s) cannot be topsoiled and seeded because of season or weather conditions and will remain exposed for more than 7 days, protect the area against erosion and washouts by means such as straw applied with a tackifier. Tar tack shall not be used in the Wetland Restoration Area. Prior to application of organic rich loam, any such materials applied for erosion control shall be thoroughly incorporated into the subgrade by discing.

G. Any washouts which occur shall be regraded and reseeded until a stabilized slope is established at no additional cost to the City.

3.03 DIGGING, HANDLING, AND PROTECTION OF PLANTS

A. Plants shall be dug with firm natural balls of earth, of sufficient diameter and depth to include most of the fibrous roots and conforming to the standards of ANSI Z60.1.

B. Roots or balls of plants shall be protected at all times from sun and from drying winds.

C. Plants which cannot be planted immediately upon delivery shall be set on the ground and be protected with soil, bark mulch, or other acceptable material.

D. No plant shall be bound with wire or rope at any time so as to damage the bark or break branches.

3.04 PLANTING OPERATIONS

A. Stake out locations as indicated and secure the Engineer's approval before excavating plant pits.

B. All plant pits shall be excavated with sloped sides.

C. Plant pits shall be three times as wide as the rootball with sloped sides and sufficiently deep to allow for the rootball to sit directly upon undisturbed soil. Backfill material for all pits shall consist of the existing material (loam) as excavated from the pit.

D. Plants shall be set in center of pits plumb and straight and at such a level that after settlement, the crown of the plant ball will be at the surrounding finished grade.

E. All burlap, rope, wire, and similar materials shall be removed from the plants and disposed of off-site.

F. Backfilling Plants

1. When balled and burlapped plants are set, loam shall be tamped lightly. Loam shall not be packed so firmly as to drive out all the fine air spaces needed for a well aerated soil. All burlap, ropes, or wires shall be removed from the top 1/3 of the balls.

2. Loam shall be backfilled in layers of not more than 9-in and each layer watered sufficiently to settle before the next layer is put in place.

3. To complete backfilling, ensure that trunk flare is completely exposed and that the top of the rootball is not covered with loam. Immediately after the plant pit is backfilled, a saucer, or shallow basin slightly larger than pit shall be formed with a ridge of soil to facilitate and contain watering.

4. After seeding the wetland replication or restoration has occurred, install a minimum of a 3-inch thick layer of shredded bark mulch in a 3 foot radius under each tree and shrub.

5. Remove and dispose of containers prior to planting.

   a. To encourage immediate root development, the outer one-half inch of the root ball shall be gently loosened.

b. When shrubs are set, loam shall be tamped lightly. Loam shall not be packed so firmly as to drive out all the fine air spaces needed for a well aerated soil.

3.05 PRUNING

A. Each plant shall be pruned at the time of planting in accordance with ISA Standards.

B. Pruning shall be done with clean, sharp tools.

3.06 OBSTRUCTIONS BELOW GROUND

A. In the event that underground boulders or obstructions are encountered in any pit excavation work under this Contract, alternate locations may be selected by the Engineer and plants shall be installed therein.

3.07 WATERING

A. Plantings shall be flooded with water twice within the first 24 hours of the time of planting.

B. Apply water at an average rate of 1 inch per week.

C. Irrigation water for planting and maintenance shall be provided by the Contractor and shall be free from ingredients harmful to plant life. The Contractor shall furnish his/her own hose and hose connections or other watering equipment.

3.08 MAINTENANCE

A. After the areas are planted and seeded, the Contractor shall request an inspection of the Work by the Engineer. At this inspection, areas will be defined by the Engineer as "approved," or "not approved." Areas noted as "approved" shall show active growth. Areas noted as "not approved" are subject to immediate correction by the Contractor at no additional cost to the City. Maintenance shall begin immediately after areas are planted and seeded and shall continue to completion of two growing seasons.

B. Corrective measures shall include reseeding, removal of dead plants, and replacement within new plants, watering, weeding, and fertilizing.

C. Except for mowing, which is not to be performed in areas with wetland seed mix, maintenance and watering shall be in accordance with Section 02930.

D. The Contractor shall provide at least 75 percent re-establishment of all disturbed wetland with indigenous wetland plant species within two growing seasons of their planting in accordance with the Wetlands Protection Act. The growing season for wetlands revegetation areas shall be April 15 to October 15. Plant species shall be selected based on their appropriateness for the wetland type and general soil moisture characteristics. Purple Loosestrife shall not be planted in any of the wetland areas. If after 180 growing days, it is evident in the opinion of the City that it is unlikely that the 75 percent re-establishment requirements will be achieved, the Contractor shall supplement the plantings as necessary to achieve the required coverage at no additional cost to the City. If at the end of two growing seasons, 75 percent re-establishment has not been

achieved, the Contractor shall provide and plant additional new plant material to achieve 75 percent re-establishment at no additional cost to the City.

3.09 INSPECTION

A. The Engineer will provide a CPWS to inspect all work performed under this Section including the Installation Inspection and Final Inspection. The inspection shall comply with requirements of the Order of Conditions and 310 CMR 10.55(4)(b)(1-7). Based on the findings of the inspection, the Contractor shall immediately correct all Work not in accordance with the above standards, at no additional cost to the City.

B. Inspection reports shall be submitted to the Engineer and City within 30 days of completing the inspections specified above in Paragraph 3.07A.

C. At least 75 percent of the surface of the restored wetland area (s) shall be established with actively growing, healthy, live planted species within two growing seasons following site planting. Bare spots shall be no larger than 10 square feet.

D. Keep the restored wetland watered and in good condition at all times until the required coverage is established and until final acceptance of the site by the Haverhill Conservation Commission and Engineer.

E. On slopes, provide against washouts using approved method. All washouts that occur shall be regarded, replanted, and stabilized at the Contractor's expense.

F. At the end of the second growing season, following planting, the Engineer will inspect the restoration area(s) upon written request submitted at least 10 days before the anticipated date. Areas not demonstrating satisfactory coverage, as determined by the Engineer, shall be renovated, reseeded, and maintained to all requirements specified herein.

G. After all necessary corrective work has been completed, the Engineer will certify in writing the final acceptance of the replacement site.

END OF SECTION

SECTION 03301

CONCRETE AND REINFORCING STEEL

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and install all concrete work complete as shown on the Drawings and as specified herein.

1.02 RELATED WORK

A. Concrete Electrical Raceway Encasement is included in Section 03800.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300, shop drawings and product data. Submittals shall include the following:

1. Concrete mix for each formulation of concrete proposed for use including constituent quantities per cubic yard, water cement ratio, type and manufacturer of cement.

2. Placing drawings and bar bending details in conformity with the recommendations of ACI 315.

3. Technical data on all materials and components.

4. Material Safety Data Sheets (MSDS) for all concrete admixtures and curing agents.

B. Test Reports

1. Sieve analysis of fine and coarse aggregates.

2. Concrete mix for each formulation of concrete proposed for use including constituent quantities per cubic yard, water cement ratio, type and manufacturer of cement, and either a. or b. below.

a. Standard deviation data for each proposed concrete mix based on statistical records.

b. Water cement ratio curve for each proposed concrete mix based on laboratory tests. Give average cylinder strength test results at 28 days for laboratory concrete mix designs. Provide results of 7 and 14 day tests if available.

C. Certifications

1. Certify admixtures used in the same concrete mix are compatible with each other and the aggregates.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM A82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.

2. ASTM A185 - Standard Specification for Steel Welded Wire Fabric, Plain for Concrete Reinforcement.

3. ASTM A615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

4. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.

5. ASTM C33 - Standard Specification for Concrete Aggregates.

6. ASTM C94 - Standard Specification for Ready-Mixed Concrete.

7. ASTM C143 - Standard Test Method for Slump of Hydraulic Cement Concrete

8. ASTM C150 - Standard Specification for Portland Cement

9. ASTM C173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.

10. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.

11. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.

12. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.

B. American Concrete Institute (ACI).

1. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete.

2. ACI 301 - Standard Specification for Structural Concrete.

3. ACI 305R - Hot Weather Concreting.

4. ACI 306R - Cold Weather Concreting.

5. ACI 315 - Details and Detailing of Concrete Reinforcement.

6. ACI 318 - Building Code Requirements for Structural Concrete.

C. Concrete Reinforcing Steel Institute (CRSI)

1. MSP - Manual of Standard Practice

D. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

A. If, during the progress of the work, it is impossible to secure concrete of the required workability and strength with the materials being furnished, the Engineer may order such changes in proportions or materials, or both, as may be necessary to secure the desired properties. All changes so ordered shall be made at no additional cost to the Owner.

B. Reinforced concrete shall comply with ACI 318.

C. All testing and inspection services required, unless otherwise specified, shall be provided and paid for by the Owner. Testing necessary to establish the concrete mixes shall be performed by and at the expense of the Contractor. Methods of testing shall comply with the latest applicable ASTM standards.

1.06 DELIVERY, STORAGE AND HANDLING

A. Reinforcing steel shall be shipped and stored with bars of the same size and shape fastened in bundles with durable tags, marked in a legible manner with waterproof markings showing the same designations as shown on the submitted placing drawings. Reinforcing steel shall be free from mill scale, loose rust, dirt, grease, or other foreign matter. Store off the ground and protect from moisture, dirt, oil, or other injurious contaminants.

B. Products shall be stored in conformity with the manufacturer's recommendations.

C. Sand, aggregates and cement shall be stored or stockpiled in conformity with the recommendations of ACI 301.

PART 2 PRODUCTS

2.01 GENERAL

A. The use of manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.

B. Like items of materials shall be the end products of one manufacturer in order to provide standardization for appearance, maintenance and manufacturer's service.

C. Materials shall comply with this Section and any applicable State or local requirements.

2.02 MATERIALS

A. Cement shall be domestic portland cement conforming to ASTM C150. The allowable types of cement for each concrete class are shown in Table 1. Air entraining cements shall not be used.

B. Fine aggregate shall be washed inert natural sand conforming to the requirements of ASTM C33.

C. Coarse aggregate shall be a well-graded crushed stone or washed gravel conforming to the requirements of ASTM C33 No. 67. Limits of Deleterious Substances and Physical Property Requirements shall be as recommended for severe weathering regions.

D. Water shall be potable, clean and free from injurious amounts of oils, acids, alkalis, organic matter, or other deleterious substances.

E. Concrete admixtures shall be free of chlorides and alkalis (except for those attributable to water). When it is required to use more than one admixture in a concrete mix, the admixtures shall be from the same manufacturer. Admixtures shall be compatible with the concrete mix including other admixtures.

1. Air entraining admixture shall comply with ASTM C260. Proportioning and mixing shall be in accordance with manufacturer's recommendations.

2. Water reducing admixture shall comply with ASTM C494, Type A. Proportioning and mixing shall be in accordance with manufacturer's recommendations.

3. Admixtures causing retarded or accelerated setting of concrete shall not be used without written approval from the Engineer. When allowed, the admixtures shall be retarding or accelerating water reducing admixtures.

F. Reinforcing steel bars shall be deformed, intermediate grade, steel conforming to ASTM A615 Grade 60.

G. Welded steel wire fabric shall conform to ASTM A185.

H. Tie wires for reinforcing steel shall be 16 gauge or heavier, black annealed wire.

I. Precast concrete block bar supports shall conform to CRSI - Manual of Standard Practice (MSP) for Precast Concrete Bar Supports.

2.03 MIXES

A. Select proportions of ingredients to meet the design strength and materials limits specified in Table 1 and to produce concrete having proper placability, durability, strength, appearance and other required properties. Proportion ingredients to produce a homogenous mixture which will readily work into corners and angles of forms and around reinforcement without permitting materials to segregate or allowing excessive free water to collect on the surface.

B. The design of each mix shall be based on standard deviation data of prior mixes with essentially the same proportions of the same constituents or, if not available, be developed by independent testing laboratory acceptable to the Engineer engaged by and at the expense of the Contractor. Acceptance of mixes based on standard deviation shall be based on the modification factors for standard deviation tests contained in ACI 318. Acceptance of mixes based on laboratory tests shall be based on strengths greater than the specified design strengths specified in Table 1. The water content of the concrete mixes to be used, as determined from the curve, shall correspond to strengths 16 percent greater than the specified design strength. The resulting mix shall not conflict with the limiting values for maximum water cement ratio and net minimum cementitious content specified in Table 1.

C. Compression Tests: Provide testing of the proposed concrete mix or mixes to demonstrate compliance with the compression strength requirements in conformity with the above paragraph.

D. Entrained air, as measured by ASTM C231, shall be as shown in Table 1.

E. Slump of the concrete as measured by ASTM C143, shall be as shown in Table 1.

F. Proportion admixtures according to the manufacturer's recommendations. Two or more admixtures specified may be used in the same mix provided that the admixtures in combination retain full efficiency and have no deleterious effect on the concrete or on the properties of each other.

TABLE 1

Class	Design Strength (1)	Cement ASTM C150	Cement Content (2)	W/C (3)	WR (4)	Slump Range Inches
A	2500	Type II	440	0.62 max.	Yes	1-4
D	4000	Type II	560	0.44 max.	Yes	3-5

All concrete classes shall have 3.5 to 5 percent air entrainment.

NOTES:

(1) Minimum compressive strength at 28 days
(2) Minimum cement content in lbs/cu yd
(3) W/C is Water Cement ratio
(4) WR is water reducing admixture

2.04 MEASURING, BATCHING, MIXING AND TRANSPORTING CONCRETE

A. Measuring, batching, mixing and transporting concrete shall conform to ASTM C94 and the requirements herein or as otherwise approved in writing by the Engineer.

B. Ready-mixed concrete, whether produced by a concrete supplier or the Contractor shall conform to the requirements above. No hand mixing will be permitted.

C. Admixtures shall be dispensed into the batch in conformity with the recommendations of the manufacturer of the admixtures.

D. Concrete shall be mixed until there is uniform distribution of the materials and shall be discharged completely before the mixer is recharged. The mixer shall be rotated at a speed recommended by the mixer manufacturer and mixing shall be continued for at least 1-1/2 minutes after all the materials are in the mixer. Concrete shall be placed within 1-1/2 hours of the time at which water was first added, otherwise it shall be rejected. Concrete which has been remixed or retempered, or to which an excess amount of water has been added, shall also be rejected.

2.05 FORMS

A. Forms shall be free from roughness and imperfections, substantially watertight and adequately braced and tied to prevent motion when concrete is placed. No wooden spreaders will be allowed in the concrete.

B. Wire ties will not be allowed. Metal ties or anchorages which are necessary within the forms shall be so constructed that the metal work can be removed for a depth of at least 1-in from the surface of the concrete without injury to such surface by spalling or otherwise. Forms shall be thoroughly cleaned before using and shall be treated with oil, or other approved material.

C. All exposed edges of the finished concrete shall be chamfered 3/4-in.

PART 3 EXECUTION

3.01 REINFORCING STEEL

A. Reinforcing steel shall be accurately fabricated to the dimensions shown. Bars shall be bent around a revolving collar having a diameter of not less than that recommended in ACI 318. All bars shall be bent cold.

B. Unless otherwise shown, splices in reinforcing steel shall be lapped in conformity with ACI 318 but not less than Class B tension lap splice. All bar splices shall be staggered wherever possible. When splicing bars of different diameters, the length of lap is based on the larger bar.

C. Splices in welded wire fabric shall be lapped not less than 1-1/2 courses or 12-in, whichever is greater. Wire fabric splices shall be tied together with wire ties spaced no more than 24-in on center.

D. Before being placed in position, reinforcement shall be thoroughly cleaned of loose mill and rust scale, dirt and other coatings, including ice, that reduce or destroy bond. Where there is a delay in depositing concrete after the reinforcement is in place, bars shall be reinspected and cleaned when necessary.

E. Reinforcement which is to be exposed for a considerable length of time after being placed shall be given a heavy coat of cement grout.

F. In no case shall any reinforcing steel be covered with concrete until the amount and position of the reinforcements have been checked and permission given to proceed by the Engineer.

3.02 INSPECTION AND COORDINATION

A. The batching, mixing, transporting, placing and curing of concrete shall be subject to the inspection of the Engineer at all times. The Contractor shall advise the Engineer of his/her readiness to proceed at least 24 hours prior to each concrete placement. The Engineer will inspect the preparations for concreting including the preparation of previously placed concrete, the reinforcing steel, and the alignment, cleanliness and tightness of formwork. No placement shall be made without the inspection and acceptance of the Engineer.

3.03 CONCRETE APPEARANCE

A. Concrete mix showing either poor cohesion or poor coating of the coarse aggregate with paste shall be remixed. If this does not correct the condition, the concrete shall be rejected.

B. Concrete for the work shall provide a homogeneous structure which, when hardened, will have the required strength, durability and appearance. Mixtures and workmanship shall be such that concrete surfaces, when exposed, will require no finishing. When concrete surfaces are stripped, the concrete when viewed in good lighting from 10-ft away shall be pleasing in appearance and at 20-ft shall show no visible defects.

3.04 PLACING AND COMPACTING

A. No concrete shall be placed until forms, condition of subgrade and method of placement have been approved by the Engineer. Before depositing concrete, all debris, foreign matter, dirt and water shall be removed from the forms. The contact surface between concrete previously placed and new concrete shall be cleaned and brushed with cement paste. Concrete, except as indicated on the Drawings, shall not be placed in water or submerged within 24 hours after placing, nor shall running water be permitted to flow over the surface of fresh concrete within 4 days after its placing.

B. Deposit concrete as near its final position as possible to avoid segregation due to rehandling or flowing. Pumping of concrete will be permitted when an approved design mix and aggregate sizes, suitable for pumping, are used. Do not deposit concrete which has partially hardened or has been contaminated by foreign materials. If the section cannot be placed continuously, place construction joints as specified or as approved. Place concrete for walls using tremie tubes in 12 to 24-in lifts, keeping the surface horizontal. Do not drop concrete more than 4-ft.

C. High frequency mechanical vibrators shall be used to the extent necessary to obtain proper consolidation of the concrete, but not to move or transport concrete in the forms. Care shall be taken to avoid segregation of aggregates by excess vibration. Vibration shall continue until the frequency returns to normal, trapped air ceases to rise and the surface appears liquefied, flattened and glistening. Concrete adjacent to forms and around pipe stubs shall be carefully spaded or rodded.

3.05 CURING AND PROTECTION

A. Protect all concrete work against injury from the elements and defacements of any nature during construction operations.

B. All concrete shall be cured in conformity with ACI 301. Water curing shall be by ponding, by continuous sprinkling or by covering with continuously saturated burlap.

C. Finished surfaces and slabs shall be protected from the direct rays of the sun to prevent checking and crazing.

D. Concrete placed during cold weather shall be batched, delivered, placed, cured and protected in compliance with the recommendations of ACI 306R. Salt, manure or other chemicals shall not be used for cold weather protection.

E. Concrete placed during hot weather, shall be batched, delivered, placed, cured and protected in compliance with the recommendations of ACI 305R. The temperature of the concrete shall be

such that it will cause no difficulties from loss of slump, flash set or cold joints. Immediately cover plastic concrete with sheet material during hot weather.

3.06 FIELD TESTS

A. Sets of three field control cylinder specimens will be taken by the Engineer during the progress of the work, in compliance with ASTM C31. The number of sets of concrete test cylinders taken of each class of concrete placed each day shall not be less than one set, nor less than one set for each 150 cu yds of concrete nor less than one set for each 5,000 sq ft of surface area for slabs or walls. One cylinder shall be broken at 7 days and two cylinders shall be broken and their strengths averaged at 28 days. When the average 28 day compressive strength of the cylinders in any set falls below the specified compressive strength or below proportional minimum 7 day strengths (where proper relation between 7 and 28 day strengths have been established by tests); the Engineer may reject the concrete represented by the set of cylinders, may require modification of the concrete and/or require modification of the proportions, water content, or temperature conditions of the design mix to achieve the required strengths.

B. Cooperate in the making of tests by allowing free access to the work for the selection of samples, providing an insulated closed curing box for specimens, affording protection to the specimens against injury or loss through his/her operations and furnishing material and labor required for the purpose of taking concrete cylinder samples. All shipping of specimens will be paid for by the Contractor.

C. Slump tests will be made in the field by the Engineer in conformity with ASTM C143.

D. Tests for air content shall be made in compliance with either the pressure method complying with ASTM C231 or by the volumetric method complying with ASTM C173.

3.07 STRIPPING AND FINISHING CONCRETE

A. Forms shall not be stripped before the concrete has attained the strength of at least 30 percent of the specified design strength, unless otherwise approved by the Engineer. This is equivalent to approximately "100 day-degrees" of moist curing.

B. Care shall be exercised to prevent damaging edges or obliterating the lines of chamfers, rustications or corners when removing the forms or doing any other work adjacent thereto.

C. Clean all exposed concrete surfaces and adjoining work stained by leakage of concrete, to the satisfaction of the Engineer.

D. As soon as forms have been stripped, form ties, if employed, shall be removed, and the recess filled to insure complete watertightness. Any defects in the surface of the walls shall be chipped out and repaired in a workmanlike manner. Defective concrete where it occurs shall be cut to a minimum depth of 1-in, thoroughly roughened and neat cement brushed in. The hole shall then be filled with mortar in the proportion of 1 part cement and 2-1/2 parts sand with a minimum of water. Mortar for filling form tie recesses shall be mixed to a slightly damp consistency (just short of "balling"), pressed into the recess until dense, and troweled smooth. Mortar in larger patches shall be applied and allowed to assume a partial set following which it shall be struck off flush with the adjoining surface. Patches shall be kept moist for several days to assure proper curing.

E. Concrete to receive dampproofing and concrete not exposed in the finished work shall have off-form finish with fins and other projections removed and tie cones and defects filled as specified.

F. Top surface of slabs shall be screeded to the established grades and shall be a true plane with a tolerance of 1/8-in when checked with a 10-ft straightedge. The surface shall be finished to give a smooth, hard, even surface free from high or low spots or other defects. Concrete subject to pedestrian traffic shall be given a broom finish. Failure to meet the condition shall be cause for removal, grinding, or other correction as directed by the Engineer

3.08 SCHEDULE

A. The following (Table 2) are the general applications for the various concrete design strengths to be used:

TABLE 2

Class	Design Strength (psi)	Description
A	2,500	Concrete fill and duct encasement
D	4,000	Slabs on grade and all other structural concrete

END OF SECTION

SECTION 11170

SOLAR IGNITED VENT FLARES

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required for thirty two (32) solar ignited vent flares to be mounted directly on landfill vents or wellheads.

B. Unless otherwise noted, all of the equipment specified in this section shall be provided by a single contractor.

C. The work includes, but is not necessarily limited to, the following:

1. Provide and install solar ignited vent flares for flange mounting on each well.

2. All components, including base flange, flame arrestor, flare tube, flare head, ignitor, solar panels, and control system shall be factory assembled to the greatest extent possible with minimal field assembly time required.

1.02 DESCRIPTION

A. The landfill gas vent flares shall be designed to combust landfill gas at low ambient pressure without the need for blowers or external power. The vent flare assemblies shall be flange mounted to the gas wellheads.

B. The landfill gas vent flares shall include a solar powered continuous ignition system, all-weather variable flow flare head, flame arrestor, stainless steel ball valve and all accessories for a complete and operating system.

C. The landfill gas vent flares shall be Landfill Technologies, Inc., Model CF-5; LFG Specialties, Inc., Model VFS212I4-2; or approved equal.

1.03 RELATED WORK

A. Landfill gas vents are included in Section 02647.

1.04 SUBMITTALS

A. Submit shop drawings showing details of fabrication, materials of construction, weights, mounting and support details, welding details, and all dimensions necessary for fabrication, assembly, and installation. The data submitted shall clearly identify the manufacturer and model number of the landfill gas vent flare chosen.

B. Submittals shall include a complete listing of all components with manufacturers' model numbers and current replacement cost and delivery time for each component.

PART 2 PRODUCTS

2.01 LANDFILL GAS VENT FLARE

A. Provide a 6 inch Schedule 80 PVC slip on adapter flange with 150# bolt pattern, to be field cemented to the Schedule 80 PVC well tubes. Provide a 150# steel mating flange which shall be bolted to the adapter flange and shall be bored and tapped to match the flare base bushing. The steel flange shall be bolted to the PVC flange with Type 304 SS bolts, nuts, and washers. A 1/8" red silicone gasket shall be installed between the flanges.

B. Provide a flame arrestor module fitted to the flare unit. The flame arrestor shall include replaceable stainless steel elements sized to prevent the migration of flame into the gas well.

C. The flare unit shall be constructed of Schedule 40 welded or NPT threaded steel pipe and fittings. All threads shall be coated with 1800 Deg. F. Joint compound immediately prior to assembly.

D. The flare head shall be constructed of minimum 1/4" thick steel plate and shall be supported a minimum of 8 feet above the base flange. The flare head shall be designed to minimize flameout due to high wind conditions. The flare head shall be provided with adjustable ignitor locations to accommodate varying gas flows.

E. All flare components shall be warranted against defects in materials and workmanship for a period of two years from the date of initial operation.

2.02 SOLAR POWERED IGNITION SYSTEM

A. Provide all components, including mounting brackets and wiring connections for factory assembly and installation of the flare ignition system.

B. Provide a solar collector of minimum 6" x 12", 5W, providing 10V open circuit peak output and 8V at 300mA normal charging power.

C. Provide a six volt rechargeable gel-cell battery with sufficient power capacity to provide stable ignition for a 21 day dark time endurance from fully charged condition.

D. Provide a transformer and timer with "on/off" switch to provide sufficient energy to produce an ignition spark at 1.5 second continuous interval.

E. Provide an insulated ignition cable, minimum 7mm size, with metallic wire and crimped eyelet terminals. The cable shall be connected between the ignition transformer output terminals and the ignitor and shall be shielded from damage due to heat generated by the combustion process.

F. A spark plug type or ignitor rod assembly shall be provided to deliver an electric spark directly into the gas stream. The ignitor assembly shall be adjustable and replaceable without removing the flare assembly from the wellhead.

G. Provide, for field installation, a minimum 30" long galvanized steel grounding rod with an eyelet connection terminal and a pointed driving tip. Provide instructions for the proper installation of the grounding rod and wire connection. Provide a minimum of 20 feet of insulated copper wire of a sufficient gauge, minimum 6 gauge stranded, to connect the flare assembly to the grounding rod.

H. The entire solar powered ignition system shall be warranted against defects in materials and workmanship for a period of two years from the date of initial operation. The gel-cell battery shall be warranted against defects in materials and workmanship for a period of one year from the date of initial operation.

PART 3 EXECUTION

3.01 INSTALLATION

A. The Contractor shall install a landfill gas vent flare assembly on each of the twenty (20) well heads as specified above. Each completed assembly shall be tested for operation and placed in an "off" position until installation on all well heads is complete, the operators have been trained on the proper operation and maintenance of the equipment and the equipment is accepted by the Owner. Upon acceptance, the equipment shall be placed into operation and the warranty period shall commence. Should partial acceptance be desired by the Contractor, the equipment warranty on all of the landfill gas vent flare assemblies shall not begin until all have been accepted.

3.02 PERFORMANCE REQUIREMENTS

A. Landfill gas will have an equivalent methane concentration which will vary between 30 - 80% of the total gas, with the remainder of the gas being primarily carbon dioxide.

B. The landfill gas vent flare units shall operate satisfactorily, providing specified destruction efficiency, combustion stability, and flame reignition of the specified gas in a range of 2 - 60 SCFM at each well. Gas will be emitted from each well at a positive pressure which will vary between 0.5 and 5 inches of water column.

CD. The landfill gas vent flare units shall be capable of combusting the specified gas, at the specified flow rates, at temperatures of 900 Deg. F. To 1300 Deg. F. measured at a point six inches above the top of the flare head. Thermal destruction efficiency shall be greater than 98% for volatile organic compounds within the specified operating conditions.

D. The landfill gas vent flare units shall be capable of reignition of combustible gases within the specified limits in less than 60 seconds after flameout, regardless of wind direction or velocity. Should reignition fail, continuous reignition attempts shall occur until successful reignition occurs.

E. When properly operated and maintained, the landfill gas vent flares shall comply with all requirements of 40 CFR 60.18 and 40 CFR 60.33c.

3.03 PERFORMANCE TESTING

A. The Contractor shall conduct a performance test of each flare prior to requesting acceptance. The Contractor shall prepare a written test protocol, describing the proposed tests, and submit it to the Engineer for approval a minimum of thirty calendar days prior to the proposed test date. The Engineer shall be given a minimum of seven calendar days' written notice of the Contractor's proposed test date and the Engineer shall witness and verify the test results. The performance test shall be a demonstration of the performance of the flares under specified conditions and with varying operating conditions within the ranges specified. All testing shall be conducted at each flare by the Contractor's personnel.

B. The Contractor shall verify the landfill gas quality and flow rate prior to initiation of the test period. At a minimum, the testing shall verify that each flare initially ignites and also reignites within 60 seconds of the opening of the gas valve with the ignitor in the "on" position. The average of ten consecutive ignition cycles should be used to measure the ignition time and no single cycle shall exceed ninety seconds.

C. Flame temperature shall within the range of 900 Deg. F. To 1300 Deg. F. as measured by a thermocouple inserted into the combustion zone at a point six inches above the flare head.

D. Any units shall be determined to be in noncompliance with the specifications if the test conditions are not satisfied. Any non-complying units shall be modified as required to achieve compliance and retested. Any unit which does not comply after two retests shall be classified as nonconforming and such unit(s) shall be removed from the wellhead(s) and replaced in its (their) entirety.

3.04 OPERATOR TRAINING

A. The Contractor shall provide a minimum of two factory trained technicians at the site for initial startup and testing of all flare units, or for a minimum of two days, whichever is longer. A minimum of two technicians shall remain at the site for a minimum of two days (in addition to the startup time specified above) to train the Owners operating and maintenance personnel on the proper operation and maintenance of the flare units. The technicians shall, at a minimum, demonstrate the proper methods of flare startup, ignition, troubleshooting, and replacement of the battery, ignitor, and flame arrestor assembly.

3.05 OPERATIONS AND MAINTENANCE MANUAL

A. The Contractor shall provide the Owner with a minimum of one copy of the manufacturer's operation and maintenance manual for each of the flare units (minimum of 20 total). The manual shall, at a minimum, describe the proper operation and maintenance procedures and troubleshooting instructions for the flares as well as contain a complete replacement parts list with recommended replacement intervals. The manual shall also contain a list of the current cost of each replacement part complete with estimated delivery/fabrication time.

END OF SECTION

APPENDIX A

Wetlands Permits for Southern Mound Closure Construction

Massachusetts Wetlands Protection Act
Order of Conditions

A. General Information (cont.)

6. Property recorded at the Registry of Deeds for (attach additional information if more than one parcel):
Essex, South District
a. County
b. Certificate Number (if registered land)
2864
c. Book
82/83
d. Page

7. Dates: November 4, 2010 (a. Date Notice of Intent Filed) November 18, 2010 (b. Date Public Hearing Closed) December 22, 2010 (c. Date of Issuance)

8. Final Approved Plans and Other Documents (attach additional plan or document references as needed):
See Attachment "A", "State and Municipal Conditions", incorporated herein and made part of this Order of Conditions

b. Prepared By
c. Signed and Stamped by
d. Final Revision Date
e. Scale
f. Additional Plan or Document Title
g. Date

B. Findings

1. Findings pursuant to the Massachusetts Wetlands Protection Act:

Following the review of the above-referenced Notice of Intent and based on the information provided in this application and presented at the public hearing, this Commission finds that the areas in which work is proposed is significant to the following interests of the Wetlands Protection Act (the Act). Check all that apply:

a. ☒ Public Water Supply
b. ☒ Land Containing Shellfish
c. ☒ Prevention of Pollution
d. ☒ Private Water Supply
e. ☒ Fisheries
f. ☒ Protection of Wildlife
g. ☒ Groundwater Supply
h. ☒ Storm Damage Prevention
i. ☒ Flood Control

2. This Commission hereby finds the project, as proposed, is: (check one of the following boxes)

Approved subject to:

a. ☒ the following conditions which are necessary in accordance with the performance standards set forth in the wetlands regulations. This Commission orders that all work shall be performed in accordance with the Notice of Intent referenced above, the following General Conditions, and any other special conditions attached to this Order. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, these conditions shall control.

B. Findings (cont.)

Denied because:

b. ☐ the proposed work cannot be conditioned to meet the performance standards set forth in the wetland regulations. Therefore, work on this project may not go forward unless and until a new Notice of Intent is submitted which provides measures which are adequate to protect the interests of the Act, and a final Order of Conditions is issued. **A description of the performance standards which the proposed work cannot meet is attached to this Order.**

c. ☐ the information submitted by the applicant is not sufficient to describe the site, the work, or the effect of the work on the interests identified in the Wetlands Protection Act. Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides sufficient information and includes measures which are adequate to protect the Act's interests, and a final Order of Conditions is issued. **A description of the specific information which is lacking and why it is necessary is attached to this Order as per 310 CMR 10.05(6)(c).**

Inland Resource Area Impacts: Check all that apply below. (For Approvals Only)

3. ☒ Buffer Zone Impacts: Shortest distance between limit of project disturbance and Bank or Bordering Vegetated Wetland boundary (if available) — 0 a. linear feet

Resource Area	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
4. ☒ Bank	1050 temporary a. linear feet	1050 temporary b. linear feet	1050 c. linear feet	1050 d. linear feet
5. ☒ Bordering Vegetated Wetland	11,000 temporary a. square feet	11,000 temporary b. square feet	11,000 c. square feet	11,000 d. square feet
6. ☐ Land Under Waterbodies and Waterways	a. square feet e. c/y dredged	b. square feet f. c/y dredged	c. square feet	d. square feet
7. ☐ Bordering Land Subject to Flooding	a. square feet	b. square feet	c. square feet	d. square feet
Cubic Feet Flood Storage	e. cubic feet	f. cubic feet	g. cubic feet	h. cubic feet
8. ☐ Isolated Land Subject to Flooding	a. square feet	b. square feet		
Cubic Feet Flood Storage	c. cubic feet	d. cubic feet	e. cubic feet	f. cubic feet

B. Findings (cont.)

Resource Area	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
9. ☒ Riverfront Area	6600 temporary	6600 temporary		
		b. total sq. feet		
Sq ft within 100 ft	0	0	0	0
	c. square feet	d. square feet	e. square feet	f. square feet
Sq ft between 100-200 ft	6600	6600	6600	6600
	g. square feet	h. square feet	i. square feet	j. square feet

Coastal Resource Area Impacts: Check all that apply below. (For Approvals Only)

10. ☐ Designated Port Areas	Indicate size under Land Under the Ocean, below				
11. ☐ Land Under the Ocean	a. square feet	b. square feet			
	c. c/y dredged	d. c/y dredged			
12. ☐ Barrier Beaches	Indicate size under Coastal Beaches and/or Coastal Dunes below				
13. ☐ Coastal Beaches	a. square feet	b. square feet	c. nourishment cu yd	d. nourishment cu yd	
14. ☐ Coastal Dunes	a. square feet	b. square feet	c. nourishment cu yd	d. nourishment cu yd	
15. ☐ Coastal Banks	a. linear feet	b. linear feet			
16. ☐ Rocky Intertidal Shores	a. square feet	b. square feet			
17. ☐ Salt Marshes	a. square feet	b. square feet	c. square feet	d. square feet	
18. ☐ Land Under Salt Ponds	a. square feet	b. square feet			
	c. c/y dredged	d. c/y dredged			
19. ☐ Land Containing Shellfish	a. square feet	b. square feet	c. square feet	d. square feet	
20. ☐ Fish Runs	Indicate size under Coastal Banks, Inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above				
	a. c/y dredged	b. c/y dredged			
21. ☐ Land Subject to Coastal Storm Flowage	a. square feet	b. square feet			

B. Findings (cont.)

22. ☐ Restoration/Enhancement:

a. square feet of BVW

b. square feet of salt marsh

23. ☐ Stream Crossing(s):

a. number of new stream crossings

b. number of replacement stream crossings

C. General Conditions Under Massachusetts Wetlands Protection Act

The following conditions are only applicable to Approved projects.

1. Failure to comply with all conditions stated herein, and with all related statutes and other regulatory measures, shall be deemed cause to revoke or modify this Order.
2. The Order does not grant any property rights or any exclusive privileges; it does not authorize any injury to private property or invasion of private rights.
3. This Order does not relieve the permittee or any other person of the necessity of complying with all other applicable federal, state, or local statutes, ordinances, bylaws, or regulations.
4. The work authorized hereunder shall be completed within three years from the date of this Order unless either of the following apply:
   a. the work is a maintenance dredging project as provided for in the Act; or
   b. the time for completion has been extended to a specified date more than three years, but less than five years, from the date of issuance. If this Order is intended to be valid for more than three years, the extension date and the special circumstances warranting the extended time period are set forth as a special condition in this Order.
5. This Order may be extended by the issuing authority for one or more periods of up to three years each upon application to the issuing authority at least 30 days prior to the expiration date of the Order.
6. If this Order constitutes an Amended Order of Conditions, this Amended Order of Conditions does not extend the issuance date of the original Final Order of Conditions and the Order will expire on December 22, 2013, unless extended in writing by the Department.
7. Any fill used in connection with this project shall be clean fill. Any fill shall contain no trash, refuse, rubbish, or debris, including but not limited to lumber, bricks, plaster, wire, lath, paper, cardboard, pipe, tires, ashes, refrigerators, motor vehicles, or parts of any of the foregoing.
8. This Order is not final until all administrative appeal periods from this Order have elapsed, or if such an appeal has been taken, until all proceedings before the Department have been completed.

C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

9. No work shall be undertaken until the Order has become final and then has been recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land upon which the proposed work is to be done. In the case of the registered land, the Final Order shall also be noted on the Land Court Certificate of Title of the owner of the land upon which the proposed work is done. The recording information shall be submitted to the Conservation Commission on the form at the end of this Order, which form must be stamped by the Registry of Deeds, prior to the commencement of work.

10. A sign shall be displayed at the site not less then two square feet or more than three square feet in size bearing the words,

    "Massachusetts Department of Environmental Protection" [or, "MassDEP"]

    "File Number 33-1302 "

11. Where the Department of Environmental Protection is requested to issue a Superseding Order, the Conservation Commission shall be a party to all agency proceedings and hearings before MassDEP.

12. Upon completion of the work described herein, the applicant shall submit a Request for Certificate of Compliance (WPA Form 8A) to the Conservation Commission.

13. The work shall conform to the plans and special conditions referenced in this order.

14. Any change to the plans identified in Condition #12 above shall require the applicant to inquire of the Conservation Commission in writing whether the change is significant enough to require the filing of a new Notice of Intent.

15. The Agent or members of the Conservation Commission and the Department of Environmental Protection shall have the right to enter and inspect the area subject to this Order at reasonable hours to evaluate compliance with the conditions stated in this Order, and may require the submittal of any data deemed necessary by the Conservation Commission or Department for that evaluation.

16. This Order of Conditions shall apply to any successor in interest or successor in control of the property subject to this Order and to any contractor or other person performing work conditioned by this Order.

17. Prior to the start of work, and if the project involves work adjacent to a Bordering Vegetated Wetland, the boundary of the wetland in the vicinity of the proposed work area shall be marked by wooden stakes or flagging. Once in place, the wetland boundary markers shall be maintained until a Certificate of Compliance has been issued by the Conservation Commission.

C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

18. All sedimentation barriers shall be maintained in good repair until all disturbed areas have been fully stabilized with vegetation or other means. At no time shall sediments be deposited in a wetland or water body. During construction, the applicant or his/her designee shall inspect the erosion controls on a daily basis and shall remove accumulated sediments as needed. The applicant shall immediately control any erosion problems that occur at the site and shall also immediately notify the Conservation Commission, which reserves the right to require additional erosion and/or damage prevention controls it may deem necessary. Sedimentation barriers shall serve as the limit of work unless another limit of work line has been approved by this Order.

NOTICE OF STORMWATER CONTROL AND MAINTENANCE REQUIREMENTS

19. **The work associated with this Order (the "Project") is** (1) ☒ **is not** (2) ☐ **subject to the Massachusetts Stormwater Standards. If the work is subject to the Stormwater Standards, then the project is subject to the following conditions:**

a) All work, including site preparation, land disturbance, construction and redevelopment, shall be implemented in accordance with the construction period pollution prevention and erosion and sedimentation control plan and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Construction General Permit as required by Stormwater Condition 8. Construction period erosion, sedimentation and pollution control measures and best management practices (BMPs) shall remain in place until the site is fully stabilized.

b) No stormwater runoff may be discharged to the post-construction stormwater BMPs unless and until a Registered Professional Engineer provides a Certification that:
i. all construction period BMPs have been removed or will be removed by a date certain specified in the Certification. For any construction period BMPs intended to be converted to post construction operation for stormwater attenuation, recharge, and/or treatment, the conversion is allowed by the MassDEP Stormwater Handbook BMP specifications and that the BMP has been properly cleaned or prepared for post construction operation, including removal of all construction period sediment trapped in inlet and outlet control structures;
ii. as-built final construction BMP plans are included, signed and stamped by a Registered Professional Engineer, certifying the site is fully stabilized;
iii. any illicit discharges to the stormwater management system have been removed, as per the requirements of Stormwater Standard 10;
iv. all post-construction stormwater BMPs are installed in accordance with the plans (including all planting plans) approved by the issuing authority, and have been inspected to ensure that they are not damaged and that they are in proper working condition;
v. any vegetation associated with post-construction BMPs is suitably established to withstand erosion.

C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

c) The landowner is responsible for BMP maintenance until the issuing authority is notified that another party has legally assumed responsibility for BMP maintenance. Prior to requesting a Certificate of Compliance, or Partial Certificate of Compliance, the responsible party (defined in General Condition 18(e)) shall execute and submit to the issuing authority an Operation and Maintenance Compliance Statement ("O&M Statement) for the Stormwater BMPs identifying the party responsible for implementing the stormwater BMP Operation and Maintenance Plan ("O&M Plan") and certifying the following: *i.*) the O&M Plan is complete and will be implemented upon receipt of the Certificate of Compliance, and *ii.*) the future responsible parties shall be notified in writing of their ongoing legal responsibility to operate and maintain the stormwater management BMPs and implement the Stormwater Pollution Prevention Plan.

d) Post-construction pollution prevention and source control shall be implemented in accordance with the long-term pollution prevention plan section of the approved Stormwater Report and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Multi-Sector General Permit.

e) Unless and until another party accepts responsibility, the landowner, or owner of any drainage easement, assumes responsibility for maintaining each BMP. To overcome this presumption, the landowner of the property must submit to the issuing authority a legally binding agreement of record, acceptable to the issuing authority, evidencing that another entity has accepted responsibility for maintaining the BMP, and that the proposed responsible party shall be treated as a permittee for purposes of implementing the requirements of Conditions 18(f) through 18(k) with respect to that BMP. Any failure of the proposed responsible party to implement the requirements of Conditions 18(f) through 18(k) with respect to that BMP shall be a violation of the Order of Conditions or Certificate of Compliance. In the case of stormwater BMPs that are serving more than one lot, the legally binding agreement shall also identify the lots that will be serviced by the stormwater BMPs. A plan and easement deed that grants the responsible party access to perform the required operation and maintenance must be submitted along with the legally binding agreement.

f) The responsible party shall operate and maintain all stormwater BMPs in accordance with the design plans, the O&M Plan, and the requirements of the Massachusetts Stormwater Handbook.

C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

g) The responsible party shall:
1. Maintain an operation and maintenance log for the last three (3) consecutive calendar years of inspections, repairs, maintenance and/or replacement of the stormwater management system or any part thereof, and disposal (for disposal the log shall indicate the type of material and the disposal location);
2. Make the maintenance log available to MassDEP and the Conservation Commission ("Commission") upon request; and
3. Allow members and agents of the MassDEP and the Commission to enter and inspect the site to evaluate and ensure that the responsible party is in compliance with the requirements for each BMP established in the O&M Plan approved by the issuing authority.

h) All sediment or other contaminants removed from stormwater BMPs shall be disposed of in accordance with all applicable federal, state, and local laws and regulations.

i) Illicit discharges to the stormwater management system as defined in 310 CMR 10.04 are prohibited.

j) The stormwater management system approved in the Order of Conditions shall not be changed without the prior written approval of the issuing authority.

k) Areas designated as qualifying pervious areas for the purpose of the Low Impact Site Design Credit (as defined in the MassDEP Stormwater Handbook, Volume 3, Chapter 1, Low Impact Development Site Design Credits) shall not be altered without the prior written approval of the issuing authority.

l) Access for maintenance, repair, and/or replacement of BMPs shall not be withheld. Any fencing constructed around stormwater BMPs shall include access gates and shall be at least six inches above grade to allow for wildlife passage.

Special Conditions (if you need more space for additional conditions, please attach a text document):

See Attachment "A", "State and Municipal Conditions", incorporated herein and made part of this Order of Conditions.

D. Findings Under Municipal Wetlands Bylaw or Ordinance

1. Is a municipal wetlands bylaw or ordinance applicable? ☒ Yes ☐ No

2. The Haverhill Conservation Commission hereby finds (check one that applies):

   a. ☐ that the proposed work cannot be conditioned to meet the standards set forth in a municipal ordinance or bylaw, specifically:

   1. Municipal Ordinance or Bylaw — 2. Citation

   Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides measures which are adequate to meet these standards, and a final Order of Conditions is issued.

   b. ☒ that the following additional conditions are necessary to comply with a municipal ordinance or bylaw:

   An Ordinance to Protect the Wetlands, Related Water Resources and Adjoining Land Areas — Chapter 253
   1. Municipal Ordinance or Bylaw — 2. Citation

3. The Commission orders that all work shall be performed in accordance with the following conditions and with the Notice of Intent referenced above. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, the conditions shall control.

   The special conditions relating to municipal ordinance or bylaw are as follows (if you need more space for additional conditions, attach a text document):

   See Attachment "A", "State and Municipal Conditions", incorporated herein and made part of this Order of Conditions

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
#33-1302
MassDEP File #

eDEP Transaction #

Haverhill
City/Town

E. Signatures

This Order is valid for three years, unless otherwise specified as a special condition pursuant to General Conditions #4, from the date of issuance.

December 22, 2010
1. Date of Issuance

Please indicate the number of members who will sign this form.
This Order must be signed by a majority of the Conservation Commission.

six
2. Number of Signers

The Order must be mailed by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate Department of Environmental Protection Regional Office, if not filing electronically, and the property owner, if different from applicant.

Signatures:

☐ by hand delivery on

Date

☒ by certified mail, return receipt requested, on

December 22, 2010
Date

F. Appeals

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate MassDEP Regional Office to issue a Superseding Order of Conditions. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Request of Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

Any appellants seeking to appeal the Department's Superseding Order associated with this appeal will be required to demonstrate prior participation in the review of this project. Previous participation in the permit proceeding means the submission of written information to the Conservation Commission prior to the close of the public hearing, requesting a Superseding Order, or providing written information to the Department prior to issuance of a Superseding Order.

The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act (M.G.L. c. 131, § 40), and is inconsistent with the wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal ordinance or bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.

G. Recording Information

This Order of Conditions must be recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land subject to the Order. In the case of registered land, this Order shall also be noted on the Land Court Certificate of Title of the owner of the land subject to the Order of Conditions. The recording information on this page shall be submitted to the Conservation Commission listed below.

Haverhill
Conservation Commission

Detach on dotted line, have stamped by the Registry of Deeds and submit to the Conservation Commission.

To:

Haverhill
Conservation Commission

Please be advised that the Order of Conditions for the Project at:

Groveland Road - Parcel IDs: 776-788-20, 21, 24, and 26

33-1302
MassDEP File Number

Has been recorded at the Registry of Deeds of:

Essex, South District
County

Book

Page

for:
Property Owner

and has been noted in the chain of title of the affected property in:

Book

Page

In accordance with the Order of Conditions issued on:

Date

If recorded land, the instrument number identifying this transaction is:

Instrument Number

If registered land, the document number identifying this transaction is:

Document Number

Signature of Applicant

Haverhill

Economic Development and Planning
Conservation Department
Phone: 978-374-2334 Fax: 978-374-2337
rmoore@cityofhaverhill.com
conservation@cityofhaverhill.com

ATTACHMENT "A"
STATE AND MUNICIPAL CONDITIONS
DEP FILE #33-1302
CITY OF HAVERHILL
GROVELAND ROAD
MAP 776, BLOCK 788, LOTS 20, 21, 24, AND 26

I. GENERAL CONSTRUCTION

1. Work on this project site shall be performed according to the following listed plans and documents. Should any conflicts be found to exist between these plans and documents and the conditions of this Order, the Haverhill Conservation Commission (HCC) shall be contacted for a clarification.
   a) "Wetlands Protection Act Notice of Intent – Southern Mound Closure Haverhill Landfill" document, including Attachments A through I, prepared by Camp Dresser McKee, Inc. (One Cambridge Place, 50 Hampshire Street, Cambridge, MA 02139), dated November 3, 2010, and on file with the HCC (Room 210, City Hall, 4 Summer Street, Haverhill, MA 01830); and
   b) "Southern Mound Closure – Haverhill Landfill Corrective Action Design" (Cover Sheet and Sheets G1, C1 through C13, and D1 through D3), site plans prepared by Camp Dresser McKee, Inc., dated October 2010, and on file with the HCC.

2. All pumps, drilling machines, and their surrounding areas, whether used for dewatering or other purposes, shall be properly contained to limit the potential for environmental impacts due to fuel leakage, pump leakage, or other failures.

3. **The applicant shall refer to and comply with the Order of Conditions, and subsequent Modifications, issued under DEP File #33-1027, as they pertain to conditioning activities proposed on these lots. Following the completion of work under DEP File #33-1027, the applicant shall apply for and obtain a Certificate of Compliance from the Commission.**

II. NOTIFICATION TO OTHER PARTIES

1. The applicant shall notify the Haverhill Conservation Commission, in writing, at least 48 hours before any activity commences on site. At this time the applicant shall also supply the HCC with a list of names, addresses, and emergency phone numbers for those parties responsible for compliance with this Order on the site, including the Environmental Monitor.

2. During the life of this Order, should any modifications to the wetland delineations be found to be necessary by the HCC, the applicant shall submit a modified plan reflecting these modifications.

3. The sign required under General Condition #9 of this Order shall not be attached to a live tree.

4. Any changes proposed under General Condition #13 of this Order might require the applicant to file a Request for a Modification to the Order of Conditions with the Commission.

5. While all activities regulated by this Order are being performed and during the construction phase of this project, an on-site foreman, directing engineer, or designated construction manager, shall have a copy of this permit and its associated plans and documents at the site, familiarize him or herself with the conditions of this permit, and adhere to such conditions. This Order of Conditions shall be made part of all construction-related documents for this project. All contractors working at the site shall be made aware of the provisions contained within this Order of Conditions and adhere to them.

6. The applicant shall secure an Environmental Monitor for this project. This Monitor shall be, at a minimum, a professional with experiences in stormwater management, erosion and siltation control practices, wildlife habitat evaluation, and wetlands protection. This Monitor shall have, at a minimum, a working knowledge of botany, hydrology, and general construction practices.
   a) On the Monday of every week during the life of this project, the Environmental Monitor shall provide the HCC with a status report of the project. This report shall indicate the activities completed the previous week and those planned for the current week. The report shall also mention any deviations from the previous week's report and any environmental mitigation measures that have been undertaken. The frequency of this reporting may be altered as site conditions warrant, upon concurrence between the HCC or its representative and the Environmental Monitor.
   b) In addition to this reporting, the Environmental Monitor shall be responsible for all inspections and reporting as outlined in this Order and the referenced plans and documents pertaining to resource area activities, erosion and siltation controls, and stormwater management. The Monitor shall be on site as necessary to ensure proper implementation of the conditions of this Order and the work outlined in the referenced plans and documents.
   c) In the weekly reports required under Condition **II**.6a, the Monitor shall maintain a photographic log, with associated text, of the pre-construction through post-construction views of waste removal activities from the wetland resource areas on this site. This log shall be used by the Monitor and the HCC to guide resource area restoration efforts and monitoring outlined under Section **VII** of this Order.

III. CONSTRUCTION SEQUENCING

1. **Prior to the commencement of work on this site**, the applicant shall request a Certificate of Compliance for the previous Order of Conditions issued for this property under DEP File #33-937, issued to regulate preliminary site investigations.

2. **Prior to the commencement of work on this site**, the applicant shall provide a detailed construction sequencing for this project to the HCC and City Engineer. This sequence shall be subject to the prior review and approval of an HCC official and the City Engineer. Should any conflicts arise between this sequencing, the conditions of this Order, and/or the general construction practices of the site contractor, a Conservation Department Official shall be contacted for a clarification.

3. **Prior to the commencement of work on this site**, the applicant shall submit a recorded copy of the 401 Water Quality Certificate (or recorded, approved deed restriction) issued by the Department of Environmental Protection for this project and an Army Corps of Engineers permit (if needed).

4. **Prior to the commencement of work on this site,** the applicant shall submit proof of filing and EPA activation of a "Notice of Intent (NOI) for Storm Water Discharges Associated with CONSTRUCTION ACTIVITY Under a NPDES General Permit" with the United States Environmental Protection Agency (EPA) under the National Pollutant Discharge Elimination System (NPDES) Program. Submitted with this proof shall be a copy of the Storm Water Pollution Prevention Plan (SWPPP) prepared for this project.

5. **Prior to the commencement of work regulated by this Order of Conditions,** pre-construction meetings shall be conducted with the site contractor, the applicant, the applicant's engineers/consultants, the Environmental Monitor, the Conservation Commission, and all other affected City Officials. The purpose of the pre-construction meetings is to review this Order of Conditions and resolve any outstanding issues at that time.

6. **Prior to the commencement of work on this site,** the applicant shall submit a Construction and Post-Construction "Operations and Maintenance Plan" relative to the site's stormwater management systems for the review and approval of a Conservation Department Official.

7. The storm drainage systems shall be constructed and functioning as part of the initial project phase.

IV. LIMITS OF PROJECT

1. Work on this project shall be performed in accordance with Haverhill Municipal Ordinances Chapter 253 – "An Ordinance to Protect the Wetlands, Related Water Resources, and Adjoining Land Areas".

2. All wetland resource areas shall be visibly staked every 25 feet along the resource area boundaries in order to assure that no intrusion into these areas occur.

3. Flagging and staking used to identify wetland resource areas shall be of a color different from any others used on the site. The existing flagging and required staking shall be maintained until the work is complete.

4. Refueling of equipment shall not be done within 100' of a wetland resource area. No fuel, oil, or other potential pollutants shall be stored within 100' of a wetland resource area.

5. Equipment shall not be staged overnight within 100' of a wetland resource area.

6. The rows of erosion control devices, as shown on the aforementioned plan, shall also act as a limit of site activity.

7. All vegetation clearing associated with this project, including any pruning that may be necessary for the construction of this project, shall be subject to the prior review and approval of an HCC official. All approved limits of clearing and/or pruning shall be clearly identified on the site by the applicant using staking, flagging, or other appropriate means.

8. In accordance with Haverhill Municipal Ordinance Chapter 253, there shall be no activities allowed within **25'** of the delineated wetland resource areas and no building construction within **50'** of these same areas, except as shown on the approved plans referenced above.

9. No waste products, grubbed stumps, slash, cut timber, construction materials, etc. shall be deposited or accumulated within 100' of a wetland resource area. Covered dumpsters shall be maintained on site for appropriate materials.

10. No storage of debris, fill, or excavated material or the stockpiling of topsoil shall be conducted within 100' of a wetland resource area or within bordering land subject to flooding, unless approved in advance by a Conservation Department Official.

V. EROSION AND SILTATION CONTROLS

1. No activity other than the installation of the erosion and siltation control devices shall take place until an HCC official inspects and approves their installation. Such rows shall be installed along the limit of activity as shown on the referenced site plans. Only incidental clearing and grubbing shall be allowed for their installation. All erosion and siltation controls shall be maintained in a state of good repair until all disturbed areas have been stabilized, or until a determination by the HCC stating that control measures are no longer necessary. Continuation of on-site work shall be contingent upon the effectiveness of the erosion and siltation control devices.

2. All erosion and siltation control devices shall be offset from the delineated wetland resource areas as shown on the approved site plans. The applicant's engineer, prior to their installation, shall stake out the locations of these devices on the site.

3. The areas of construction shall remain in a stable condition at the close of each construction day. Erosion controls should be inspected at this time, and maintained or reinforced if necessary.

4. The Environmental Monitor shall oversee any emergency placement of controls and regular inspection or replacement of erosion and sedimentation control devices. The name and phone number of the Monitor must be provided to the HCC in the event that this person has to be contacted, due to an emergency at the site, during any 24-hour period, including weekends. This person shall be given authority to stop construction for erosion control purposes. The Environmental Monitor will be required to inspect all such devices and oversee cleaning and the proper disposal of waste products. The Monitor shall immediately correct any erosion problems that may occur on the site.

5. An adequate stockpile of erosion control materials shall be on site at all times for emergency or routine replacement and shall include materials to repair silt fences, hay bales, stone-riprap, filter dikes or any other devices planned for use during construction.

6. All graded slopes shall maintain a slope ratio no greater than 2:1, unless otherwise approved by the City Engineer and HCC.

7. Upon completion of the project all disturbed areas shall be permanently stabilized with rapidly growing cover with sufficient topsoil to assure long term stabilization of disturbed areas.

8. Erosion control devices may be modified based on experience at the site. Approval of the HCC must be obtained prior to any non-emergency modification of the approved erosion and sediment control measures. All such devices shall be inspected, cleaned, or replaced during construction and shall remain in place until such time as the site is stabilized with vegetative cover.

9. Subsequent to seeding, disturbed areas are to be covered with hay mulch or jute netting in order to provide a suitable surface cover until seed germination.

10. During all phases of construction, all disturbed or exposed soil surfaces shall be brought to final finished grade and either a) covered with loam and seeded in accordance with USDA Soil Conservation Services Guidelines for permanent stabilization or b) stabilized in another way approved by the HCC. Bare ground that cannot be permanently stabilized within 30 days shall be stabilized with mulch or any other protective covering and/or method approved by the USDA Soil Conservation Service.

11. The HCC reserves the right to impose additional conditions on portions of this project to mitigate any impacts which could result from site erosion or any noticeable degradation of surface water quality discharging from the site.

12. All dewatering activities shall be controlled by implementing Best Management Practices (BMP's). Dewatered fluids shall be prevented from flowing directly into resource areas. Discharge structures, such as detention basins, retention basins, or other BMP's will be configured to maximize ground infiltration. If discharge towards resource areas cannot be avoided, it shall be via a maximized distance of overland upland sheet flow unless an HCC Official approves an alternative in advance. The Erosion Control Monitor shall review and approve all dewatering methods prior to implementation.

13. No planting of non-native or invasive plants, even if already found on this site, shall occur anywhere on this project site.

14. The locations of long term (greater than 30 days) stockpiles and the locations and construction methods of the temporary construction entrances shall receive the prior approval of an HCC official, City Engineer, and the Environmental Monitor. Any conflicts regarding these matters shall be resolved with the applicant's filing of a proposal in accordance with condition **II.**4.

VI. STORMWATER

1. During construction, all drainage systems shall be maintained as outlined in the Operation and Maintenance Plan required under Condition **III.**5.

2. During construction, the detention basin outlet structures shall be constructed in such a manner that allows for the emergency shut down/plugging of the structures. The devices used for this purpose shall be available on site at all times for use at the discretion of the Environmental Monitor, Resident Engineer, and the HCC.

3. As each basin is completed, as-built plans of the stormwater management systems shall be submitted for review and approval to the HCC to define the geometry of the basins. Such plans shall contain at least 1 cross section, showing all structures details and applicable seasonal high groundwater elevations, and be drawn at a scale equal to that of the proposed site plans. The plans shall be accompanied by as-built volumetric calculations (at one-foot increments) with a comparison to design volumetric calculations to show that the constructed basins and forebays meet or exceed their design requirements.

VII. RESOURCE AREA ACTIVITIES

1. All work proposed within wetland resource areas and the 25'-No Disturbance Zone shall be performed according to the plans and documents submitted as part of the Notice of Intent filing, unless specified otherwise in this Order. The proposed mitigation areas shall meet or exceed the General Performance Standards outlined in 310 CMR 10.00 and Haverhill Municipal Ordinances Chapter 253. Should these areas fail to meet any of these standards, the HCC reserves the right to require those measures necessary to achieve compliance.

2. The Environmental Monitor shall be on site during construction of all mitigation areas. The Monitor shall supervise this construction.

3. The contractor shall not disturb any area of protected or regulated Federal, State, and/or Local wetland resource area or buffer zone except for that which has been permitted by this Order.

4. The contractor shall restore all temporarily disturbed resource areas and buffer zones (e.g. if approved for the implementation of this project) to the satisfaction of the HCC and the Environmental Monitor. He shall ensure that 75 percent of the surface area of all temporarily disturbed and restoration areas is reestablished with indigenous plant species within two growing seasons of their planting or replanting. If at the end of one growing season it is evident, in the opinion of the Environmental Monitor or the Conservation Commission, that a disturbed area is not likely to be successfully reestablished within this time frame, the Monitor shall submit to the HCC a corrective plan of action detailing supplements to the planting, soils, and/or grading, as necessary, to achieve the required coverage. This plan shall be implemented upon HCC approval.

5. The contractor shall follow the directions of the Environmental Monitor, whether given prior to, or during, construction of any mitigation area(s). If feasible, the contractor shall propose alternative mitigation and environmental protection techniques that provide cost or time savings, improved environmental protection, or enhanced mitigation, provided (1) they provide equivalent or greater wetland protection and mitigation than afforded by the methods contained in this Order and NOI and provided by the Environmental Monitor; (2) they receive prior approval by the HCC and the Environmental Monitor; and (3) they meet the Performance Standards of the Massachusetts Wetland Protection Regulations (310 CMR 10.00) and the requirements of Haverhill Municipal Ordinance Chapter 253.

6. Debris/waste removal from resource areas and their buffer zones shall be performed during low flow/groundwater conditions.

7. Every effort shall be made to perform the wetland related activities during low flow and low groundwater conditions.

8. Following the completion of the proposed mitigation activities, a row of siltation fencing shall be installed along the outer edge of the mitigation area(s).

9. The following general sequencing shall be adhered to for the creation of the mitigation area(s). **Once waste removal commences within the resource areas, the applicant shall move expeditiously to complete this work and restore the impacted resource areas as approved under this Order.**

a) Sedimentation and erosion control measures shall be in place prior to proceeding with any work proposed in the wetland resource areas. An HCC Official shall inspect their proper installation. At this time a preconstruction meeting shall be held on site with the Official, Environmental Monitor, applicant, and any other individual in charge of work on the site to discuss any issues that remain at that time.
b) Excavation equipment brought onto the site shall be cleaned at an off site location prior to commencement of site work to remove any soils which may contain noxious plant remains.
c) Upon inspection and approval of the sedimentation and erosion control devices, and the holding of the preconstruction meeting, implementation of the mitigation work proposed may begin. The Environmental Monitor shall be on site at this time to monitor the activities within the resource areas.
d) Upon completion of the finished grading, the mitigation area(s) shall be planted as per the approved plans and documents referenced above.
e) The applicant is to contact the HCC upon completion of the mitigation area(s); an appointment for inspection by an HCC Official shall be arranged with the Environmental Monitor.
f) Following this inspection, the applicant shall submit a status report, written by the Environmental Monitor describing to the HCC the status of this area. This report shall be accompanied by an as-built grading plan that details this area as well as its immediate surroundings.
g) The Environmental Monitor, prior to and following each growing season until a Certificate of Compliance is issued, shall submit monitoring reports to the HCC. Monitoring reports shall describe, using narratives, plans, and color photographs, the physical characteristics of the mitigation area(s) with respect to soils, hydrology, habitat value, stability, survivorship of vegetation and plant mortality, aerial extent and distribution, species diversity and vertical stratification (i.e., the herb, shrub, and tree layers), etc. A minimum of four monitoring reports for these areas shall be submitted over the first two years. These monitoring reports shall be submitted by May 31 and September 30 of the first two years. Applicable General Performance standards as outlined in 310 CMR are to be met within two years of completion. A Certificate of Compliance is to be issued ONLY AFTER the General Performance Standards have been met.
h) Removal of noxious plant species by hand from the mitigation area(s) shall be required. This requirement shall be addressed in the monitoring reports required under condition h.
i) A color photographic log of the site shall be kept with associated text by the Environmental Monitor and submitted as follows:
   i. With the status report described in condition "f" above showing pre-construction through post-construction views of the mitigation area(s), undisturbed resource area(s) and 25'-No Disturbance Zone(s), and erosion/sedimentation control devices.
   ii. With monitoring reports described in condition "g" above showing the mitigation area(s), undisturbed resource area(s) and 25'-No Disturbance Zone(s), and erosion/sedimentation control devices.

VIII. OTHER CONDITIONS

1. If any unforeseen problem occurs during construction, which affects any of the eight statutory interests of the Wetlands Protection Act, M.G.L. Chapter 131, Section 40, upon discovery, the applicant shall notify the HCC and an immediate meeting shall be held between the Commission, the applicant, the engineer, contractor, and other concerned parties to determine the corrective measures to be employed. The applicant shall then act to correct the problems using the corrective measures agreed upon.

2. Upon completion of the project, the applicant shall request a Certificate of Compliance from the Commission and shall submit the following information with the request:

a) A written statement by a professional engineer or land surveyor registered in the Commonwealth of Massachusetts certifying compliance with the approved plans referenced above and this Order of Conditions and setting forth deviations, if any exist;
b) A final monitoring report prepared by the Environmental Monitor in accordance with the criteria outlined in Section **VII.**
c) Two sets of as-built site plans prepared by a registered land surveyor or registered professional engineer showing grades, utilities, drainage systems, building footprint and detailed landscaping (i.e. all wetland resource areas, limits of work, etc.). These plans shall include the date(s) of fieldwork and shall be prepared in accordance with the "Plot Plan Standards" of the HCC Policy - P2000-02 "Occupancy Permit Checklist Endorsement".

IX. ONGOING CONDITIONS

Certain conditions are ongoing and do not expire upon the completion of the project or the issuance of a Certificate of Compliance. These conditions shall remain in effect after the issuance of a Certificate of Compliance for the project and shall be referenced in the chain of title for the property. These conditions are:

1. The applicant and/or property owners shall ensure that at least one copy of all the plans and documents referenced in condition **I.1**, this Order of Conditions, the subsequent Certificate of Compliance, all Modifications to the Order and their relevant revised plans and/or documents is maintained at all times. This information shall be made available for use by the property owners in its implementation of the activities discussed within and by the HCC during any inspections that may be necessary.

2. The drainage systems shall be maintained to insure serviceability during operation as designed and as required in the Operation and Maintenance Plan required under Condition **III.5** of this Order. In addition to the monitoring requirements incorporated in the OMP, the applicant's and/or property owner's professional engineer on a monthly basis shall inspect the stormwater management systems for their first 12 months of post-construction usage. At the end of this first year, the engineer shall report to the Commission his findings regarding maintenance frequency needs so that the OMP may be properly amended, if necessary. Each component of the drainage systems shall be maintained in compliance with the intent of the maintenance criteria outlined in the Stormwater Technical Handbook, prepared by the Department of Environmental Protection and Office of Coastal Zone Management, for each respective Best Management Practice.

3. The maintenance or repair of the drainage systems shall be the responsibility of the applicant and/or property owners. The design capacity and structural integrity of these facilities must be maintained as required in the Operation and Maintenance Plan required under Condition **III.5** of this Order.

4. The City of Haverhill reserves the right to schedule an annual inspection with the property owners as part of the "Operation and Maintenance Plan" program to inspect any and all components of the proposed stormwater management systems for proper function and maintenance.

5. The Haverhill Conservation Commission reserves the right to enforce any and all restrictions and/or requirements established for this property within this Order of Conditions under the enforcement powers of the City's wetlands protection ordinance, Municipal Ordinance Chapter 253.

6. When de-icing is proposed, alternative compounds such as calcium chloride ($CaCl_2$) and calcium magnesium acetate (CMA) shall be considered for use.

7. Pesticides, herbicides, and fungicides shall not be used within 100' of any wetland resource area for the purpose of lawn maintenance.

8. Fertilizers utilized for landscaping and lawn care within this property shall be slow-release, low-nitrogen types and shall not be used within 30' of any wetland resource area.

Army Corps of Engineers- General Permit Category 2

DEPARTMENT OF THE ARMY
NEW ENGLAND DISTRICT, CORPS OF ENGINEERS
696 VIRGINIA ROAD
CONCORD, MASSACHUSETTS 01742-2751

REPLY TO
ATTENTION OF

February 8, 2011

Regulatory Division
CENAE-R-PEA
File Number: NAE-2010-2369

Robert E. Ward
City of Haverhill
40 South Porter Street
Haverhill, Massachusetts 01835

Dear Mr. Ward:

We have reviewed your application to perform work and place approximately 11,000 square feet of temporary fill below the ordinary high water mark of waters of the United States including wetlands in order to close the Southern Mound of the Haverhill Landfill by placing a cap over the land-filled waste material. The project will temporarily alter 11,000 square feet of wetlands along the intermittent stream located on the west side of the site in order to remove waste material within wetlands, remediate soils, and install the landfill cap. Altered wetland areas will be restored in place. This project is located in the Johnson Creek and the Merrimack River off Old Groveland Road, Haverhill, Massachusetts. The work is shown on the attached plans entitled, "Southern Mound Closure – Haverhill Landfill, Corrective Action Design," on 18 sheets, and dated October, 2010.

Based on the information you have provided, we have determined that the proposed activity, which includes a discharge of dredged or fill material into waters or wetlands, will have only minimal individual or cumulative environmental impacts on waters of the United States, including wetlands. Therefore, this work is authorized as a Category 2 activity under the attached Federal permit known as the Massachusetts General Permit (GP). This work must be performed in accordance with the terms and conditions of the GP.

The Corps of Engineers has consulted with the National Marine Fisheries Service (NMFS) regarding the effects of your project on Essential Fish Habitat (EFH) as designated under the Magnuson-Stevens Fishery Conservation and Management Act. The NMFS has not provided EFH conservation recommendations.

You are responsible for complying with all of the GP's requirements. Please review the attached GP carefully, in particular the GP conditions beginning on Page 5, to familiarize yourself with its contents. You should ensure that whoever does the work fully understands the requirements and that a copy of the permit document and this authorization letter are at the project site throughout the time the work is underway.

This determination becomes valid only after the Massachusetts Department of Environmental Protection (MassDEP) issues or waives Water Quality Certification (WQC) as required under Section 401 of the Clean Water Act. In the event the DEP denies the 401 WQC, this determination becomes null and void. The address of the MassDEP Regional office for your area is provided in the attached GP.

Your project is located within, or may affect resources within the coastal zone. The Massachusetts Office of Coastal Zone Management (CZM) has already determined that no further Federal Consistency Review is required.

This GP expires on January 21, 2015. Activities authorized under this GP that have commenced (i.e., are under construction) or are under contract to commence before this GP expires will have until January 21, 2016 to complete the activity under the terms and general conditions of the current GP. For work within Corps jurisdiction that is not completed by January 21, 2016, you will need to reference any reissued GP to see if your project is still authorized under Category 1 (no application required), or Category 2 (application required). If it is no longer authorized you must submit an application and receive written authorization before you can continue work within our jurisdiction. Please contact us immediately if you change the plans or construction methods for work within our jurisdiction. This office must approve any changes before you undertake them.

This authorization requires you to complete and return the attached Work Start Notification Form to this office at least two weeks before the anticipated starting date. You must also complete and return the enclosed Compliance Certification Form within one month following the completion of the authorized work.

This authorization presumes that the work as described above and as shown on your plans noted above is in waters of the U.S. Should you desire to appeal our jurisdiction, submit a request for an approved jurisdictional determination in writing to this office.

This permit does not obviate the need to obtain other federal, state, or local authorizations required by law, as listed on Page 2 of the GP. Performing work not specifically authorized by this determination or failing to comply with all the terms and conditions of the GP may subject you to the enforcement provisions of our regulations.

We continually strive to improve our customer service. In order for us to better serve you, we would appreciate your completing our Customer Service Survey located at http://per2.nwp.usace.army.mil/survey.html

Please contact Kevin Kotelly, of my staff at 978-318-8703 if you have any questions.

Sincerely,

Brian E. Valeta
for Karen Kirk Adams
Chief, Permits & Enforcement Branch
Regulatory Division

Attachments

Copies Furnished:

Ed Reiner, U.S. EPA, Region 1, Boston, Massachusetts, reiner.ed@epa.gov
Christopher Boelke, National Marine Fisheries Service, Gloucester, Massachusetts, christopher.boelke@noaa.gov
Rachel Freed, DEP NERO, Wetland and Waterways, Wilmington, Massachusetts, rachel.freed@state.ma.us (DEP File No. x235384)
Cheryl Accardi, Conservation Department, City Hall, Room 210, 4 Summer Street, Haverhill, Massachusetts 01830
Magdalena Lofstedt, CDM, Inc., 50 Hampshire Street, Cambridge, Massachusetts 02139

US Army Corps
of Engineers®
New England District

GENERAL PERMIT
WORK-START NOTIFICATION FORM
(Minimum Notice: Two weeks before work begins)

****
* MAIL TO: U.S. Army Corps of Engineers, New England District *
* Permits and Enforcement Branch *
* Regulatory Division *
* 696 Virginia Road *
* Concord, Massachusetts 01742-2751 *
****

Corps of Engineers Permit No. NAE-2010-2369 was issued to the City of Haverhill, Massachusetts, on February 9, 2011. This project is located in the Johnson Creek and the Merrimack River off Old Groveland Road, Haverhill, Massachusetts. The permit authorized the permittee to perform work and place approximately 11,000 square feet of temporary fill below the ordinary high water mark of waters of the United States including wetlands in order to close the Southern Mound of the Haverhill Landfill by placing a cap over the land-filled waste material. The project will temporarily alter 11,000 square feet of wetlands along the intermittent stream located on the west side of the site in order to remove waste material within wetlands, remediate soils, and install the landfill cap. Altered wetland areas will be restored in place.

The people (e.g., contractor) listed below will do the work, and they understand the permit's conditions and limitations.

PLEASE PRINT OR TYPE

Name of Person/Firm: _____

Business Address: _____

_____

_____

Telephone Numbers: (___) _____ (___) _____

Proposed Work Dates: **Start:** _____ **Finish:** _____

Permittee/Agent Signature: _____ **Date:** _____

Printed Name: _____ **Title:** _____

Date Permit Issued: _____ **Date Permit Expires:** _____

****

FOR USE BY THE CORPS OF ENGINEERS

PM: Kevin Kotelly **Submittals Required:** _____

Inspection Recommendation: _____

_____

_____

US Army Corps
of Engineers ®
New England District

(Minimum Notice: Permittee must sign and return notification within one month of the completion of work.)

COMPLIANCE CERTIFICATION FORM

Permit Number: NAE-2010-2369

Project Manager Kevin Kotelly

Name of Permittee: City of Haverhill, Massachusetts

Permit Issuance Date: February 8, 2011

Please sign this certification and return it to the following address upon completion of the activity and any mitigation required by the permit. You must submit this after the mitigation is complete, but not the mitigation monitoring, which requires separate submittals.

****
* MAIL TO: U.S. Army Corps of Engineers, New England District *
* Permits and Enforcement Branch A *
* Regulatory Division *
* 696 Virginia Road *
* Concord, Massachusetts 01742-2751 *
****

Please note that your permitted activity is subject to a compliance inspection by an U.S. Army Corps of Engineers representative. If you fail to comply with this permit you are subject to permit suspension, modification, or revocation.

I hereby certify that the work authorized by the above referenced permit was completed in accordance with the terms and conditions of the above referenced permit, and any required mitigation was completed in accordance with the permit conditions.

_____ _____
Signature of Permittee Date

_____ _____
Printed Name Date of Work Completion

(____) _____ (____) _____
Telephone Number Telephone Number

Water Quality Certificate

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NORTHEAST REGIONAL OFFICE
205B Lowell Street, Wilmington, MA 01887 • (978) 694-3200

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lieutenant Governor

RICHARD K. SULLIVAN JR.
Secretary

KENNETH L. KIMMELL
Commissioner

MassDEP NERO FAX TRANSMITTAL FORM

TO:

Date: 2/9/11

Attention: Magdalena Lefstedt

Company Name: CDM

Company Fax Number: 617 452-6597

Company Phone Number: _____

RE: 401 WQC - HAVERHILL LANDFILL

FROM:

MassDEP Contact Person: Nancy White

MassDEP Bureau: BRP - Wetlands

MassDEP Contact Telephone: 978 694 3359

Comments:

Transmittal Form plus 9 pages.

To report transmission problems, please contact the MassDEP employee this fax is directed to.
FAX Number for MassDEP NERO is 978-694-3499

MassDEP
Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection
Northeast Regional Office • 205B Lowell Street, Wilmington MA 01887 • 978-694-3200

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lieutenant Governor

RICHARD K. SULLIVAN JR.
Secretary

KENNETH L. KIMMELL
Commissioner

February 9, 2011

City of Haverhill,
40 South Porter Street
Haverhill, MA 01835

Attn: Mr. Robert E. Ward

RE: **Water Quality Certification**
BRP WW10
Major Project
AT: off Groveland Road, Haverhill, MA
DEP File #'s 033-1302
Transmittal Number: X235384

Dear Mr. Ward:

MassDEP has reviewed your application for a Water Quality Certification, as referenced above. In accordance with the provisions of MGL c.21, §§ 26-53 and Section 401 of the Federal Clean Water Act as amended (33 U.S.C. §1251 et seq.) it has been determined there is reasonable assurance the project or activity will be conducted in a manner which will not violate applicable water quality standards. A site visit for the project [see: 314 CMR 9.05 (4)] was conducted by MassDEP staff on January 20, 2011, as part of a regulatory agency field inspection of the site.

The purpose of the project is to cap the 35-acre Southern Mound of the Haverhill Landfill in accordance with the MassDEP Solid Waste Management Regulations (310 CMR 19.00). The purpose of the capping is to isolate landfill contents, thus reducing leachate production, preventing run-off contact with waste, and volatilization of landfill gases and subsequent contaminant migration. Closure of the Haverhill Municipal Landfill is proceeding in accordance with an Administrative Consent Order (ACO) dated January 22, 1999 between the Site's owners (the City and Aggregate Industries) and MassDEP. Since the Haverhill Landfill is also a Superfund Site, closure must also meet the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) administrated by the U.S. Environmental Protection Agency (EPA).

Capping of the Haverhill Landfill Northern Mound and further assessment of arsenic impacted groundwater (to be required by the MassDEP Solid Waste Program) in the vicinity of Johnson

Creek will be conducted separate from the Southern Mound closure project. Regarding the assessment of project-wide impacts, MassDEP finds that the Southern Mound Closure can be conducted independently of the Northern Mound Closure and the Johnson Creek assessment projects. The existing site contains 62,000 square feet of BVW and 1,100 linear feet of Bank associated with the intermittent stream. Specific Southern Mound project activities approved by this Certification include the temporary alteration of 11,000 square feet of Bordering Vegetated Wetlands (BVW) and 1,050 linear feet of Bank associated with the intermittent stream located on the western side of the site. The alteration is proposed in order to remove waste material within the BVW, remediate soils, and install the landfill cap. The altered wetlands will be restored in place with no net loss. An Invasive Species Control Plan will also be implemented to remove and properly dispose of invasive species currently established in the western BVW. Six isolated depressions on or near the Southern Mound were determined to be non-jurisdictional wetland resource areas by the Haverhill Conservation Commission and therefore not subject to the Massachusetts Wetlands Protection Act. MassDEP concurs with this opinion and has also confirmed the findings of the United States Army Corps of Engineers (USACE) that these six areas are not subject to Federal Jurisdiction as Waters of the United States because they are not associated with, or lack significant nexus to, "navigable waters."

An Environmental Notification Form (ENF) was filed with the Massachusetts Environmental Policy Act (MEPA) for the project and the Certificate on the ENF was issued on November 30, 2001. More recently, a Notice of Project Change (NPC) was submitted to MEPA in July 2009 requesting separation of the Northern and Southern Mounds into two separate and distinct closure projects. The Certificate on the NPC was issued on September 18, 2009 approving the project change and stating that no further MEPA review was required for the Southern Mound.

The proposed project is being permitted under the Wetlands Protect Act through an Order of Conditions, DEP File # 33-1302, issued by the Haverhill Conservation Commission on December 22, 2010.

The Criteria for Evaluating Proposed Discharge to Wetlands of the March 1995, Regulations for the Water Quality Certification Program (the Regulations) requires the submittal of certain information that is necessary for MassDEP to determine that the project complies with the Wetland Protection Act, minimizes individual and cumulative impacts, and, complies with the Massachusetts Surface Water Quality Standards.

In accordance with the provisions of MGL c.21, §§ 26-53 and Section 401 of the Federal Clean Water Act as amended (33 U.S.C. §1251 et seq.), and the Regulations 314 CMR 9.00, and as a result of the proposed mitigation measures, as supplemented by the following Conditions, there is reasonable assurance the project will be conducted in a manner which will not violate applicable water quality standards at 314 CMR 4.00 as implemented by 314 CMR 9.00. Therefore, based on information currently in the record, MassDEP grants a Water Quality Certification for this project subject to the following conditions to maintain water quality, to minimize impact on waters and wetlands, and to ensure compliance with appropriate state law:

1. This project could result in a violation of MassDEP's Water Quality Standards, 314 CMR 4.00. Therefore, reasonable care and diligence shall be taken to assure that the proposed activity will not violate Class B standards.

2. All activity shall conform to the following plans and documents:

   a. Application for Water Quality Certificate dated November 4, 2010, which includes Transmittal Form #X235384.
   b. Plan entitled:
   "City of Haverhill, Massachusetts & Aggregate Industries – Northeast Region, Inc., Southern Mound Closure – Haverhill Landfill Corrective Action Design, Project No. CWSRF-3403," Sheets G-1, C-1 through C-13, and D-1 through D-3, Various Scales. Dated October 2010. Plans Prepared by: CDM and stamped by Bruce William Haskell, P.E. No. 37487.

3. All activity shall conform to the requirements set forth in the Order of Conditions issued by the Haverhill Conservation Commission on December 22, 2010, for DEP File #033-1302, unless specified herein.

4. All activity shall conform to the requirements set forth in the Army Corps of Engineers, Individual 404 Permit, Category 2 Activity, Application Number NAE-2010-2369.

5. MassDEP shall be notified of all changes in plans affecting waters or wetlands. MassDEP will determine whether the changes require a revision to this certification.

6. Prior to the commencement of any activity on this site, there shall be a pre-construction meeting between the project supervisor, the contractor responsible for the work, the Environmental Monitor, a member of the Haverhill Conservation Commission or its Administrator, and a representative of MassDEP to ensure that the requirements of the Water Quality Certification are understood. Arrangements shall be made two weeks prior to any activity to arrange for the pre-construction meeting.

7. The project proponent shall notify MassDEP and the Haverhill Conservation Commission in writing, 48 hours before any activity commences on site.

8. Members and agents of MassDEP and the Haverhill Conservation Commission shall have the right to enter and inspect the premises to evaluate compliance with conditions stated in this Water Quality Certification. The project proponent shall submit any data MassDEP deems necessary for that evaluation.

9. Prior to construction, erosion controls shall be placed on site between areas of proposed work and resource areas. Haybales and/or silt fence must be staked. Silt fencing must be entrenched.

10. An adequate stockpile of erosion control materials shall be on site at all times for emergency or routine replacement and shall include materials to repair or replace silt

fences, haybales, stone riprap filter berms, or any other devices planned for use during construction.

11. The applicant shall be responsible for anticipating the need for and the installation of additional erosion controls during construction. Such controls may include, but are not limited to, temporary sedimentation basins, berms, additional silt fencing and haybales. If field conditions or professional judgment dictate, the applicant's contractor shall install additional erosion controls to protect wetland resource areas beyond what is shown on the plan.

12. Erosion controls shall be deployed as shown on the reference plans and described in the Notice of Intent and application for 401 Certification. The site-specific Stormwater Pollution Prevention Plan (SWPPP) developed for construction of this project shall be supplied to the MassDEP and Haverhill Conservation Commission prior to construction activities. Noncompliance with the erosion control plan and /or SWPPP shall constitute non-compliance with the requirements of this Certification.

13. The applicant shall employ a qualified professional to oversee emergency placement of controls and regular inspection or replacement of sedimentation and turbidity control devices for this project. The name and contact information for this staff person shall be provided to the Haverhill Conservation Commission and MassDEP prior to the start of work. This staff person shall be responsible for inspection of erosion controls on a weekly basis during construction and after any storm event measuring more than ½-inch of precipitation in each 24-hour period and shall have the authority to modify existing controls or require additional controls if he or she deems it necessary. This staff person shall have the authority to require that any erosion problems are addressed immediately and shall immediately notify MassDEP and the Haverhill Conservation Commission if any discharges to streams or any other wetlands resource areas occur.

14. The amount of Wetlands that will be temporarily filled is a total of 11,000 square feet with 11,000 square feet restored. The applicant shall conduct monitoring. A qualified environmental monitor (wetland specialist) shall conduct periodic inspections of work to remove existing waste, remediate soils and install the landfill cap, located within and immediately adjacent to wetland resource areas to ensure revegetation takes place, including:

a. Inspection of final elevation of the replication areas including: i) comparison to the preexisting topography, ii) comparison to the elevation of adjacent undisturbed area, and iii) examination of the top strata of backfilled soils and confirmation of the correct depth of organics;

b. A biannual evaluation of the extent and type of revegetation of the revegetated areas. Reports shall be sent to this Office until the area becomes revegetated with 75% indigenous species over five growing seasons after completion of construction. The evaluation shall be done in the late spring and at the end of the growing season. The format and minimum monitoring data shall be as shown in Appendix 4 in DEP's Massachusetts Inland Wetland Replication Guidelines;

c. Selection of photographic stations to provide "control" sites in unaltered areas adjacent to the replication areas, where photographs shall be taken as representative baseline conditions. Additionally, photographic stations shall be selected within the replication area where photographs shall be taken to monitor replication success. Such photographs shall be taken during each monitoring inspection and submitted with reports and also during the following phases of construction: 1) completion of subgrades; 2) completion of final grades; and 3) completion of planting;
d. Inspection and oversight to ensure that if removal of existing soils within BVW requires excavation below 12 inches, fill consistent with adjacent wetland (i.e. organic or mineral soil) shall be used to backfill to within 8-12 inches below finished grades.

15. During the construction of wetland restoration areas, the applicant shall provide the following documentation to the MassDEP:
    a. Certification by a registered engineer or land surveyor that the sub-grades and final grades have been completed in accordance with the approved plans;
    b. Certification by a wetland professional or registered landscape architect that the planting has been completed in accordance with the approved plans.

16. All wetland restoration areas shall be restored to pre-existing grades prior to planting. Natural or manufactured topsoil shall be used. Natural topsoil to be used for the creation/restoration of wetlands consists of a least twelve percent organic carbon content (by weight). The percent organic content may be adjusted based on individual site conditions. Manufactured topsoil consists of a mixture of equal volumes of organic and mineral materials. A statement from a qualified individual shall be submitted to the MassDEP prior to construction of wetland restoration areas certifying that the soils to be used comply with the terms of this Special Condition.

17. Invasive species located in the BVW proposed for soil remediation and along the bank of the intermittent stream located on the western portion of the site shall be removed, properly disposed of, monitored and controlled according with the recommendations contained in the "Invasive and Noxious Species Control Plan" referenced in Condition #20a above and the conditions contained in this Permit.

18. The Contractor shall prevent any debris from entering the resource areas during all phases of construction.

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19. Stormwater discharged to all water courses and vegetated wetlands shall be treated prior to discharge at least to a level to ensure that there is no exceedance of the effluent limitations, including thermal criteria, corresponding to the class of each receiving water, established pursuant to 314 CMR 4.00, the Massachusetts Surface Water Discharge Standards.

20. At no time during or after construction shall fill or other materials be placed, slump into or fall beyond the limit of grading as shown on the plan. The applicant shall be responsible for inspecting and maintaining all slopes and shall immediately notify

Sincerely,

Rachel Freed

Rachel Freed
Section Chief
Wetlands Program

cc: Haverhill Conservation Commission
USACOE-Regulatory Program

Notice of Appeal rights

A) Appeal Rights and Time Limits

Certain persons shall have a right to request an adjudicatory hearing concerning certifications by the MassDEP when an application is required: (a) the applicant or property owner; (b) any person aggrieved by the decision who has submitted written comments during the public comment period; any ten (10) persons of the Commonwealth pursuant to M.G.L. c. 30A where a group member has submitted written comments during the public comment period; or (c) any governmental body or private organization with a mandate to protect the environment which has submitted written comments during the public comment period. Any person aggrieved, any ten (10) persons of the Commonwealth, or a governmental body or private organization with a mandate to protect the environment may appeal without having submitted written comments during the public comment period only when the claim is based on new substantive issues arising from material changes to the scope or impact of the activity and not apparent at the time of pubic notice. To request an adjudicatory hearing pursuant to M.G.L. chapter 30A section 10, a Notice of Claim must be made in writing provided that the request is made by certified mail or hand delivery to the MassDEP, with the appropriate filing fee specified within 310 CMR 4.10 along with a MassDEP Fee Transmittal Form within twenty-one (21) days from the date of issuance of this Certificate, and addressed to:

Case Administrator
Dept of Environmental Protection
One Winter Street- 2nd Floor
Boston, MA 02108

A copy of the request shall at the same time be sent by certified mail or hand delivery to the issuing office of the Wetlands and Waterways Program at:

MassDEP, Northeast Regional Office
205B Lowell Street
Wilmington, MA 01887

B) Contents of Hearing Request

A Notice of Claim for Adjudicatory Hearing shall comply with the MassDEP's Rules for Adjudicatory Proceedings, 310 CMR 1.01 (6), and shall contain the following information pursuant to 314 CMR 9.10(3):

a. the 401 Certification Transmittal Number and MassDEP Wetlands Protection Act File Number;
b. the complete name of the applicant and address of the project;
c. the complete name, address, and fax and telephone numbers of the party filing the request, and, if represented by counsel or other representative, the name, fax, and telephone number of the attorney;
d. if claiming to be a party aggrieved, the specific facts that demonstrate that the party satisfies the definition of "aggrieved person" found at 314 CMR 9.02;
e. a clear and concise statement that an adjudicatory hearing is being requested;

f. a clear and concise statement of (1) the facts which are grounds for the proceedings, (2) the objections to the Certificate, including specifically the manner in which it is alleged to be inconsistent with the MassDEP's Water Quality Regulations, 314 CMR 9.00, and (3) the relief sought through the adjudicatory hearing, including specifically the changes desired in the final written Certification, and

g. a statement that a copy of the request has been sent by certified mail or hand delivery to the applicant, the owner (if different from the applicant), the conservation commission of the city or town where the activity will occur, the Department of Conservation and Recreation (when the certificate concerns projects in Areas of Critical Environmental Concern), the public or private water supplier where the project is located (when the certificate concerns projects in Outstanding Resource Waters), and any other entity with responsibility for the resource where the project is located.

C) Filing Fee and Address

The hearing request along with a MassDEP Fee Transmittal Form and a valid check or money order payable to the Commonwealth of Massachusetts in the amount of one hundred dollars ($100) must be mailed to:

Commonwealth of Massachusetts
Department of Environmental Protection
Commonwealth Master Lockbox
P.O. Box 4062
Boston, MA 02211

The request will be dismissed if the filing fee is not paid, unless the applicant is exempt or granted a waiver. The filing fee is not required if the appellant is a city or town (or municipal agency), county, or district of the Commonwealth of Massachusetts, or a municipal housing authority. The MassDEP may waive the adjudicatory hearing filing fee pursuant to 310 CMR 4.06 (2) for a person who shows that paying the fee will create an undue financial hardship. A person seeking a waiver must file an affidavit setting forth the facts believed to support the claim of undue financial hardship together with the hearing request as provided above.

APPENDIX B

Wetlands Permits for the Soils Project

File - Haverhill

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

DEP File Number:
#33-1027
Provided by DEP

A. General Information

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.

From:

Haverhill
Conservation Commission

This issuance if for (check one):

☒ Order of Conditions

☐ Amended Order of Conditions

To: Applicant:

City of Haverhill, ATTN: William Pauk
Name

4 Summer Street
Mailing Address

Haverhill | MA | 01830
City/Town | State | Zip Code

Property Owner (if different from applicant):

Name

Mailing Address

City/Town | State | Zip Code

1. Project Location:

off Old Groveland Road
Street Address

Haverhill
City/Town

Map 776, Block 788
Assessors Map/Plat Number

Lots 20, 21, 24, 27, 1AA
Parcel/Lot Number

2. Property recorded at the Registry of Deeds for:

Essex South
County

223
Book

Page

48969
Certificate (if registered land)

3. Dates:

Novemb. er 1, 2001
Date Notice of Intent Filed

December 20, 2001
Date Public Hearing Closed

January 1[illegible], 2002
Date of Issuance

4. Final Approved Plans and Other Documents (attach additional plan references as needed):

See Attachment "A", State and Municipal Conditions, incorporated herein and made part of this Order of Conditions.

Date

5. Final Plans and Documents Signed and Stamped by:

See Attachment "A", State and Municipal Conditions, incorporated herein and made part of this Order of Conditions.
Name

6. Total Fee:

(from Appendix B: Wetland Fee Transmittal Form)

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

DEP File Number:
#33-1027
Provided by DEP

B. Findings

Findings pursuant to the Massachusetts Wetlands Protection Act:

Following the review of the above-referenced Notice of Intent and based on the information provided in this application and presented at the public hearing, this Commission finds that the areas in which work is proposed is significant to the following interests of the Wetlands Protection Act. Check all that apply:

☒ Public Water Supply	☒ Land Containing Shellfish	☒ Prevention of Pollution
☒ Private Water Supply	☒ Fisheries	☒ Protection of Wildlife Habitat
☒ Groundwater Supply	☒ Storm Damage Prevention	☒ Flood Control

Furthermore, this Commission hereby finds the project, as proposed, is: (check one of the following boxes)

Approved subject to:

☒ the following conditions which are necessary, in accordance with the performance standards set forth in the wetlands regulations, to protect those interests checked above. This Commission orders that all work shall be performed in accordance with the Notice of Intent referenced above, the following General Conditions, and any other special conditions attached to this Order. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, these conditions shall control.

Denied because:

☐ the proposed work cannot be conditioned to meet the performance standards set forth in the wetland regulations to protect those interests checked above. Therefore, work on this project may not go forward unless and until a new Notice of Intent is submitted which provides measures which are adequate to protect those interests, and a final Order of Conditions is issued.

☐ the information submitted by the applicant is not sufficient to describe the site, the work, or the effect of the work on the interests identified in the Wetlands Protection Act. Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides sufficient information and includes measures which are adequate to protect the Act's interests, and a final Order of Conditions is issued. A description of the specific information which is lacking and why it is necessary is attached to this Order as per 310 CMR 10.05(6)(c).

General Conditions (only applicable to approved projects)

1. Failure to comply with all conditions stated herein, and with all related statutes and other regulatory measures, shall be deemed cause to revoke or modify this Order.
2. The Order does not grant any property rights or any exclusive privileges; it does not authorize any injury to private property or invasion of private rights.
3. This Order does not relieve the permittee or any other person of the necessity of complying with all other applicable federal, state, or local statutes, ordinances, bylaws, or regulations.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

DEP File Number:
#33-1027
Provided by DEP

B. Findings (cont.)

4. The work authorized hereunder shall be completed within three years from the date of this Order unless either of the following apply:
   a. the work is a maintenance dredging project as provided for in the Act; or
   b. the time for completion has been extended to a specified date more than three years, but less than five years, from the date of issuance. If this Order is intended to be valid for more than three years, the extension date and the special circumstances warranting the extended time period are set forth as a special condition in this Order.

5. This Order may be extended by the issuing authority for one or more periods of up to three years each upon application to the issuing authority at least 30 days prior to the expiration date of the Order.

6. Any fill used in connection with this project shall be clean fill. Any fill shall contain no trash, refuse, rubbish, or debris, including but not limited to lumber, bricks, plaster, wire, lath, paper, cardboard, pipe, tires, ashes, refrigerators, motor vehicles, or parts of any of the foregoing.

7. This Order is not final until all administrative appeal periods from this Order have elapsed, or if such an appeal has been taken, until all proceedings before the Department have been completed.

8. No work shall be undertaken until the Order has become final and then has been recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land upon which the proposed work is to be done. In the case of the registered land, the Final Order shall also be noted on the Land Court Certificate of Title of the owner of the land upon which the proposed work is done. The recording information shall be submitted to this Conservation Commission on the form at the end of this Order, which form must be stamped by the Registry of Deeds, prior to the commencement of work.

9. A sign shall be displayed at the site not less then two square feet or more than three square feet in size bearing the words,

   "Massachusetts Department of Environmental Protection" [or, "MA DEP"]

   "File Number 33-1027"

10. Where the Department of Environmental Protection is requested to issue a Superseding Order, the Conservation Commission shall be a party to all agency proceedings and hearings before DEP.

11. Upon completion of the work described herein, the applicant shall submit a Request for Certificate of Compliance (WPA Form 8A) to the Conservation Commission.

12. The work shall conform to the plans and special conditions referenced in this order.

13. Any change to the plans identified in Condition #12 above shall require the applicant to inquire of the Conservation Commission in writing whether the change is significant enough to require the filing of a new Notice of Intent.

14. The Agent or members of the Conservation Commission and the Department of Environmental Protection shall have the right to enter and inspect the area subject to this Order at reasonable hours to evaluate compliance with the conditions stated in this Order, and may require the submittal of any data deemed necessary by the Conservation Commission or Department for that evaluation.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

DEP File Number:
#33-1027
Provided by DEP

B. Findings (cont.)

15. This Order of Conditions shall apply to any successor in interest or successor in control of the property subject to this Order and to any contractor or other person performing work conditioned by this Order.

16. Prior to the start of work, and if the project involves work adjacent to a Bordering Vegetated Wetland, the boundary of the wetland in the vicinity of the proposed work area shall be marked by wooden stakes or flagging. Once in place, the wetland boundary markers shall be maintained until a Certificate of Compliance has been issued by the Conservation Commission.

17. All sedimentation barriers shall be maintained in good repair until all disturbed areas have been fully stabilized with vegetation or other means. At no time shall sediments be deposited in a wetland or water body. During construction, the applicant or his/her designee shall inspect the erosion controls on a daily basis and shall remove accumulated sediments as needed. The applicant shall immediately control any erosion problems that occur at the site and shall also immediately notify the Conservation Commission, which reserves the right to require additional erosion and/or damage prevention controls it may deem necessary. Sedimentation barriers shall serve as the limit of work unless another limit of work line has been approved by this Order.

Special Conditions (use additional paper, if necessary):

See Attachment "A", State and Municipal Conditions, incorporated herein and made part of this Order of Conditions.

Findings as to municipal bylaw or ordinance

Furthermore, the Haverhill Conservation Commission hereby finds (check one that applies):

☐ that the proposed work cannot be conditioned to meet the standards set forth in a municipal ordinance or bylaw specifically:

Name — Municipal Ordinance or Bylaw

Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides measures which are adequate to meet these standards, and a final Order of Conditions is issued.

☒ that the following additional conditions are necessary to comply with a municipal ordinance or bylaw, specifically:

An Ordinance to Protect the Wetlands, Related Water Resources and adjoining land areas. — Chapter 253 (Municipal Ordinance or Bylaw)

The Commission orders that all work shall be performed in accordance with the said additional conditions and with the Notice of Intent referenced above. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, the conditions shall control.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

DEP File Number:
#33-1027
Provided by DEP

B. Findings (cont.)

Additional conditions relating to municipal ordinance or bylaw:

See Attachment "A", State and Municipal Conditions, incorporated herein and made part of this Order of Conditions.

This Order is valid for three years, unless otherwise specified as a special condition pursuant to General Conditions #4, from the date of issuance.

January 11, 2005
Date

This Order must be signed by a majority of the Conservation Commission. The Order must be mailed by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate Department of Environmental Protection Regional Office (see Appendix A) and the property owner (if different from applicant).

Signatures:

On 20th Day Of January 2002 Month and Year

before me personally appeared

the above members

to me known to be the person described in and who executed the foregoing instrument and acknowledged that he/she executed the same as his/her free act and deed.

Notary Public

November 15, 2007
My Commission Expires

This Order is issued to the applicant as follows:

☐ by hand delivery on

Date

☒ by certified mail, return receipt requested, on

January 21, 2002
Date

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

DEP File Number:

#33-1027
Provided by DEP

C. Appeals

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate DEP Regional Office to issue a Superseding Order of Conditions. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Appendix E: Request of Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act, (M.G.L. c. 131, § 40) and is inconsistent with the wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal ordinance or bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.

D. Recording Information

This Order of Conditions must be recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land subject to the Order. In the case of registered land, this Order shall also be noted on the Land Court Certificate of Title of the owner of the land subject to the Order of Conditions. The recording information on Page 7 of Form 5 shall be submitted to the Conservation Commission listed below.

Haverhill
Conservation Commission

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

DEP File Number:
#33-1027
Provided by DEP

D. Recording Information (cont.)

Detach on dotted line, have stamped by the Registry of Deeds and submit to the Conservation Commission

To:

Haverhill
Conservation Commission

Please be advised that the Order of Conditions for the Project at:

off Old Groveland Road — #33-1027
Project Location — DEP File Number

Has been recorded at the Registry of Deeds of:

County — Book — Page

for:

Property Owner

and has been noted in the chain of title of the affected property in:

Book — Page

In accordance with the Order of Conditions issued on:

Date

If recorded land, the Instrument number identifying this transaction is:

Instrument Number

If registered land, the document number identifying this transaction is:

Document Number

Signature of Applicant

ATTACHMENT "A"
STATE AND MUNICIPAL CONDITIONS
DEP FILE #33-1027
CITY OF HAVERHILL
GROVELAND ROAD
MAP 776, BLOCK 788, LOTS 20, 21, 24, 27, AND 1AA

GENERAL CONSTRUCTION:

1. Work on this project site shall be performed according to the following listed plans and documents. Should any conflicts be found to exist between these plans and documents and the conditions of this Order, the Haverhill Conservation Commission (HCC) shall be contacted for a clarification.
   a) "Closure of Old Haverhill Landfill - Existing Conditions Plan", site plans prepared by Camp Dresser & McKee, Inc. (One Cambridge Place, 50 Hampshire Street, Cambridge, MA 02139), dated December 2001, and on file with the HCC (Room 205, City Hall, 4 Summer Street, Haverhill, MA 01830);
   b) "Closure of Old Haverhill Landfill - Operations Plan", site plans prepared by Camp Dresser & McKee, Inc. (One Cambridge Place, 50 Hampshire Street, Cambridge, MA 02139), dated December 2001, and on file with the HCC (Room 205, City Hall, 4 Summer Street, Haverhill, MA 01830);
   c) "Closure of Old Haverhill Landfill - Stormwater Control Details Phase I", site plans prepared by Camp Dresser & McKee, Inc. (One Cambridge Place, 50 Hampshire Street, Cambridge, MA 02139), dated December 2001, and on file with the HCC (Room 205, City Hall, 4 Summer Street, Haverhill, MA 01830);
   d) "Closure of Old Haverhill Landfill - Stormwater Detention Basin Details Phase I", site plans prepared by Camp Dresser & McKee, Inc. (One Cambridge Place, 50 Hampshire Street, Cambridge, MA 02139), dated December 2001, and on file with the HCC (Room 205, City Hall, 4 Summer Street, Haverhill, MA 01830);
   e) "Section 3 - Stormwater Management Controls", five-page document (amendment to "SWPPP") prepared by Camp Dresser & McKee, Inc. (One Cambridge Place, 50 Hampshire Street, Cambridge, MA 02139), dated received December 7, 2001, and on file with the HCC;
   f) "Section 6 - Slope Stabilization Contingency Plan", two-page document (amendment to "SWPPP") prepared by Camp Dresser & McKee, Inc. (One Cambridge Place, 50 Hampshire Street, Cambridge, MA 02139), dated received December 7, 2001, and on file with the HCC;
   g) "Notice of Intent", application prepared by Camp Dresser & McKee, Inc. (One Cambridge Place, 50 Hampshire Street, Cambridge, MA 02139), dated November 2001, and on file with the HCC; and
   h) "Stormwater Pollution Prevention Plan -Haverhill Landfill Closure Project Phase I", (the "SWPPP") document prepared by Camp Dresser & McKee, Inc. (One Cambridge Place, 50 Hampshire Street, Cambridge, MA 02139), dated October 2001, and on file with the HCC.

2. While all activities regulated by this Order are being performed and during the construction phase of this project, an on-site foreman, directing engineer, or designated construction manager, shall have a copy of this permit and its associated plans and documents at the site, familiarize himself or herself with the conditions of this permit, and adhere to such conditions.

This Order of Conditions shall be made part of all construction-related documents for this project. All contractors working at the site shall be made aware of the provisions contained within this Order of Conditions and adhere to them.

3. Prior to the commencement of construction, a pre-construction meeting shall be conducted with the site contractor, the applicant, the applicant's engineers/consultants, the Conservation Commission and all other affected City Officials. The purpose of the pre-construction meeting is to resolve any outstanding issues at that time.

4. The applicant shall secure an Environmental Monitor for this project. This Monitor shall be, at a minimum, a professional with experiences in wetland replication/restoration, erosion and siltation control practices, and wildlife habitat evaluation. This Monitor shall have, at a minimum, a working knowledge of wetland protection and general construction practices.
   a) The Environmental Monitor shall perform daily erosion control and general site inspections. On the Monday of every week during the life of this project, the Environmental Monitor shall provide the HCC with a status report of the project. This report shall indicate the activities completed the previous week and those planned for the current week. The report shall also mention any deviations from the previous week's report and any environmental mitigation measures that have been undertaken.
   b) In addition to this reporting, the Environmental Monitor shall be responsible for all inspections and reporting as outlined in this Order and the referenced plans and documents pertaining to wetland activities, erosion and siltation controls, and wildlife habitat protection. The Monitor shall be on site as necessary to ensure proper implementation of the conditions of this Order and the work outlined in the referenced plans and documents.
   c) In the weekly reports required under condition #4a above, the Monitor shall maintain a photographic log, with associated text, of the pre-construction through post-construction views of the riverfront area on this site. This log shall be used by the Monitor and the HCC to evaluate any impacts caused to the riverfront area by this project.

NOTIFICATION TO OTHER PARTIES:

1. The applicant shall notify the Haverhill Conservation Commission, in writing, at least 48 hours before any activity commences on site. At this time the applicant shall also supply the HCC with a list of names, addresses, and emergency phone numbers for those parties responsible for compliance with this Order on the site, including the Environmental Monitor.

2. During the life of this Order, should any modifications to the wetland delineations be found to be necessary by the HCC, the applicant shall submit a modified plan reflecting these modifications.

3. The sign required under General Condition #9 of this Order shall not be attached to a live tree.

4. Any changes proposed under General Condition #13 of this Order might require the applicant to file a Request for a Modification to the Order of Conditions with the Commission.

5. Prior to the commencement of work, the applicant shall submit to the Commission a copy of the 401 Water Quality Certification issued for this project by the Department of Environmental Protection. Should the Department deem a Certification unnecessary, a copy of a letter from the Department stating such shall be submitted to the Commission.

LIMITS OF PROJECT:

1. As proposed by the applicant, no work shall occur within 150' of the pond and intermittent stream shown on the plans to flow into wetland flag #2-7 until such time that the areas are formally delineated and a revised plan is submitted for approval. This plan shall be submitted in accordance with the Commission's "Request for a Modification to the Order of Conditions application procedures".

2. All wetland resource areas shall be visibly staked every 25 feet along the resource area boundaries in order to assure that no intrusion into these areas occurs. There shall be no crossing of these areas with equipment or any vehicles at any time during construction.

3. Flagging and staking used to identify wetland resource areas shall be of a color different from any others used on the site. The flagging and staking shall be maintained until the work is complete.

4. Refueling of equipment shall not be done within 100' of a wetland resource area. No fuel, oil, or other potential pollutants shall be stored within 100' of a wetland resource area.

5. Equipment shall not be staged overnight within 100' of a wetland resource area.

6. The rows of erosion control devices, as shown on the aforementioned plan, shall also act as a limit of site activity.

7. All vegetation clearing associated with this project shall be subject to the prior review and approval of an HCC official. Particular attention shall be paid to the outlet and overflow system of basin #2 where every effort shall be made to eliminate the need for tree clearing.

8. In accordance with Haverhill Municipal Ordinance Chapter 253, there shall be no activities allowed within 25' of the delineated wetland resource areas and no building construction within 50' of these same areas, except as shown on the approved plans.

9. No waste products, grubbed stumps, slash, construction materials, etc. shall be deposited or accumulated within 100' of a wetland resource area. Dumpsters shall be maintained on site for appropriate materials.

10. No storage of debris, fill, or excavated material or the stockpiling of topsoil shall be conducted within 100' of a wetland resource area.

11. Work on this project shall be performed in accordance with Haverhill Municipal Ordinance Chapter 253 – "An Ordinance to Protect the Wetlands, Related Water Resources, and Adjoining Land Areas".

EROSION AND SILTATION CONTROLS:

1. As proposed by the applicant, haybale lines shall be installed parallel to the proposed slope, perpendicular to stormwater flow, at 25' vertical increments during the regrading of the site.

2. As proposed by the applicant, the jute baffles shall be installed in the basins in the same manner as the proposed silt fencing.

3. No activity other than the installation of the erosion and siltation control devices shall take place until an HCC official inspects and approves their installation. At a minimum, a row of filter fabric fencing, embedded in the ground six inches and backed by one row of staked hay bales placed end to end, shall be placed upgradient of all resource areas. Such rows shall be installed along the limit of activity between all disturbed areas and the wetland. Only incidental clearing and grubbing shall be allowed for their installation. All erosion and siltation controls shall be maintained in a state of good repair until all disturbed areas have been stabilized, or until a determination by the HCC stating that control measures are no longer necessary.

4. All erosion and siltation control devices shall be offset from the delineated wetland resource areas as shown on the site plans. The applicant's engineer, prior to their installation, shall stake out the locations of these devices on the site.

5. The areas of construction shall remain in a stable condition at the close of each construction day. Erosion and siltation controls should be inspected at this time, and maintained or reinforced if necessary.

6. The Environmental Monitor shall oversee any emergency placement of controls and regular inspection or replacement of erosion and sedimentation control devices. The name and phone number of the Monitor must be provided to the HCC in the event that this person has to be contacted, due to an emergency at the site, during any 24-hour period, including weekends. This person shall be given authority to stop construction for erosion control purposes. The Environmental Monitor will be required to inspect all such devices and oversee cleaning and the proper disposal of waste products. The Monitor shall immediately correct any erosion problems that may occur on the site.

7. An adequate stockpile of erosion control materials shall be on site at all times for emergency or routine replacement and shall include materials to repair silt fences, hay bales, stone-riprap, filter dikes or any other devices planned for use during construction, such as the polymer bricks.

8. Upon completion of the project all disturbed areas shall be permanently stabilized with rapidly growing cover with sufficient topsoil to assure long term stabilization of disturbed areas.

9. Erosion control devices may be modified based on experience at the site. Approval of the HCC must be obtained prior to any modification of the approved erosion and sediment control measures. All such devices shall be inspected, cleaned, or replaced during construction and shall remain in place until such time as the site is stabilized with vegetative cover.

10. Subsequent to seeding, disturbed areas are to be covered with the proposed erosion control blankets or jute matting in order to provide a suitable surface cover until seed germination.

11. During all phases of construction, all disturbed or exposed soil surfaces shall be brought to final finished grade and either a) covered with loam and seeded in accordance with USDA Soil Conservation Services Guidelines for permanent stabilization or b) stabilized in another way approved by the HCC. Bare ground that cannot be permanently stabilized within 30 days shall

be stabilized with mulch or any other protective covering and/or method approved by the USDA Soil Conservation Service.

12. The HCC reserves the right to impose additional conditions on portions of this project to mitigate any impacts which could result from site erosion or any noticeable degradation of surface water quality discharging from the site.

13. All dewatering activities shall be controlled by implementing Best Management Practices (BMP's). Non-contaminated, dewatered fluids shall be prevented from flowing directly into resource areas. Discharge structures, such as detention basins, retention basins, or other BMP's will be configured to maximize ground infiltration. If discharge towards resource areas cannot be avoided, it shall be via 100 to 200 feet of overland upland sheet flow. The Environmental Monitor shall review and approve all dewatering methods prior to implementation.

WILDLIFE HABITAT PROTECTION:

1. Prior to the commencement of work the applicant shall submit a letter from the Natural Heritage and Endangered Species Program (NHESP) that states the Program has a favorable review of the project phase regulated under this Order of Conditions. A copy of all information submitted by the applicant to the NHESP during its continued review of this project shall be submitted to the HCC. Any project changes required by the NHESP shall be submitted to the Commission for review and approval in accordance with Condition #4 - Notification to Other Parties. Such changes may be deemed significant enough to require the filing of a new Notice of Intent.

2. The Environmental Monitor shall instruct all workers, who may enter the estimated habitat of the Bald Eagle (Haliaeetus leucocephalus) on this site, in identification and habitats of Bald Eagles. Each day, prior to construction activity, the area of estimated habitat on this site shall be inspected for Bald Eagles.

3. All Bald Eagles encountered within the estimated habitat area shall be photographed. The date, time, weather conditions, and Eagle's activity of each encounter shall be documented. This information shall be included in the Environmental Monitor's weekly report. Bald Eagle sightings and documentation shall be promptly reported to the HCC, with copies provided to the Department of Environmental Protection and the NHESP.

STORMWATER:

1. During construction, all drainage systems shall be maintained as outlined in the "SWPPP" prepared by CDM.

2. As-built plans of the detention basins, including forebays, shall be submitted for review and approval to the HCC to define the geometry of the basin. Such plans shall contain at least 1 cross section, showing all structures details, and be drawn at a scale equal to that of the proposed site plans. The plans shall be accompanied by as-built volumetric calculations (at one-foot increments) with a comparison to design volumetric calculations to show that the constructed basins meet or exceed their design requirements. These plans shall be submitted for review and approval of the HCC and the City Engineer prior to the use of the basins.

3. The detention basin outlet structures shall be constructed in such a manner that allows for the emergency shut down/plugging of the structures. The devices used for this purpose shall be available on site at all times for use at the discretion of the Environmental Monitor, Resident Engineer, and the HCC.

4. As proposed by the applicant, the proposed forebay located on the south side of the National Grid Easement, to be used with basin #2, shall be lined in the same manner as the basins.

CONSTRUCTION SEQUENCING:

1. The proposed detention basins, forebays, swales, and culvert system shall be constructed/installed and stabilized prior to the deposition of the proposed fill material on this site.

OTHER CONDITIONS:

1. If any unforeseen problem occurs during construction, which affects any of the eight statutory interests of the Wetlands Protection Act, M.G.L. Chapter 131, Section 40, upon discovery, the applicant shall notify the HCC and an immediate meeting shall be held between the Commission, the applicant, the engineer, contractor, and other concerned parties to determine the corrective measures to be employed. The applicant shall then act to correct the problems using the corrective measures agreed upon.

2. Upon completion of the project, the applicant shall request a Certificate of Compliance from the Commission and shall submit the following information with the request:
   a) A written statement by a professional engineer or land surveyor registered in the Commonwealth of Massachusetts certifying compliance with the approved plans referenced above and this Order of Conditions and setting forth deviations, if any exist; and
   b) One set of as-built site plans prepared by a registered land surveyor or registered professional engineer showing grades, utilities, building footprint and landscaping. These plans shall include the date(s) of fieldwork.

3. Certain conditions are ongoing and do not expire upon the completion of the project or the issuance of a Certificate of Compliance. These conditions shall be recorded as such on the Certificate of Compliance. These conditions are:
   a) The culverts shall be maintained to insure serviceability during operation as designed and as required in the "SWPPP" and its amended sections prepared by CDM .
   b) The maintenance or repair of the detention basins, forebays, and supporting drainage systems shall be the responsibility of the applicant and/or property owner. The design capacity and structural integrity of these facilities must be maintained as required in the "SWPPP" and its amended sections.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

DEP File Number:
#33-1027
Provided by DEP

D. Recording Information (cont.)

Detach on dotted line, have stamped by the Registry of Deeds and submit to the Conservation Commission

To:

Haverhill
Conservation Commission

Please be advised that the Order of Conditions for the Project at:

off Old Groveland Road — #33-1027
Project Location — DEP File Number

Has been recorded at the Registry of Deeds of:

Essex County — 223 — 48969
County — Book — Page

for:

Tremont Bituminous Products Co.
Property Owner

and has been noted in the chain of title of the affected property in:

223 — 48969
Book — Page

In accordance with the Order of Conditions issued on:

1/22/02
Date

If recorded land, the instrument number identifying this transaction is:

Instrument Number

If registered land, the document number identifying this transaction is:

3935342
Document Number

Robert E. [illegible] for WTP.
Signature of Applicant

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

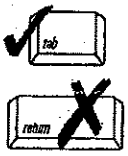
WPA Form 7 – Extension Permit for Orders of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

DEP File Number:
#3-1027
Provided by DEP

A. General Information

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



1. Applicant:

City of Haverhill
Name

40 South Porter Street
Mailing Address

Haverhill	MA	01835
City/Town	State	Zip Code

2. Property Owner (if different):

City of Haverhill/Aggregate Industries
Name

40 S. Porter St, 1715 Broadway
Mailing Address

Haverhill, Saugus	MA	01835/01906
City/Town	State	Zip Code

B. Finding Information

The Order of Conditions (or Extension Permit) issued to the applicant or property owner listed above on:

January 11, 2002
Date

for work at:

Groveland Road	Map 776, Block 788	Lot 20,21,24,26,27, 1AA
Street Address	Assessor's Map/Plat Number	Parcel/Lot Number

recorded at the Registry of Deeds for:

Essex South	223	48969
County	Book	Page

Certificate (if registered land)

is hereby extended until:

January 11, 2007
Date

This date can be no more than 3 years from the expiration date of the Order of Conditions or the latest extension. Only unexpired Orders of Conditions or Extension may be extended.

Date the Order was last extended (if applicable):

Date

Issued by:

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 7 – Extension Permit for Orders of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

DEP File Number:
#3-1027
Provided by DEP

Haverhill
Conservation Commission

B. Finding Information (cont.)

This Order of Conditions Extension must be signed by a majority of the Conservation Commission and a copy sent to the applicant and the appropriate DEP Regional Office (see Appendix A).

Signatures:

On 24th (Day) Of June 2004 (Month and Year)

before me personally appeared

the above members

to me known to be the person described in and who executed the foregoing instrument and acknowledged that he/she executed the same as his/her free act and deed.

Notary Public

November 15, 2007
My Commission Expires

SHERRY L. GRAHAM, Notary Public
My Commission Expires Nov. 15, 2007

C. Recording Confirmation

The applicant shall record this document in accordance with General Condition 8 of the Order of Conditions (see below), complete the form attached to this Extension Permit, have it stamped by the Registry of Deeds, and return it to the Conservation Commission.

Note: General Condition 8 of the Order of Conditions requires the applicant, prior to commencement of work, to record the final Order (or in this case, the Extension Permit for the Order of Conditions) in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, it shall be noted in the Registry's Granter Index under the name of the owner of the land upon which the proposed work is to be done. In the case of registered land, it shall also be noted on the Land Court Certificate of Title of the owner of the land upon which the proposed work is done.

Detach page 3 of Form 7 and submit it to the Conservation Commission prior to the expiration of the Order of Conditions subject to this Extension Permit.

C. Recording Confirmation (cont.)

To:

Haverhill
Conservation Commission

Please be advised that the Extension Permit to the Order of Conditions for the project at:

Groveland Road — Project Location
#33-1027 — DEP File Number

has been recorded at the Registry of Deed of:

County

for:

Property Owner

and has been noted in the chain of title of the affected property in accordance with General Condition 8 of the original Order of Conditions on:

Date — Book — Page

If recorded land the instrument number which identifies this transaction is:

Instrument Number

If registered land, the document number which identifies this transaction is:

Document Number

Signature of Applicant

Haverhill

Economic Development and Planning
Conservation Department
Phone: 978-374-2334 Fax: 978-374-2337
rmoore@cityofhaverhill.com
conservation@cityofhaverhill.com

MUNICIPAL ORDINANCE - CHAPTER 253
MODIFICATION # 1
DEP FILE #33- 1027

Issued to Applicant: City of Haverhill, c/o Robert Ward, Acting Director, Water/Wastewater Division
Mailing Address: 40 South Porter Street, Haverhill, MA 01835
Project Location:
Street Address Groveland Road
Assessor's Map(s) 776 Block(s) 788 Lot(s) 20,21,24,26,27,1AA
Date RMOC was file: January 13, 2005 Date public hearing was closed: January 27, 2005
Date Order of Conditions is due to expire: January 11, 2007

The Haverhill Conservation Commission, at its meeting on January 27, 2005, voted to issue this Modification approving the changes to the Order of Conditions issued under DEP File #33-1027 that you requested. Also approved by the Commission with this Modification are the following plans and documents and the attached special conditions (check _____ if applicable):
"Closure of Old Haverhill Landfill – Existing Conditions Plan" (Drawing #1), Prepared by Camp Dresser & McKee, Inc., dated revised January 25, 2005 and on file with the Haverhill Conservation Commission

In order to maintain a valid Order of Conditions it is necessary that this Modification be recorded in accordance with the Recording Information requirements of the Order of Conditions. A marginal reference shall be made to the Order of Conditions recorded at Essex South Registry of Deeds Book 223 Page 48969 or Certificate (if registered land) 393542.

When issued by the Commission, this Modification must be signed by a majority of its members.

Then before me personally appeared the above members to me known to be the persons described in and who executed the foregoing instrument and acknowledged that he/she executed the same as his/her free act and deed.

NOTARY PUBLIC

November 29th, 2009
MY COMMISSION EXPIRES

C: DEP-NERO, Division of Wetlands, One Winter Street, Boston, MA 02108

Soils/ 4.6.5h

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

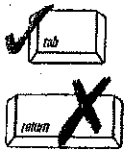
WPA Form 7 – Extension Permit for Orders of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

DEP File Number: 33-1027
Provided by DEP

A. General Information

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



1. Applicant:

City of Haverhill (Robert Ward)
Name

40 South Porter Street
Mailing Address

Haverhill	MA	01835
City/Town	State	Zip Code

2. Property Owner (if different):

City of Haverhill / Aggregate Industries
Name

40 South Porter Street / 1715 Broadway
Mailing Address

Haverhill / Saugus	MA	01835/ 01906
City/Town	State	

B. Authorization

The Order of Conditions (or Extension Permit) issued to the applicant or property owner listed above on:

January 11, 2002 (OOC), June 24, 2004 (EXT)
Date

for work at:

Old Groveland Road	Map 776, Block 788	Lots 20,21,24, 27, 1AA
Street Address	Assessor's Map/Plat Number	Parcel/Lot Number

recorded at the Registry of Deeds for:

Essex South	223	48969
County	Book	Page

Certificate (if registered land)

is hereby extended until:

July 11, 2008
Date

This date can be no more than 3 years from the expiration date of the Order of Conditions or the latest extension. Only unexpired Orders of Conditions or Extension may be extended.

Date the Order was last extended (if applicable): June 24, 2004
Date

Issued by:

Haverhill	January 9, 2007
Conservation Commission	Date

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 7 – Extension Permit for Orders of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

DEP File Number: 33-1027
Provided by DEP

B. Authorization (cont.)

This Order of Conditions Extension must be signed by a majority of the Conservation Commission and a copy sent to the applicant and the appropriate DEP Regional Office.

Signatures:

Notary Acknowledgement

Commonwealth of Massachusetts County of Essex

On this 21st (Day) of December (Month) 2006 (Year)

Before me, the undersigned Notary Public, personally appeared

Haverhill Conservation Commission,
Name of Signer

proved to me through satisfactory evidence of identification, which was/were

Personal knowledge of the Commission
Description of evidence of identification

to be the person whose name is signed on the preceding or attached document, and acknowledged to me that he/she signed it voluntarily for its stated purpose.

As member of Haverhill (City/Town) Conservation Commission

DEBRA A. STEWART
NOTARY PUBLIC
COMMONWEALTH OF MASSACHUSETTS
My Commission Expires Nov. 20, 2009

Signature of Notary Public

Debra A. Stewart
Printed Name of Notary Public

Place notary seal and/or any stamp above

November 20, 2009
My Commission Expires (Date)

C. Recording Confirmation

The applicant shall record this document in accordance with General Condition 8 of the Order of Conditions (see below), complete the form attached to this Extension Permit, have it stamped by the Registry of Deeds, and return it to the Conservation Commission.

Note: General Condition 8 of the Order of Conditions requires the applicant, prior to commencement of work, to record the final Order (or in this case, the Extension Permit for the Order of Conditions) in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, it shall be noted in the Registry's Granter Index under the name of the owner of the land upon which the proposed work is to be done. In the case of registered land, it shall also be noted on the Land Court Certificate of Title of the owner of the land upon which the proposed work is done.

Detach page 3 of Form 7 and submit it to the Conservation Commission prior to the expiration of the Order of Conditions subject to this Extension Permit.

To:

Haverhill
Conservation Commission

Please be advised that the Extension Permit to the Order of Conditions for the project at:

Old Groveland Road-Map 776, Block 788, Lots 20, 21, 24, 27, 1AA

33-1027
DEP File Number

has been recorded at the Registry of Deeds of:

County

for:

Property Owner

and has been noted in the chain of title of the affected property in accordance with General Condition 8 of the original Order of Conditions on:

Date | Book | Page

If recorded land the instrument number which identifies this transaction is:

Instrument Number

If registered land, the document number which identifies this transaction is:

Document Number

Signature of Applicant

Haverhill

Economic Development and Planning
Conservation Department
Phone: 978-374-2334 Fax: 978-374-2337
rmoore@cityofhaverhill.com
conservation@cityofhaverhill.com

MUNICIPAL ORDINANCE-CHAPTER 253
MODIFICATION # 2
DEP FILE # 33-1027

Issued to Applicant: City of Haverhill,c/o Robert Ward, Water/Wastewater Superintendnet/Engineer
Mailing Address: 40 South Porter Street, Haverhill, MA 01835

Project Location: Groveland Road
Assessor's Map: Map 776, Block 788, Lots 20,21,24,26,27 and 1AA

Date RMOC was filed: April 10, 2008 Date public hearing was closed: April 24, 2008
Date Order of Conditions is due to expire: July 11, 2008

The Haverhill Conservation Commission, at its meeting on April 24,2008, voted to issue this Modification approving the changes to the Order of Conditions issued under DEP File #: 33-1027 that you requested. Also approved by the Commission with this Modification are the following plans and documents and the attached special conditions (check X if applicable):
See Attachment "A", "Special Conditions", incorporated herein and made part of this Modification

In order to maintain a valid Order of Conditions it is necessary that this Modification be recorded in accordance with the Recording Information requirements of the Order of Conditions. A marginal reference should be made to the Order of Conditions recorded at Regisgty of Deeds ESsex South
Book: 223 Page: 48969 Certificate (if registered land): _____

When issued by the Commission, this Modification must be signed by a majority of its members.

Then before me personally appeared the above members to me known to be the persons described in and who executed the foregoing instrument and acknowledged that he/she executed the same as his/her free act and deed.

NOTARY PUBLIC SIGNITURE

DEBRA A. STEWART
NOTARY PUBLIC
COMMONWEALTH OF MASSACHUSETTS
My Commission Expires Nov. 20, 2009

November 20, 2009
COMMISSION EXPIRES

C: DEP-NERO

Haverhill

Economic Development and Planning
Conservation Department
Phone: 978-374-2334 Fax: 978-374-2337
planning@cityofhaverhill.com
conservation@cityofhaverhill.com

MODIFICATION #2
ATTACHMENT "A"
SPECIAL CONDITIONS
DEP FILE #33-1027
CITY OF HAVERHILL
GROVELAND ROAD
MAP 776, BLOCK 788, LOTS 20, 21, 24, 26, 27, AND 1AA

1. Work on this project site shall be performed according to the following listed revised plans and documents. Should any conflicts be found to exist between these plans and documents and the conditions of this Order, the Haverhill Conservation Commission (HCC) shall be contacted for a clarification.
   a) "Phase IA Soils Project Grading and Shaping Plan" (1 Sheet), site plan prepared by Camp Dresser & McKee, Inc. (One Cambridge Place, 50 Hampshire Street, Cambridge, MA 02139), dated April 2008, and on file with the HCC (Room 210, City Hall, 4 Summer Street, Haverhill, MA 01830);
   b) "Request for a Modification to an Order of Conditions" (Application Package, including Figures 1 – 3 and Attachments A - D), document prepared by CDM, dated April 2008, and on file with the HCC; and
   c) "Addendum to Phase I Soils Project – Stormwater Pollution Prevention Plan (May 2004), Phase IA Soils Grading and Shaping of the Haverhill Landfill" (Including Sections 1 –6 and Appendices A – E), document prepared by CDM, dated April 2008, and on file with the HCC.

2. The applicant shall keep the Conservation Department informed of all matters relative to the Groveland Road drainage culvert that currently exists adjacent to the Groveland Road landfill entrance.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

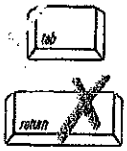
WPA Form 7 – Extension Permit for Orders of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

DEP File Number: 33-1027 Provided by DEP

A. General Information

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



1. Applicant:

City of Haverhill, c/o Robert E. Ward
Name

40 South Porter Street
Mailing Address

Haverhill	MA	01835
City/Town	State	Zip Code

2. Property Owner (if different):

City of Haverhill / Aggregate Industries
Name

4 Summer Street / 91 Chester Road, P. O. Box 1448
Mailing Address

Haverhill / Raymond	MA / NH	01830 / 03077
City/Town	State	

B. Authorization

The Order of Conditions (or Extension Permit) issued to the applicant or property owner listed above on:

*January 11, 2002(OOC), June 24, 2004 (EXT), January 27, 2005 (Modification), January 9, 2007 (EXT), April 24, 2008 (Modification)

for work at:

Groveland Road	Map 776, Block 788	20,21,24,27, and 1AA
Street Address	Assessor's Map/Plat Number	Parcel/Lot Number

recorded at the Registry of Deeds for:

Essex	223	48969
County	Book	Page

Certificate (if registered land)

is hereby extended until:

July 11, 2011
Date

This date can be no more than 3 years from the expiration date of the Order of Conditions or the latest extension. Only unexpired Orders of Conditions or Extension may be extended.

Date the Order was last extended (if applicable): January 9, 2007 (Date)

Issued by:

Haverhill	July 14, 2008
Conservation Commission	Date

B. Authorization (cont.)

This Order of Conditions Extension must be signed by a majority of the Conservation Commission and a copy sent to the applicant and the appropriate DEP Regional Office (see http://www.mass.gov/dep/about/region/findyour.htm).

Signatures:

Robert Accardi — Peter C. Richardson

Brenda Boerlach — Shamus Hurley

Notary Acknowledgement

Commonwealth of Massachusetts County of Essex

On this 26th (Day) of June (Month) 2008 (Year)

Before me, the undersigned Notary Public, personally appeared

Haverhill Conservation Commission,
Name of Signer

proved to me through satisfactory evidence of identification, which was/were

Personal knowledge of the Commission
Description of evidence of identification

to be the person whose name is signed on the preceding or attached document, and acknowledged to me that he/she signed it voluntarily for its stated purpose.

As member of Haverhill (City/Town) Conservation Commission

DEBRA A. STEWART
NOTARY PUBLIC
COMMONWEALTH OF MASSACHUSETTS
My Commission Expires Nov. 20, 2009

Signature of Notary Public

Debra A. Stewart
Printed Name of Notary Public

Place notary seal and/or any stamp above

November 20, 2009
My Commission Expires (Date)

C. Recording Confirmation

The applicant shall record this document in accordance with General Condition 8 of the Order of Conditions (see below), complete the form attached to this Extension Permit, have it stamped by the Registry of Deeds, and return it to the Conservation Commission.

Note: General Condition 8 of the Order of Conditions requires the applicant, prior to commencement of work, to record the final Order (or in this case, the Extension Permit for the Order of Conditions) in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, it shall be noted in the Registry's Granter Index under the name of the owner of the land upon which the proposed work is to be done. In the case of registered land, it shall also be noted on the Land Court Certificate of Title of the owner of the land upon which the proposed work is done.

Detach page 3 of Form 7 and submit it to the Conservation Commission prior to the expiration of the Order of Conditions subject to this Extension Permit.

To:

Haverhill
Conservation Commission

Please be advised that the Extension Permit to the Order of Conditions for the project at:

Groveland Road - Map 776, Block 788, Lots 20,21,24,27, and 1AA

33-1027
DEP File Number

has been recorded at the Registry of Deeds of:

County

for:

Property Owner

and has been noted in the chain of title of the affected property in accordance with General Condition 8 of the original Order of Conditions on:

Date | Book | Page

If recorded land the instrument number which identifies this transaction is:

Instrument Number

If registered land, the document number which identifies this transaction is:

Document Number

Signature of Applicant

APPENDIX C

Test Pit Logs

CDM

Memorandum

To: *Mr. Andy Miller, P.E.*

From: *Justin Gove, P.E.*

Date: *September 27, 2010*

Subject: *Documentation of Test Pitting*
Haverhill Landfill – September 16, 2010

On September 16, 2010, CDM personnel oversaw test pits conducted at the Haverhill Landfill in Haverhill, Massachusetts. Test pits were performed by the City of Haverhill Water Department. The purpose of the test pits was to confirm and augment the limits of landfilled waste established during previous test pit programs. This memorandum briefly summarizes the scope and findings of the test pit program.

The scope of the recent test pit program focused on two specific areas around the landfill, which are described below:

- Test pits were conducted in the area known as the former "burn pit" area. Previous test pitting programs were unable to confirm the limits of waste in this area due to lack of access to the abutting private properties 190 and 200 Old Groveland Road. Access agreements were established with properties owners enabling the completion of test pit efforts along those property lines.

- The second area investigated during the recent test pit program is located adjacent to the north east corner of the private property located at 158 Old Groveland Road. Similar to the former burn pit area, access to the 158 Old Groveland was established prior to the September 2010 test pit program.

During the September 2010 program, a total of 9 test pits were conducted (TP-201, TP-201A, TP-202, TP-203, TP-204, TP-205, TP-206, TP-20, and TP-208). All test pit locations were recorded with a handheld Trimble GPS unit, the locations of which are depicted on the attached Figure 1. The test pits logs are attached.

Findings

A revised limit of waste has been determined based on the results of the previous and recent test pit programs. The revised limit of waste is depicted on the attached Figure 1. As indicated on the attached figure, the September test pit program confirmed that the limits of waste do

not extend onto the private properties located at 190 and 200 Old Groveland Road. The waste in this area appears to be limited to the top six feet of the soil column and is comprised mainly of scrap metal, rubble, glass, and a small amount of ash. Based on the test pits and field observations it appears that waste was relocated into this area as part of historical grading and shaping efforts.

The September test pit program indicated that there is a small area of offsite waste (3,500 square feet) located on the 158 Old Groveland Road property in the north east corner of the lot. The offsite waste appears to but up against a landscaped berm located along the back edge of 158 Old Groveland yard. The berm appears to have been constructed of stumps and debris from the clearing of the adjacent lawn. It is likely that any waste extending into the lawn in this area was pushed back during construction of the berm. Field personnel noted that the waste in this area appeared to contain more organic matter than observed at the former burn pit area, and noted a strong "septic" odor.

Copies of the test pit logs are attached to this memo for reference.

cc: Andy Miller

Attachments:
- Site Plan
- Test Pit Logs

LEGEND
EXISTING CONDITIONS

- PROPERTY LINE
- WETLANDS LINE
- 10' EXISTING CONTOUR (DASHED WHERE INFERRED)
- 2' EXISTING CONTOUR (DASHED WHERE INFERRED)
- TREE LINE
- W — W — WATER SERVICES
- CITY OF HAVERHILL/ TOWN OF GROVELAND BOUNDARY
- LOT LINE
- FENCE
- EASEMENT
- OHW — OHW — OVERHEAD ELECTRICAL LINES
- D — D — DRAINAGE PIPES
- ISOLATED WETLANDS
- 100' WETLAND BUFFER ZONE
- 200' RIVERFRONT AREA
- UNDERGROUND POWER LINE
- STONE BOUND
- TREE
- UTILITY POLE
- RIP RAP
- VENT 22 — LANDFILL GAS VENT
- TP-1 — TEST PIT (1993) – NO WASTE FOUND
- TP-2 — TEST PIT (1993) – EDGE OF WASTE
- TP-3 — TEST PIT (1993) – WASTE PRESENT
- TP-1 — TEST PIT (2000) – NO WASTE FOUND
- TP-25 — TEST PIT (2000) – EDGE OF WASTE
- TP-12 — TEST PIT (2000) – WASTE PRESENT
- TP-117 — TEST PIT (2008) – NO WASTE FOUND
- TP-100 — TEST PIT (2008) – EDGE OF WASTE
- TP-106 — TEST PIT (2008) – WASTE PRESENT
- TP-1 — TEST PIT (2007)
- FORCE MAIN TEST PIT (2005)
- LOW SPOT
- PROPOSED AREA OF WASTE RELOCATION

1" = 100'

NOTES:

1. BASE SURVEY PLAN BY EASTERN TOPOGRAPHICS OF WOLFBORO, NH. (SCALE 1"=40', 2'=DOF CONTOUR INTERVAL). PHOTO DATES APRIL 13, 1992 AND AUGUST 31, 1999; COMPILATION DATES OF NOVEMBER 23, 1993 AND SEPTEMBER 9, 1999. GROUND CONTROL BY RICHARD F. KAMINSKI & ASSOCIATES, INC. LAWRENCE MA.
2. PROPERTY BOUNDARY SURVEY BY RICHARD F. KAMINSKI & ASSOCIATES, INC. LAWRENCE MA. (FEBRUARY 13, 2006).
3. EDGE OF WASTE REVISED FROM 2000 CSA BASED ON WASTE RELOCATION CONDUCTED DURING PHASE I SOILS PROJECT IN AREA OF STORMWATER BASIN NO. 1 & TEST PITS CONDUCTED IN NOV/DEC 2008.
4. CONTOURS SHOWN WITHIN THE EDGE OF WASTE REPRESENT PRE-DAP SUBGRADE CONDITIONS AT THE CONCLUSION OF THE PHASE IA SOILS PROJECT (EXPECTED SEPTEMBER 2010). CONTOURS SHOWN ARE THE SAME AS THE PHASE IA SOILS PROJECT DESIGN CONTOURS SHOWN ON SHEET C-1A.

CONSTRUCTION NOTES:

1. MATERIALS GENERATED FROM WASTE RELOCATION CAN BE PLACED ON EXISTING LANDFILL SURFACE, HOWEVER ANY MATERIAL LARGER THAN 2" IN DIAMETER MUST BE BURIED AT LEAST 6" BELOW GROUND SURFACE.
2. ACCESS TO WASTE RELOCATION AREAS 1-4 IS THROUGH LANDFILL PROPERTY ONLY.
3. CONTRACTOR TO MINIMIZE DISTURBANCE TO PRIVATE PROPERTY WHEN CONDUCTING WASTE RELOCATION ON OR ADJACENT TO PRIVATE PROPERTY. ALL DISTURBED AREAS TO BE RESTORED TO EXISTING GRADES, INCLUDING PLACEMENT OF TOPSOIL AND SEED.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: L. SUGAY
DRAWN BY: F. CONTRERAS
PROJECT CHK'D BY: L. SUGAY
CROSS CHK'D BY: A. MILLER
APPROVED BY: B. HOSCH
DATE: SEPTEMBER 2010

CDM
Camp Dresser & McKee
One Cambridge Place, 50 Hampshire Street
Cambridge, MA 02139
Tel: (617) 452-6000
engineering • engineering • construction • operations

CITY OF HAVERHILL / AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
HAVERHILL, MASSACHUSETTS

CORRECTIVE ACTION DESIGN
SOUTHERN MOUND - HAVERHILL LANDFILL

UPDATED TEST PIT PLAN - SEPTEMBER 2010

PROJECT NO. 6512-63503
FILE NAME: CSTP1_503
SHEET NO. 1

CDM

50 Hampshire Street
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Test Pit Log

Client:	City of Haverhill & Aggregate In	Contractor:	City of Haverhill	Test Pit No.	TP-201
Project Name:	Haverhill Landfill	Equipment:	JCB 213 Backhoe	Logged By:	J. Gove
Project Location:	Haverhill MA	Depth to Water:	NA	Date:	9/16/2010
Project Number:	0522	Ground Surface	NA	Page:	1 of

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1	Dry, tan, fine sand (native). No waste	**Native**	**E**
6	Bottom of excavation		

T.P. DIMENSIONS	
Width (ft):	3
Length (ft):	12
Depth (ft):	6
Vol (ft^3):	216

TEST PIT PLAN

N ⇧

BOULDER COUNT

6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks: **Located at the edge of the fence around garden of No. 200 Groveland. Test pit conducted to determine if landfill waste was located on the 200 Groveland property. Test pit indicates that waste does not extend onto property.**

Updated On: 1/23/2002

50 Hampshire Street
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Test Pit Log

Client:	City of Haverhill & Aggregate In	Contractor:	City of Haverhill	Test Pit No.	TP-201-A
Project Name:	Haverhill Landfill	Equipment:	JCB 213 Backhoe	Logged By:	J. Gove
Project Location:	Haverhill MA	Depth to Water:	NA	Date:	9/16/2010
Project Number:	0522	Ground Surface	NA	Page:	2 of

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1	Dry, brown, sand and silt with some MSW (20%), which included metal, glass, and a small amount of ash	**Waste**	**E**
2	Dry, tan, fine sand (native)	**Native**	**E**
3			
4			
5			
6	Bottom of excavation		
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS
Width (ft): 3
Length (ft): 10
Depth (ft): 6
Vol (ft^3): 180

TEST PIT PLAN

N ⇧

BOULDER COUNT
6 in-12 in:
12 in-18 in:
18 in-24 in:
24 in-30 in:

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks: **Located several feet back from the northern edge of TP-201.**
Edge of waste is located approximatly 17' north (towards landfill) of the garden fence on 200 Groveland (see attached LOW plan)

Updated On: 1/23/2002

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Test Pit Log

Client:	City of Haverhill & Aggregate In	Contractor:	City of Haverhill	Test Pit No.	TP-202
Project Name:	Haverhill Landfill	Equipment:	JCB 213 Backhoe	Logged By:	J. Gove
Project Location:	Haverhill MA	Depth to Water:	NA	Date:	9/16/2010
Project Number:	0522	Ground Surface	NA	Page:	3 of

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1	Dry, tan to brown, sand and silt.	**Native**	**E**
2			
3			
4			
5	Bottom of Excavation		
6			
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS
Width (ft): 3
Length (ft): 10
Depth (ft): 5
Vol (ft^3): 150

TEST PIT PLAN

N ⇧

BOULDER COUNT
6 in-12 in:
12 in-18 in:
18 in-24 in:
24 in-30 in:

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks: **Located at the toe of the bank slope north of 200 Groveland. No waste encountered**
Test pit conducted to determine south eastern extents of waste in the former "burn pit" area.

Updated On: 1/23/2002

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Test Pit Log

Client:	City of Haverhill & Aggregate In	Contractor:	City of Haverhill	Test Pit No.	TP-203
Project Name:	Haverhill Landfill	Equipment:	JCB 213 Backhoe	Logged By:	J. Gove
Project Location:	Haverhill MA	Depth to Water:	NA	Date:	9/16/2010
Project Number:	0522	Ground Surface	NA	Page:	3 of

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1	Dry, tan to brown, sand and silt and MSW (metal, brick, glass, small amout of ash)	**Waste**	**E**
2			
3			
4			
5			
6			
7	Dry, tan, fine sand	**Native**	**E**
8			
9			
10			
11			
12			

T.P. DIMENSIONS
Width (ft): 3
Length (ft): 10
Depth (ft): 5
Vol (ft^3): 150

TEST PIT PLAN

N ⇧

BOULDER COUNT
6 in-12 in:
12 in-18 in:
18 in-24 in:
24 in-30 in:

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks: **Located several feet west of TP-202**
EOW of waste located and GPS (see attached revised limits of waste)

Updated On: 1/23/2002

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Test Pit Log

Client:	City of Haverhill & Aggregate In	Contractor:	City of Haverhill	Test Pit No.	TP-204
Project Name:	Haverhill Landfill	Equipment:	JCB 213 Backhoe	Logged By:	J. Gove
Project Location:	Haverhill MA	Depth to Water:	NA	Date:	9/16/2010
Project Number:	0522	Ground Surface	NA	Page:	3 of

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1	Dry, tan to brown, sand and silt and MSW (metal, brick, glass)	**Waste**	**E**
2			
3			
4			
5	Dry, tan, fine sand	**Native**	**E**
6	Bottom of excavation		
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS
Width (ft): 3
Length (ft): 10
Depth (ft): 6
Vol (ft^3): 180

TEST PIT PLAN

N ⇧

BOULDER COUNT
6 in-12 in:
12 in-18 in:
18 in-24 in:
24 in-30 in:

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks: **Located at same spot as previous TP-104A. Conducted to confirm the depth of waste.**

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Test Pit Log

Client:	City of Haverhill & Aggregate In	Contractor:	City of Haverhill	Test Pit No.	TP-205
Project Name:	Haverhill Landfill	Equipment:	JCB 213 Backhoe	Logged By:	J. Gove
Project Location:	Haverhill MA	Depth to Water:	NA	Date:	9/16/2010
Project Number:	0522	Ground Surface	NA	Page:	3 of

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1	Dry, tan to brown, sand and silt and MSW (metal, brick, glass)	**Waste**	**E**
2			
3			
4			
5	Dry, tan, fine sand	**Native**	**E**
6	Bottom of excavation		
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS
Width (ft): 3
Length (ft): 10
Depth (ft): 6
Vol (ft^3): 180

TEST PIT PLAN

N ⇧

BOULDER COUNT
6 in-12 in:
12 in-18 in:
18 in-24 in:
24 in-30 in:

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks: **Located on eastern slope of former burn pit area.**

Updated On: 1/23/2002

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Test Pit Log

Client:	City of Haverhill & Aggregate In	Contractor:	City of Haverhill	Test Pit No.	TP-206
Project Name:	Haverhill Landfill	Equipment:	JCB 213 Backhoe	Logged By:	J. Gove
Project Location:	Haverhill MA	Depth to Water:	NA	Date:	9/16/2010
Project Number:	0522	Ground Surface	NA	Page:	3 of

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1	Dry, tan, fine sand	**Native**	**E**
2			
3			
4			
5	Bottom of excavation		
6			
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS
Width (ft): 3
Length (ft): 10
Depth (ft): 6
Vol (ft^3): 180

TEST PIT PLAN

N ⇧

BOULDER COUNT
6 in-12 in:
12 in-18 in:
18 in-24 in:
24 in-30 in:

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks: **Located at western edge of former "burn pit" at the north east corner of No. 190 Groveland Road.**
Test pit conducted to determine if there is any offsite waste in this area (no waste found)

Updated On: 1/23/2002

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Test Pit Log

Client:	City of Haverhill & Aggregate In	Contractor:	City of Haverhill	Test Pit No.	TP-207
Project Name:	Haverhill Landfill	Equipment:	JCB 213 Backhoe	Logged By:	J. Gove
Project Location:	Haverhill MA	Depth to Water:	NA	Date:	9/16/2010
Project Number:	0522	Ground Surface	NA	Page:	3 of

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1–6	Moist, grey sand, silt, gravel and waste (paper, plastic, metal). Strong sepic like odor.	**Waste**	**E**
7	Moist, grey, sand, silt, and gravel - strong odor. Bottom of excavation	**Fill**	**E**
8–12			

T.P. DIMENSIONS
Width (ft): 3
Length (ft): 10
Depth (ft): 7
Vol (ft^3): 210

TEST PIT PLAN

N ⇧

BOULDER COUNT
6 in-12 in:
12 in-18 in:
18 in-24 in:
24 in-30 in:

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks: **Located at the north east corner of No. 158 Groveland Street**
Waste appears to but up against northen side of berm in this area.

Updated On: 1/23/2002

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Test Pit Log

Client:	City of Haverhill & Aggregate In	Contractor:	City of Haverhill	Test Pit No.	TP-208
Project Name:	Haverhill Landfill	Equipment:	JCB 213 Backhoe	Logged By:	J. Gove
Project Location:	Haverhill MA	Depth to Water:	NA	Date:	9/16/2010
Project Number:	0522	Ground Surface	NA	Page:	3 of

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAVATION EFFORT
1	Moist, grey sand, silt, gravel . Strong sepic like odor.	Fill	E
7	Bottom of excavation		

T.P. DIMENSIONS	
Width (ft):	3
Length (ft):	10
Depth (ft):	7
Vol (ft^3):	210

TEST PIT PLAN

N ⇧

BOULDER COUNT

6 in-12 in:	
12 in-18 in:	
18 in-24 in:	
24 in-30 in:	

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks: **Located west of TP-107 near the north east corner of 158 Groveland.**

Updated On: 1/23/2002

CDM

Memorandum

To: *Laura Bugay, P.E.*

From: *Kristopher Beaudoin*

Date: *December 10, 2008*

Subject: *Summary of Partial Test Pits completed at the Haverhill Landfill during November and December 2008 Supplemental CSA test pitting activities.*

Test pit activities conducted at the Haverhill Landfill in November and December of 2008, were designed to supplement previous test pits conducted in 1993 and 2000 and to further confirm the edge of waste. The primary goal was to determine the edge of waste along the east, south and west perimeters of the southern landfill mound. Therefore some test pits were not completed and abandoned to chase the edge of waste. The following summarizes the information noted from these partial test pits (no formal test pit logs will be completed for these partial test pits).

Formal test pit logs were completed for test pits which confirmed the edge of waste, and are attached: TP-100, TP-101, TP-102, TP-103, TP-104C, TP-105B, TP-106, TP-107, TP-108A, TP-109D, TP-110A, TP-111, TP-112, TP-113, TP-114, TP-115, TP-116, TP-117A,TP-118, and TP-119.

Summary of Partial Test Pits

TP-104
11-21-08
Test pit started between vents 19 and 18
(0-2') Top soil mixed with bricks and metal
(2-4') Waste: ash metal, and plastics
Edge of waste was not determined
Photos: 34-47
Reference: TP-104A, 104B, and 104C

TP-104A
11-21-08
(0-5') Top soil mixed with bricks, metal and car parts
(5') Tan sand

Edge of waste was not determined
Photos: 48-54
Reference: TP-104, 104B, and 104C

TP-104B
11-21-08
(0-3') Top soil mixed with bricks, glass, plastics, and metal
(4') Tan sand
Edge of waste not determined
Photo: 55
Reference: TP-104, 104A, and 104C

TP-105
11-21-08
(0-1') Top soil
(1') Tan sand
No waste observed
Photo: 65
Reference: TP-105A and 105B

TP-105A
11-21-08
(0-1') Top soil
(1') Tan sand
No waste observed
Photos: 66-68
Reference: TP-105 and 105B

TP-108
11-24-08
Between vents 3 and 4
(0-3') Brown fine sand
No waste observed.
Photos: 104-105
Reference: TP-108A

TP-109
11-24-08
(0-3') Brown fine sand
(3') Waste: Bricks, asphalt, paper, and plastics
Edge of waste was not determined
Photos: 113-118
Reference: TP-109A, 109B, 109C, and 109D

TP-109A
11-24-08
(0-1') Brown sand mixed with surficial waste paper and plastics
(1-2') Waste: Plastics, metal, and paper
Edge of waste was not determined
Photos: 119-123
Reference: TP-109, 109B, 109C, and 109D

TP-109B
11-24-08
(0-1') Brown Sand mixed with surficial waste paper and plastics
(1-3') Waste: Plastics, metal, paper, and glass
Edge of waste was not determined
Photos: 124-125
Reference: TP-109, 109A, 109C, and 109D

TP-109C
11-24-08
(0-0.5') Top soil
(0.5-3') Tan fine sand
No waste observed
Photos: 126-129
Reference: TP-109, 109A, 109B, 109D

TP-110
11-24-08
Edge of old access road
(0-2') Waste: Plastic, metal, and fabric
Edge of waste was not determined
Photos: 135-137
Reference: TP-110A, 110B and 110C

TP-110B
11-24-08
(0-5') Brown gray sands mixed with asphalt
Edge of waste was not determined
Photos: 145-148
Reference: TP-110, 110A, and 110C

TP-110C
11-24-08
(0-4') Brown sand mixed with asphalt
Edge of waste was not determined
Photos: 149-161

Reference: TP-110, 110A, and 110B

TP-117
12-2-08
Test pit dug into the south end of the berm.
(0-8') Brown rocky sand
No waste observed.
Photos: NA
Reference: TP-117A

Summary of Test Pit Locations November - December 2008 Haverhill Landfill Closure Project Haverhill Landfill, Haverhill , Massachusetts		
Test Pit Number	Northing	Easting
TP-100	638735.394	722106.893
TP-101	638859.998	722113.239
TP-102	639117.254	722099.821
TP-103	639314.488	722126.946
TP-104	638383.718	721920.711
TP-104A	638348.488	721886.810
TP-104B	638329.941	721865.205
TP-104C	638305.404	721850.576
TP-105	638363.023	721833.013
TP-105A	638375.768	721864.510
TP-105B	638384.765	721896.007
TP-106	638334.497	721954.742
TP-107	638443.881	722001.088
TP-108	638424.523	721675.749
TP-108A	638455.185	721658.441
TP-109	638558.978	721550.698
TP-109A	638540.496	721548.810
TP-109B	638520.191	721545.426
TP-109C	638497.629	721533.014
TP-109D	638471.670	721530.455
TP-110	638645.121	721518.800
TP-110A	638585.931	721506.719
TP-110B	638607.864	721523.576
TP-110C	638622.610	721533.675
TP-111	638744.148	721468.285
TP-112	638782.459	721409.780
TP-113	639755.058	720990.165
TP-114	639577.707	720932.220
TP-115	639435.499	720913.504
TP-116	639267.539	720890.562
TP-117	639114.317	720994.114
TP-117A	639120.676	721018.163
TP-118	639023.697	721092.143
TP-119	638941.125	721142.383

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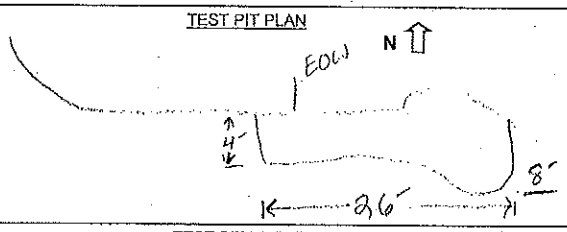
Test Pit Log

Client:	City of Haverhill & Aggregate	Contractor:	City of Haverhill	Test Pit No.	TP-100
Project Name:	Haverhill Landfill Closure	Equipment:	JBC Sitemaster 214 Series 2 backhoe	Logged By:	K. Beaudoin
Project Location:	Old Groveland Road	Depth to Water:	NA	Date:	11/21/2008
Project Number:	0522-62500-RT.FIELD.TPITS	Ground Surface EL:	70'	Page:	1 of 1
GPS Coordinates:	N 638735.394	E 722106.898			

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	(0-1') Topsoil	Top Soil	E
2	(1-2') Gray silty material	Fill Silt	E
3	(2-4') Light brown fine sand	Fill Sand	E
4			
5	(4-5') Waste: Plastic bags, hose, wires, glass bottles.	Waste	E
6	(5-8') Light brown fine sand	Fill Sand	E
7			
8	Bottom of excavation		
9			
10			
11			
12			

T.P. DIMENSIONS
Width (ft): 2
Length (ft): 26
Depth (ft): 4
Vol (ft^3): 208

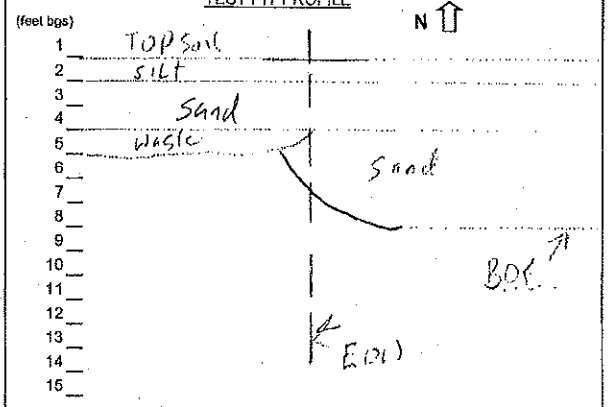
TEST PIT PLAN



BOULDER COUNT
6 in-12 in: NA
12 in-18 in: NA
18 in-24 in: NA
24 in-30 in: NA

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PROFILE



EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks:

Photos Taken (attached:) Photos 1-9

Updated On: 12/19/05

CDM

One Cambridge Place
50 Hampshire Street
Cambridge, MA 02139
(617) 452-6000

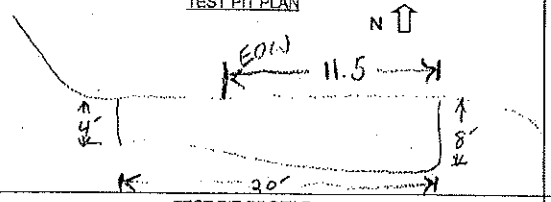
Test Pit Log

Client: City of Haverhill & Aggregate	Contractor: City of Haverhill	Test Pit No.	TP-101
Project Name: Haverhill Landfill Closure	Equipment: JBC Sitemaster 214 Series 2 backhoe	Logged By:	K. Beaudoin
Project Location: Old Groveland Road	Depth to Water: NA	Date:	11/21/2008
Project Number: 0522-62500-RT.FIELD.TPITS	Ground Surface EL: 68'	Page:	1 of 1
GPS Coordinates: N 638859.998 E 722113.239			

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	(0-1') Material from the Phase I Soils project. (Soils compliant with Mass DEP policay COMM097-001)	Fill	E
2	(1-4') Brown fine sand	Sand	E
3			
4			
5	(4-5') Waste: Plastic, paper, glass, burned wood, metal.	Waste	E
6	(5-8') Brown fine sand	Sand	E
7			
8	Bottom of excavation		
9			
10			
11			
12			

T.P. DIMENSIONS
Width (ft): 2
Length (ft): 20
Depth (ft): 4
Vol (ft^3): 160

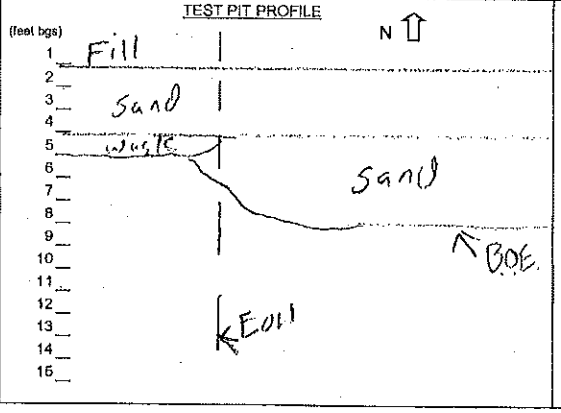
TEST PIT PLAN



BOULDER COUNT
6 in-12 in: NA
12 in-18 in: NA
18 in-24 in: NA
24 in-30 in: NA

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PROFILE



EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks:
Photos Taken (attached:) Photos 10-22

Updated On: 12/19/05

CDM

One Cambridge Place
50 Hampshire Street
Cambridge, MA 02139
(617) 452-6000

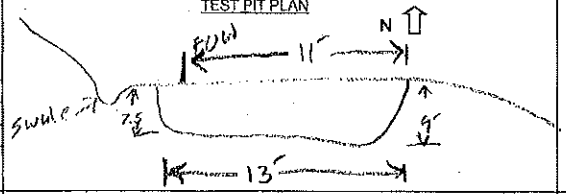
Test Pit Log

Client:	City of Haverhill & Aggregate	Contractor:	City of Haverhill	Test Pit No.	TP-102
Project Name:	Haverhill Landfill Closure	Equipment:	JBC Sitemaster 214 Series 2 backhoe	Logged By:	K. Beaudoin
Project Location:	Old Groveland Road	Depth to Water:	NA	Date:	11/21/2008
Project Number:	0522-62500-RT.FIELD.TPITS	Ground Surface EL:	38'	Page:	1 of 1
GPS Coordinates:	N 639117.254 E 722099.821				

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	(0-2') Top soil, boulders, surfical waste (tire, plastics, fabric, metal)	Top soil	E
2			
3	(2-7.5)' Brown sand	Sand	E
4			
5			
6			
7			
8	(7.5-8') Black stained sand and waste. Plastics, fabric, metal.	Waste	E
	(8-9') Brown sand	Sand	E
9	Bottom of excavation		
10			
11			
12			

T.P. DIMENSIONS
Width (ft): 2
Length (ft): 13
Depth (ft): 7.5
Vol (ft³): 195

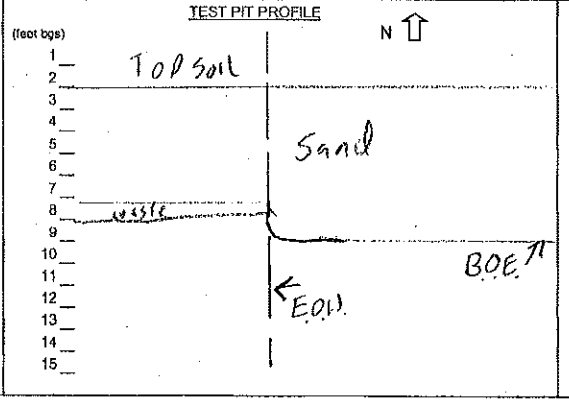
TEST PIT PLAN



BOULDER COUNT
6 in-12 in: Little
12 in-18 in: Little
18 in-24 in: NA
24 in-30 in: NA

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PROFILE



EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks:

Photos Taken (attached:) Photos 23-28

Updated On: 12/19/05

CDM

One Cambridge Place
50 Hampshire Street
Cambridge, MA 02139
(617) 452-6000

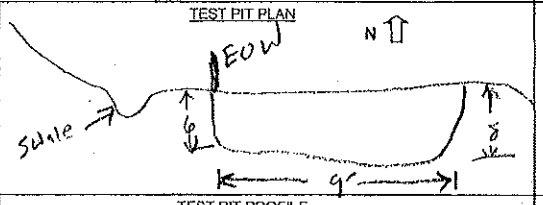
Test Pit Log

Client:	City of Haverhill & Aggregate	Contractor:	City of Haverhill	Test Pit No.	TP-103
Project Name:	Haverhill Landfill Closure	Equipment:	JBC Sitemaster 214 Series 2 backhoe	Logged By:	K. Beaudoin
Project Location:	Old Groveland Road	Depth to Water:	NA	Date:	11/21/2008
Project Number:	0522-62500-RT.FIELD.TPITS	Ground Surface EL:	30'	Page:	1 of 1
GPS Coordinates:	N 639314.488 E 722126.946				

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	(0-1') Top soil	Top soil	E
2	(1-3') Brown Sand with some boulders and some cobbles. Surficial waste: plastic, fabric	Fill	E
3			
4	(3-6') Black sand with surficial waste; plastic fabric metal	Fill	E
5			
6			
7	(6-7') Waste: Metal plastic fabric	Waste	E
8	(7-8') Brown sand Bottom of excavation	Sand	E
9			
10			
11			
12			

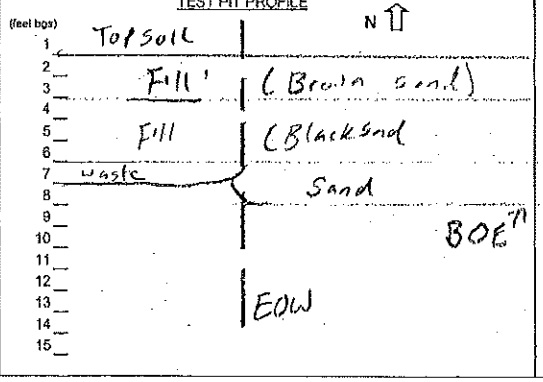
T.P. DIMENSIONS
Width (ft): 2
Length (ft): 9
Depth (ft): 6
Vol (ft³): 108

TEST PIT PLAN



BOULDER COUNT
6 in-12 in: Some
12 in-18 in: Some
18 in-24 in: NA
24 in-30 in: NA

TEST PIT PROFILE



DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks:
Photos Taken (attached:) Photos 29-33

Updated On: 12/19/05

CDM

One Cambridge Place
50 Hampshire Street
Cambridge, MA 02139
(617) 452-6000

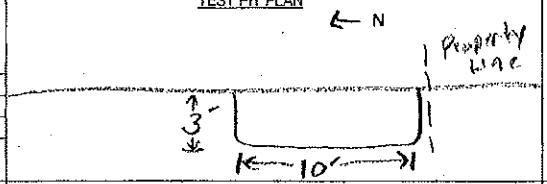
Test Pit Log

Client: City of Haverhill & Aggregate	Contractor: City of Haverhill	Test Pit No.	TP-104C
Project Name: Haverhill Landfill Closure	Equipment: JBC Sitemaster 214 Series 2 backhoe	Logged By:	K. Beaudoin
Project Location: Old Groveland Road	Depth to Water: NA	Date:	11/21/2008
Project Number: 0522-62500-RT.FIELD.TPITS	Ground Surface EL: 69'	Page:	1 of 1
GPS Coordinates: N 638305.404 E721850.576			

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	(0-3') Top soil mixed with waste: metal, small metal soda container with solid unknown blue/white material, glass, and plastics.	Top soil Waste	E
4	(3') Tan Sand. Bottom of excavation	Sand	E

T.P. DIMENSIONS
Width (ft): 2
Length (ft): 10
Depth (ft): 3
Vol (ft^3): 60

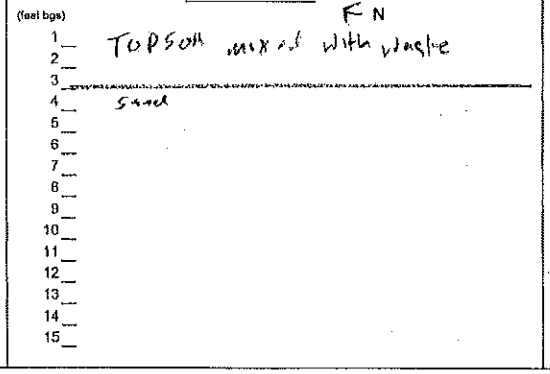
TEST PIT PLAN



BOULDER COUNT
6 in-12 in: NA
12 in-18 in: NA
18 in-24 in: NA
24 in-30 in: NA

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PROFILE



EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks: **Edge of waste not determined before the property line.**
Photos Taken (attached:) Photos 56-64

Updated On: 12/19/05

CDM

One Cambridge Place
50 Hampshire Street
Cambridge, MA 02139
(617) 452-6000

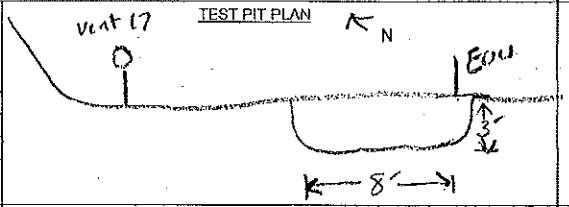
Test Pit Log

Client: City of Haverhill & Aggregate	Contractor: City of Haverhill	Test Pit No. TP-105B	
Project Name: Haverhill Landfill Closure	Equipment: JBC Sitemaster 214 Series 2 backhoe	Logged By: K. Beaudoin	
Project Location: Old Groveland Road	Depth to Water: NA	Date: 11/21/2006	
Project Number: 0522-62500-RT.FIELD.TPITS	Ground Surface EL: 74'	Page: 1 of 1	
GPS Coordinates: N 638384.765 E 721896.007			

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	(0-1') Top soil with some bricks	Top soil Fill	E
2	(1-3') Waste: Bricks, metal, glass	Waste	E
3	3' Tan Sand Bottom of excavation	Sand	E
4			
5			
6			
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS
Width (ft): 2
Length (ft): 8
Depth (ft): 3
Vol (ft^3): 48

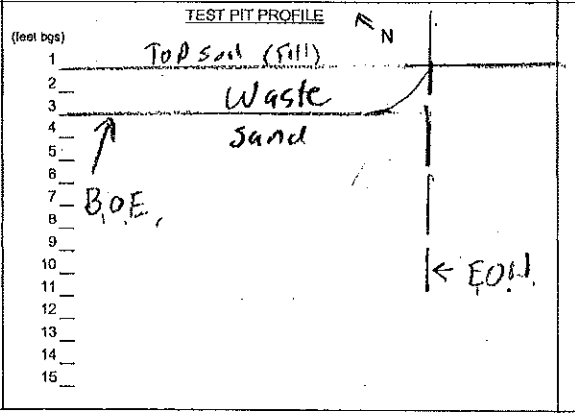
TEST PIT PLAN



BOULDER COUNT
6 in-12 in: NA
12 in-18 in: NA
18 in-24 in: NA
24 in-30 in: NA

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PROFILE



EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks:
Photos Taken (attached:) Photos 68-72

Updated On: 12/19/05

CDM

One Cambridge Place
50 Hampshire Street
Cambridge, MA 02139
(617) 452-6000

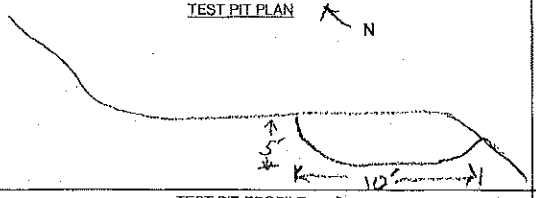
Test Pit Log

Client: City of Haverhill & Aggregate	Contractor: City of Haverhill	Test Pit No.	TP-106
Project Name: Haverhill Landfill Closure	Equipment: Case 580E Backhoe	Logged By:	K. Beaudoin
Project Location: Old Groveland Road	Depth to Water: NA	Date:	11/24/2008
Project Number: 0522-62500-RT.FIELD.TPITS	Ground Surface EL: 68'	Page:	1 of 1
GPS Coordinates: N 638334.497 E 721954.742			

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	(0-3') Top soil with surficial waste	Top soil	E
2			
3			
4	(3-5') Tan sand	Sand	E
5			
6	(5') Waste: plastics, glass, metal and fabrics Bottom of excavation	Waste	E
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS
Width (ft): 2
Length (ft): 10
Depth (ft): 5
Vol (ft^3): 100

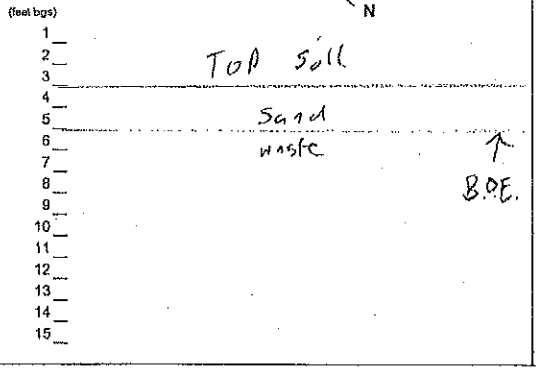
TEST PIT PLAN



BOULDER COUNT
6 in-12 in: NA
12 in-18 in: NA
18 in-24 in: NA
24 in-30 in: NA

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PROFILE



EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks: Edge of waste not determined before the land slopes

Photos Taken (attached:) Photos 73-82

Updated On: 12/19/05

CDM

One Cambridge Place
50 Hampshire Street
Cambridge, MA 02139
(617) 452-6000

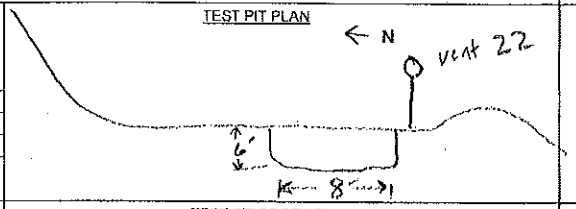
Test Pit Log

Client:	City of Haverhill & Aggregate	Contractor:	City of Haverhill	Test Pit No.	TP-107
Project Name:	Haverhill Landfill Closure	Equipment:	Case 580E Backhoe	Logged By:	K. Beaudoin
Project Location:	Old Groveland Road	Depth to Water:	NA	Date:	11/24/2008
Project Number:	0522-62500-RT.FIELD.TPITS	Ground Surface EL:	70'	Page:	1 of 1
GPS Coordinates:	N 658443.881 E 722001.088				

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	(0-2') Top soil with surficial waste: fabric and plastics	Top soil Fill	E
2			
3	(2-4') Black stained sand with surficial waste: plastics and metal	Fill	E
4			
5	(4-6') Waste: Plastics, metal, metal container containing thick white unknown liquid	Waste	E
6			
7	(6') Light brown fine sand. Bottom of excavation	Sand	E
8			
9			
10			
11			
12			

T.P. DIMENSIONS
Width (ft): 2
Length (ft): 8
Depth (ft): 6
Vol (ft³): 96

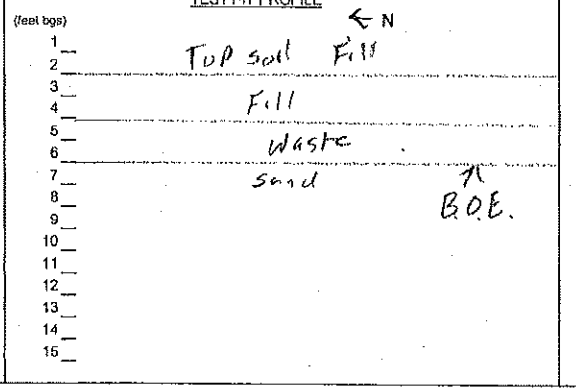
TEST PIT PLAN



BOULDER COUNT
6 in-12 in: NA
12 in-18 in: NA
18 in-24 in: NA
24 in-30 in: NA

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PROFILE



EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks: Edge of waste not found. Could not chase waste due to the terrain.

Photos Taken (attached:) Photos 82-99

Updated On: 12/19/06

CDM

One Cambridge Place
50 Hampshire Street
Cambridge, MA 02139
(617) 452-6000

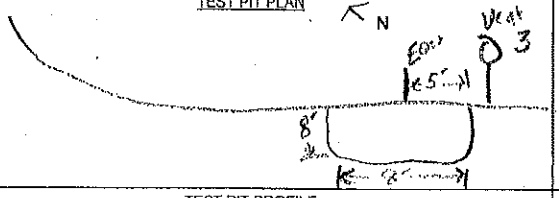
Test Pit Log

Client: City of Haverhill & Aggregate	Contractor: City of Haverhill	Test Pit No.	TP-108A
Project Name: Haverhill Landfill Closure	Equipment: Case 580E Backhoe	Logged By:	K. Beaudoin
Project Location: Old Groveland Road	Depth to Water: NA	Date:	11/24/2008
Project Number: 0522-62500-RT.FIELD.TPITS	Ground Surface EL: 94'	Page:	1 of 1
GPS Coordinates: N 638455.185	E 721658.441		

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	(0-1') Top soil	Top soil	E
2	(1-8') Waste: Plastics, metal, and fabric.	Waste	M
3			
4			
5			
6			
7			
8			
9	(8-9') Brown sand Bottom of excavation	Sand	E
10			
11			
12			

T.P. DIMENSIONS
Width (ft): 2
Length (ft): 8
Depth (ft): 8
Vol (ft³): 128

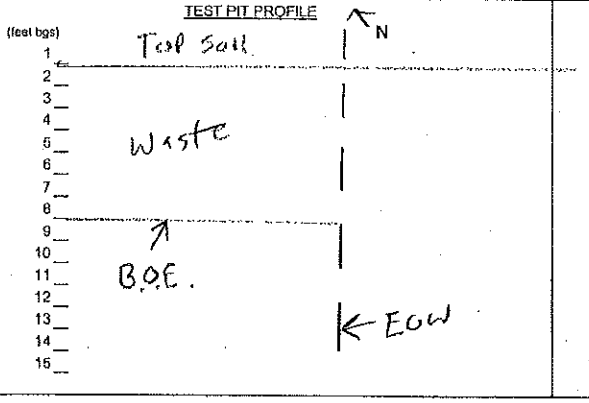
TEST PIT PLAN



BOULDER COUNT
6 in-12 in: NA
12 in-18 in: NA
18 in-24 in: NA
24 in-30 in: NA

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PROFILE



EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks:

Photos Taken (attached:) Photos 106-113

Updated On: 12/19/05

CDM

One Cambridge Place
50 Hampshire Street
Cambridge, MA 02139
(617) 452-6000

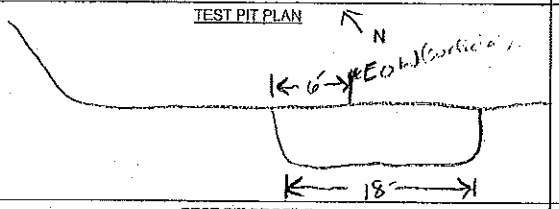
Test Pit Log

Client: City of Haverhill & Aggregate	Contractor: City of Haverhill	Test Pit No.	TP-109D
Project Name: Haverhill Landfill Closure	Equipment: Case 580E Backhoe	Logged By:	K. Beaudoin
Project Location: Old Groveland Road	Depth to Water: NA	Date:	11/24/2008
Project Number: 0522-62500-RT.FIELD.TPITS	Ground Surface EL: 88'	Page:	1 of 1
GPS Coordinates: N 688471.670	E 721530.455		

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	(0-2') Brown sand with surficial waste: plastics, metal cable	Fill	E
2			
3	(2-3') Tan fine sand	Sand	E
	Bottom of excavation		
4			
5			
6			
7			
8			
9			
10			
11			
12			

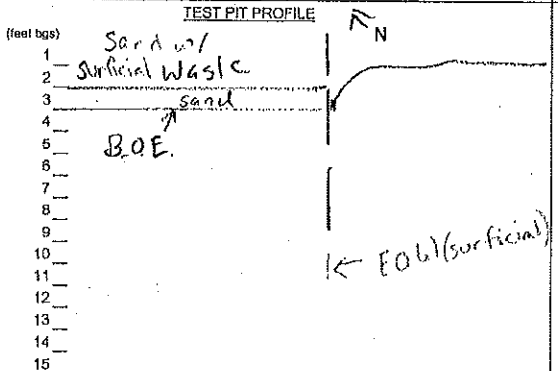
T.P. DIMENSIONS
Width (ft): 2
Length (ft): 18
Depth (ft): 3
Vol (ft^3): 108

TEST PIT PLAN



BOULDER COUNT
6 in-12 in: NA
12 in-18 in: NA
18 in-24 in: NA
24 in-30 in: NA

TEST PIT PROFILE



DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks:

Photos Taken (attached:) Photos 130-134

Updated On: 12/19/05

CDM

One Cambridge Place
50 Hampshire Street
Cambridge, MA 02139
(617) 452-6000

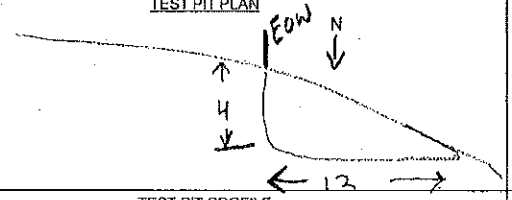
Test Pit Log

Client:	City of Haverhill & Aggregate	Contractor:	City of Haverhill	Test Pit No.	TP-110A
Project Name:	Haverhill Landfill Closure	Equipment:	Case 580E Backhoe	Logged By:	K. Beaudoin
Project Location:	Old Groveland Road	Depth to Water:	NA	Date:	11/24/2008
Project Number:	0522-62500-RT.FIELD.TPITS	Ground Surface EL:	84'	Page:	1 of 1
GPS Coordinates:	N688585.931 E 721506.719				

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
0	(0-4') Brown sand with asphalt (76%)	Waste	D
4	(4') Tan find sand. Bottom of excavation	Sand	E

T.P. DIMENSIONS
Width (ft): 2
Length (ft): 12
Depth (ft): 4
Vol (ft³): 96

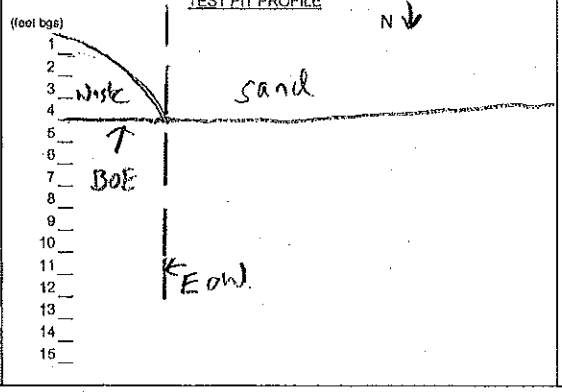
TEST PIT PLAN



BOULDER COUNT
6 in-12 in: NA
12 in-18 in: NA
18 in-24 in: NA
24 in-30 in: NA

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PROFILE



EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks:

Photos Taken (attached:) Photos 138-144

Updated On: 12/19/05

CDM

One Cambridge Place
50 Hampshire Street
Cambridge, MA 02139
(617) 452-6000

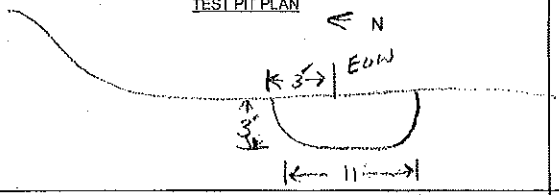
Test Pit Log

Client:	City of Haverhill & Aggregate	Contractor:	City of Haverhill	Test Pit No.	TP-111
Project Name:	Haverhill Landfill Closure	Equipment:	JBC Silomaster 214 Series 2 backhoe	Logged By:	K. Beaudoin
Project Location:	Old Groveland Road	Depth to Water:	NA	Date:	11/26/2008
Project Number:	0522-62500-RT.FIELD.TPITS	Ground Surface EL:	90'	Page:	1 of 1
GPS Coordinates:	N 638744.148 E 721468.285				

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
0	(0-3') Brown sand and waste metal, plastic, glass	Waste	E
1			
2			
3			
4	(3') Brown sand. Bottom of excavation.	Sand	E
5			
6			
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS
Width (ft): 2
Length (ft): 11
Depth (ft): 3
Vol (ft³): 66

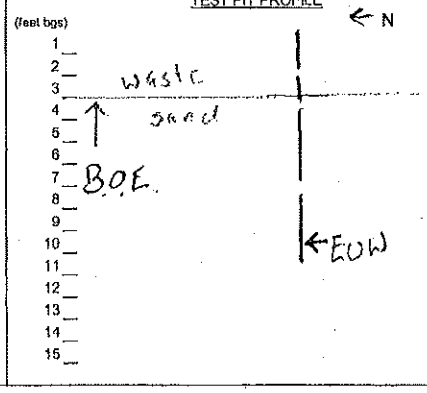
TEST PIT PLAN



BOULDER COUNT
6 in-12 in: NA
12 in-18 in: NA
18 in-24 in: NA
24 in-30 in: NA

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PROFILE



EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks:
Photos Taken (attached:) Photos 162-166

Updated On: 12/19/05

CDM

One Cambridge Place
50 Hampshire Street
Cambridge, MA 02139
(617) 452-6000

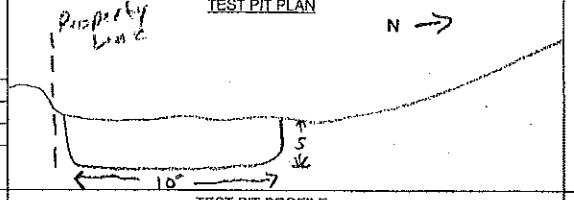
Test Pit Log

Client:	City of Haverhill & Aggregate	Contractor:	City of Haverhill	Test Pit No.	TP-112
Project Name:	Haverhill Landfill Closure	Equipment:	JBC Sitemaster 214 Series 2 backhoe	Logged By:	K. Beaudoin
Project Location:	Old Groveland Road	Depth to Water:	NA	Date:	11/25/2008
Project Number:	0522-62500-RT.FIELD.TPITS	Ground Surface EL:	88'	Page:	1 of 1
GPS Coordinates:	N 638 782.459	E 721 409.780			

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	(0-1") Top soil and gravel with some cobbles	Top soil / Fill	E
2	(1-1.5') Gray Silt	Silt	E
3	(1.5-3') Brown sand	Sand	E
4	(3-5') Waste: plastics, rubber, metal.	Waste	E
5	Bottom of excavation		
6			
7			
8			
9			
10			
11			
12			

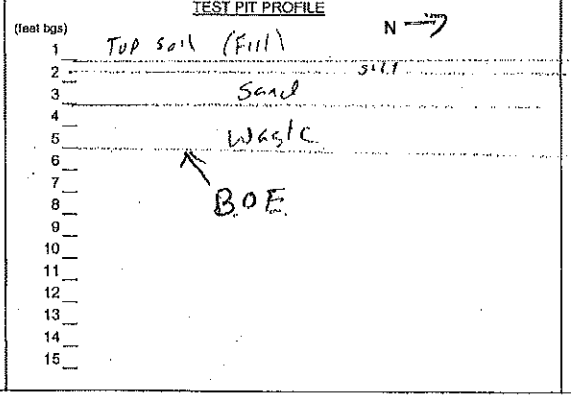
T.P. DIMENSIONS
Width (ft): 2
Length (ft): 10
Depth (ft): 5
Vol (ft³): 100

TEST PIT PLAN



BOULDER COUNT
6 in-12 in: NA
12 in-18 in: NA
18 in-24 in: NA
24 in-30 in: NA

TEST PIT PROFILE



DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks: Could not chase waste due to property boundary

Photos Taken (attached:) Photos 167-172

Updated On: 12/19/05

CDM

One Cambridge Place
50 Hampshire Street
Cambridge, MA 02139
(617) 452-6000

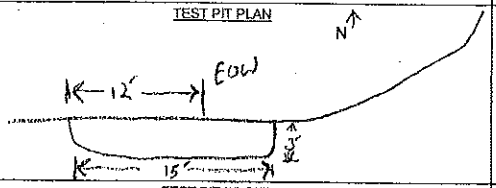
Test Pit Log

Client:	City of Haverhill & Aggregate	Contractor:	City of Haverhill	Test Pit No.	TP-113
Project Name:	Haverhill Landfill Closure	Equipment:	Kubota KX 121-3 mini excavator	Logged By:	K. Beaudoin
Project Location:	Old Groveland Road	Depth to Water:	NA	Date:	12/2/2008
Project Number:	0522-62500-RT.FIELD.TPITS	Ground Surface EL:	42'	Page:	1 of 1
GPS Coordinates:	N 639755.058 E 790990.165				

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	(0-1') Top soil	Top soil	E
2	(1-2') Waste: plastics, metal, glass	Waste	E
3	(2-3') Brown Sand Bottom of excavation	Sand	E
4			
5			
6			
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS
Width (ft): 2
Length (ft): 15
Depth (ft): 3
Vol (ft^3): 90

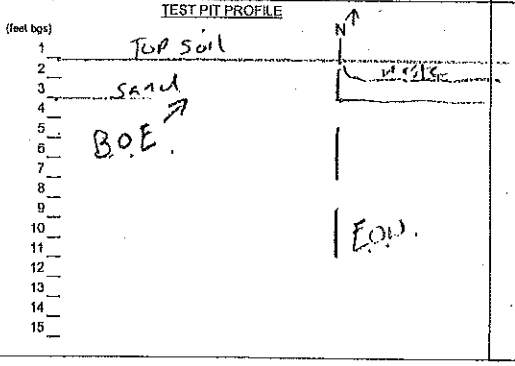
TEST PIT PLAN



BOULDER COUNT
6 in-12 in: NA
12 in-18 in: NA
18 in-24 in: NA
24 in-30 in: NA

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PROFILE



EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks:
Photos Taken (attached:) Photos 173-176

Updated On: 12/19/05

CDM

One Cambridge Place
50 Hampshire Street
Cambridge, MA 02139
(617) 452-6000

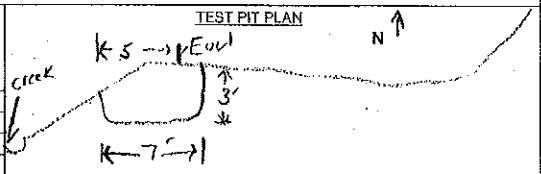
Test Pit Log

Client:	City of Haverhill & Aggregate	Contractor:	City of Haverhill	Test Pit No.	TP-114
Project Name:	Haverhill Landfill Closure	Equipment:	Kubota KX 121-3 mini excavator	Logged By:	K. Beaudoin
Project Location:	Old Groveland Road	Depth to Water:	2'	Date:	12/2/2008
Project Number:	0522-62500-RT.FIELD.TPITS	Ground Surface EL:	48'	Page:	1 of 1
GPS Coordinates:	N 699577.707 E 720932.220				

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
	(0-.5') Top soil	Top soil	E
1	(.5-3') Waste: Metal, cables, fabric, glass, plastics, wood	Waste	E
2			
3	Bottom of excavation		
	(3-4') Brown sand	Sand	E
4	Bottom of excavation		
5			
6			
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS
Width (ft): 2
Length (ft): 7
Depth (ft): 3
Vol (ft³): 42

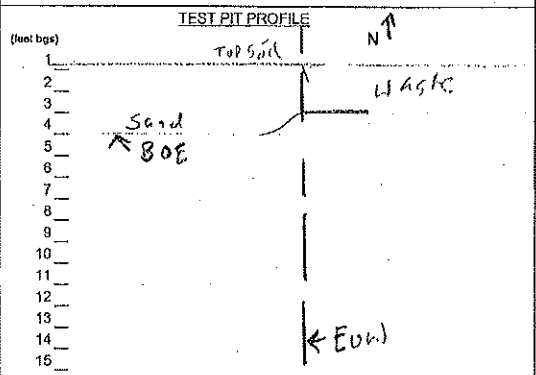
TEST PIT PLAN



BOULDER COUNT
6 in-12 in: NA
12 in-18 in: NA
18 in-24 in: NA
24 in-30 in: NA

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PROFILE



EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks:
Photos Taken (attached:) Photos 177-184

Updated On: 12/18/08

CDM

One Cambridge Place
50 Hampshire Street
Cambridge, MA 02139
(617) 452-6000

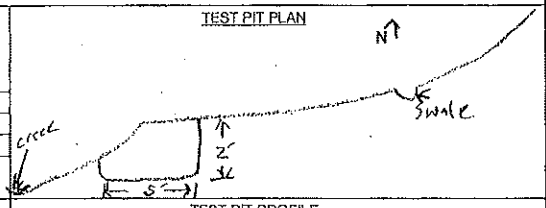
Test Pit Log

Client:	City of Haverhill & Aggregate	Contractor:	City of Haverhill	Test Pit No.	TP-115
Project Name:	Haverhill Landfill Closure	Equipment:	Kubota KX 121-3 mini excavator	Logged By:	K. Beaudoin
Project Location:	Old Groveland Road	Depth to Water:	NA	Date:	12/2/2008
Project Number:	0522-62500-RT.FIELD.TPITS	Ground Surface EL:	62'	Page:	1 of 1
GPS Coordinates:	N689485.499 E720913.504				

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	(0-2') Waste: Fabric, glass, plastics.	Waste	E
2	Bottom of excavation		
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

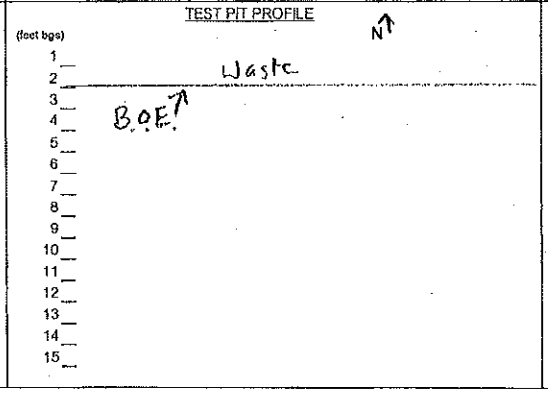
T.P. DIMENSIONS
Width (ft): 2
Length (ft): 5
Depth (ft): 2
Vol (ft³): 20

TEST PIT PLAN



BOULDER COUNT
6 in-12 in: NA
12 in-18 in: NA
18 in-24 in: NA
24 in-30 in: NA

TEST PIT PROFILE



DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks: Edge of waste not determined. Ground slopes off into a creek. Excavator could not go down slope.

Photos Taken (attached:) Photos 185-190

Updated On: 12/19/05

CDM

One Cambridge Place
50 Hampshire Street
Cambridge, MA 02139
(617) 452-6000

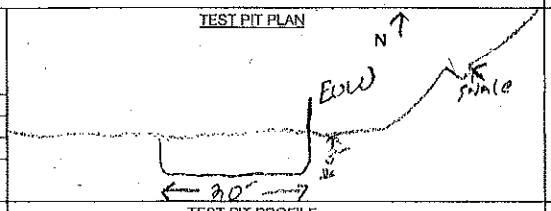
Test Pit Log

Client:	City of Haverhill & Aggregate	Contractor:	City of Haverhill	Test Pit No.	TP-116
Project Name:	Haverhill Landfill Closure	Equipment:	Kubota KX 121-3 mini excavator	Logged By:	K. Beaudoin
Project Location:	Old Groveland Road	Depth to Water:	2.5'	Date:	12/2/2008
Project Number:	0522-62500-RT.FIELD.TPITS	Ground Surface EL:	80'	Page:	1 of 1
GPS Coordinates:	N 689267.539	E 720890.582			

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	(0-2') Top soil with some cobbles	Top soil	E
2	(2-2.5') Waste: Plastics and fabric. Waste tapers off at edge.	Waste	E
3	(2.5-3') Brown sand with cobbles. Bottom of excavation	Sand	E
4			
5			
6			
7			
8			
9			
10			
11			
12			

T.P. DIMENSIONS
Width (ft): 2
Length (ft): 20
Depth (ft): 3
Vol (ft^3): 120

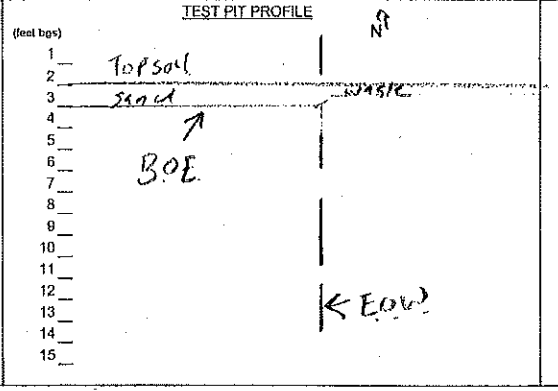
TEST PIT PLAN



BOULDER COUNT
6 in-12 in: NA
12 in-18 in: NA
18 in-24 in: NA
24 in-30 in: NA

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PROFILE



EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks:

Photos Taken (attached:) Photos 191-198

Updated On: 12/19/05

CDM

One Cambridge Place
50 Hampshire Street
Cambridge, MA 02139
(617) 452-6000

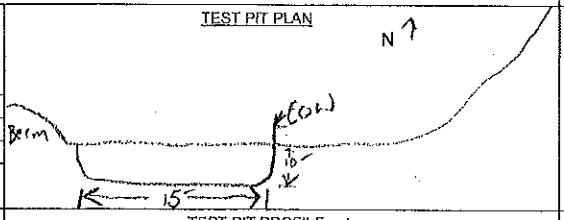
Test Pit Log

Client:	City of Haverhill & Aggregate	Contractor:	City of Haverhill	Test Pit No.	TP-117A
Project Name:	Haverhill Landfill Closure	Equipment:	Kubota KX 121-3 mini excavator	Logged By:	K. Beaudoin
Project Location:	Old Groveland Road	Depth to Water:	6'	Date:	12/2/2008
Project Number:	0522-62500-RT.FIELD.TPIT	Ground Surface EL:	72'	Page:	1 of 1
GPS Coordinates:	N 639120.676	E 721018.163			

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	(0-6') Brown sand with cobbles and surficial waste plastics	Sand	E
7	(6-8') Waste Plastics, metal, glass, fabric	Waste	E
9	(8-10") Brown sand with cobbles	Sand	E
10	Bottom of excavation		

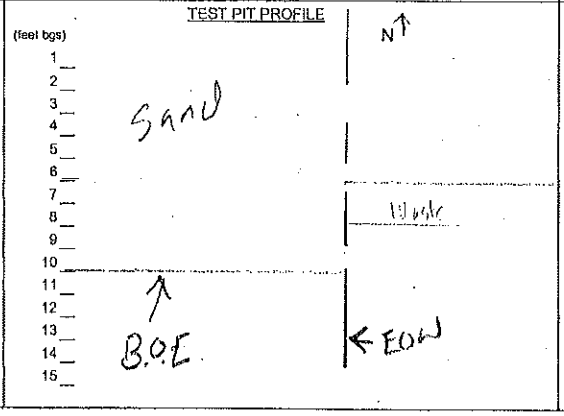
T.P. DIMENSIONS
Width (ft): 2
Length (ft): 15
Depth (ft): 10
Vol (ft^3): 300

TEST PIT PLAN



BOULDER COUNT
6 in-12 in: NA
12 in-18 in: NA
18 in-24 in: NA
24 in-30 in: NA

TEST PIT PROFILE



DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks:

Photos Taken (attached:) Photos 199-214

Updated On: 12/19/05

CDM

One Cambridge Place
50 Hampshire Street
Cambridge, MA 02139
(617) 452-6000

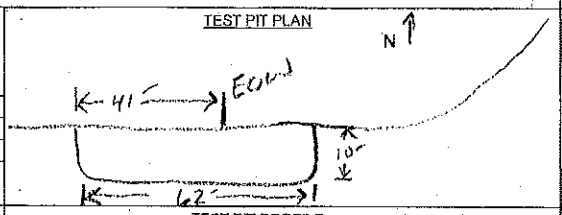
Test Pit Log

Client:	City of Haverhill & Aggregate	Contractor:	City of Haverhill	Test Pit No.	TP-118
Project Name:	Haverhill Landfill Closure	Equipment:	Kubota KX 121-3 mini excavator	Logged By:	K. Beaudoin
Project Location:	Old Groveland Road	Depth to Water:	3'	Date:	12/2/2008
Project Number:	0522-62500-RT.FIELD.TPITS	Ground Surface EL:	78'	Page:	1 of 1
GPS Coordinates:	N 639023.697	E 721092.143			

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	(0-6') Brown sand with surficial waste plastics	Sand	E
6	(5-6')Waste: Black sludge	Waste	E
7	(6-10') Brown sand	Sand	E
10	Bottom of excavation		
11		Waste	E
12			

T.P. DIMENSIONS
Width (ft): 2
Length (ft): 62
Depth (ft): 10
Vol (ft³): 1240

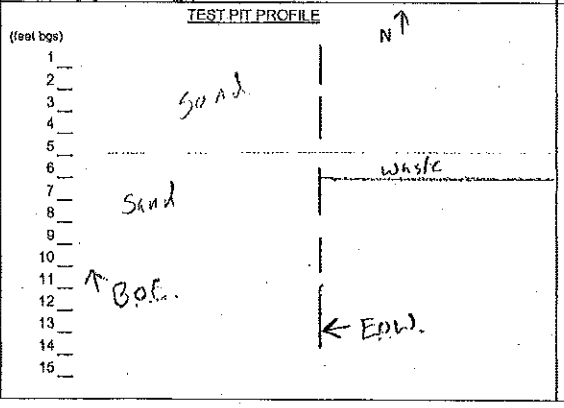
TEST PIT PLAN



BOULDER COUNT
6 in-12 in: NA
12 in-18 in: NA
18 in-24 in: NA
24 in-30 in: NA

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PROFILE



EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks:
Photos Taken (attached:) Photos 215-236

Updated On: 12/19/05

CDM

One Cambridge Place
50 Hampshire Street
Cambridge, MA 02139
(617) 452-6000

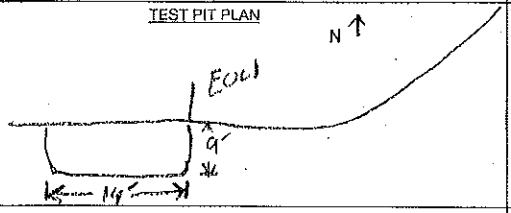
Test Pit Log

Client: City of Haverhill & Aggregate	Contractor: City of Haverhill	Test Pit No.	TP-119
Project Name: Haverhill Landfill Closure	Equipment: Kubota KX 121-3 mini excavator	Logged By:	K. Beaudoin
Project Location: Old Groveland Road	Depth to Water: 7.5'	Date:	12/2/2008
Project Number: 0522-62500-RT.FIELD.TPITS	Ground Surface EL: 76'	Page:	1 of 1
GPS Coordinates: N638941.125	E721142.383		

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1–7	(0-7.5') Brown sand with cobbles	Sand	E
8	(7.5-8') Waste: Plastics, glass, wood, fabric.	Waste	E
9	(8-9') Brown Sand Bottom of excavation	Sand	E
10–12			

T.P. DIMENSIONS
Width (ft): 2
Length (ft): 14
Depth (ft): 7.5
Vol (ft³): 210

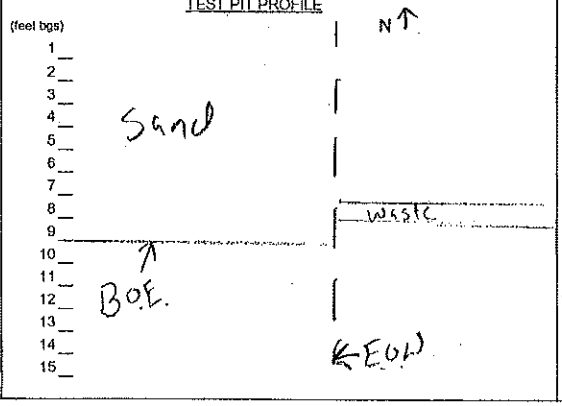
TEST PIT PLAN



BOULDER COUNT
6 in-12 in: NA
12 in-18 in: NA
18 in-24 in: NA
24 in-30 in: NA

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PROFILE

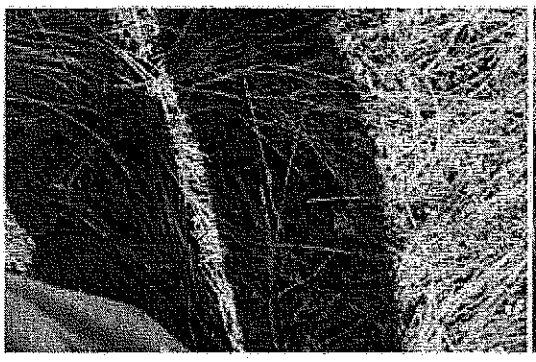


EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

Remarks:

Photos Taken (attached:) Photos 237-241

Updated On: 12/19/05

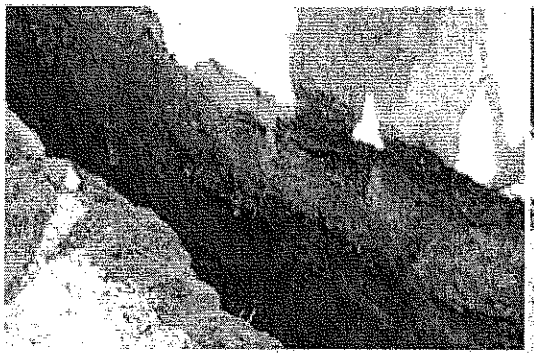


DSC_0001.JPG

DSC_0002.JPG

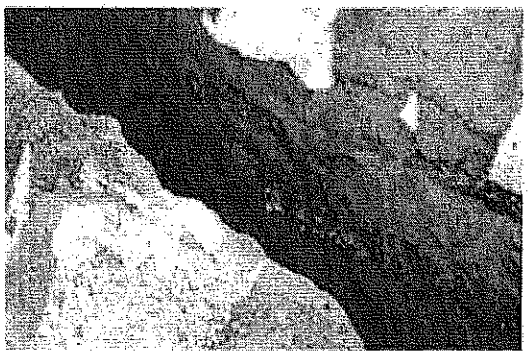
DSC_0003.JPG

DSC_0004.JPG



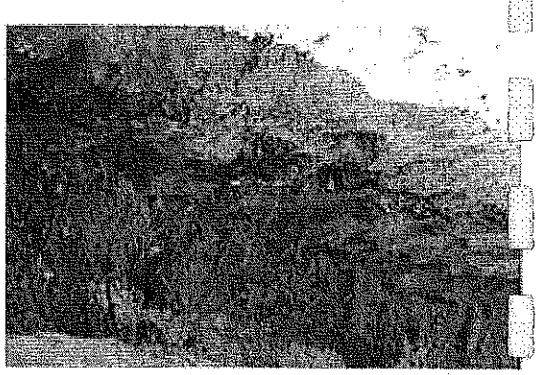
DSC_0005.JPG

DSC_0006.JPG

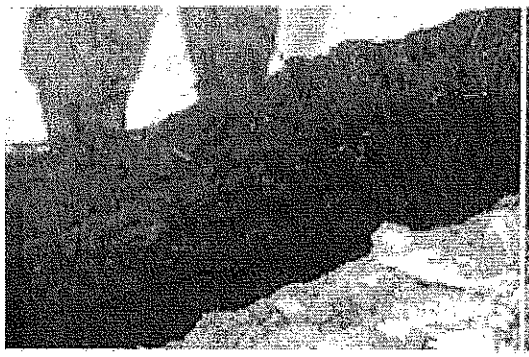


DSC_0007.JPG

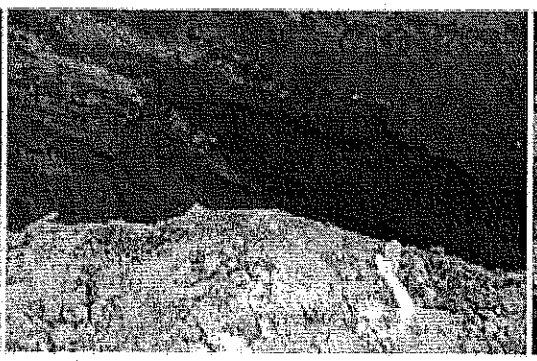
DSC_0008.JPG



DSC_0009.JPG

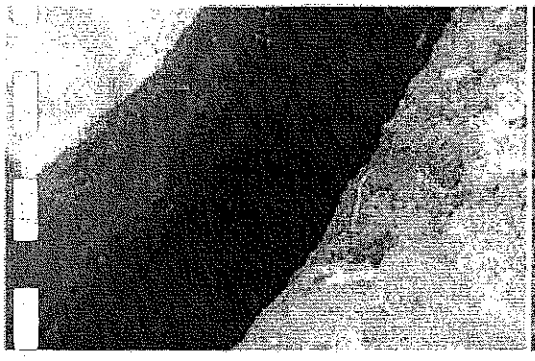


DSC_0010.JPG

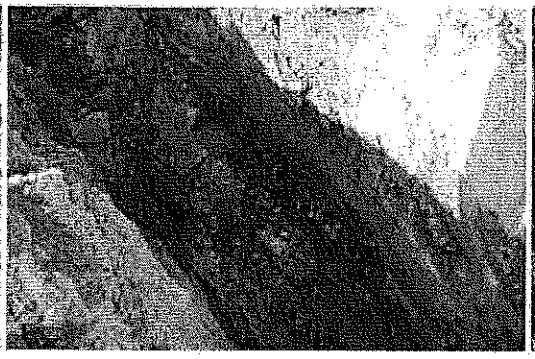


DSC_0011.JPG

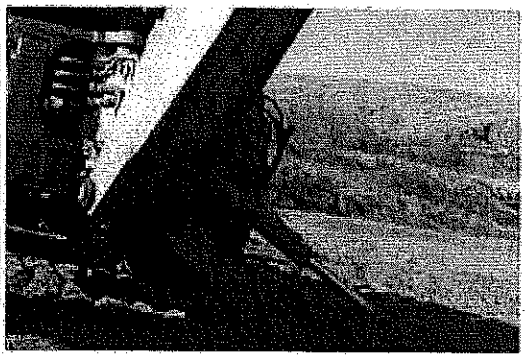
DSC_0012.JPG



DSC_0013.JPG

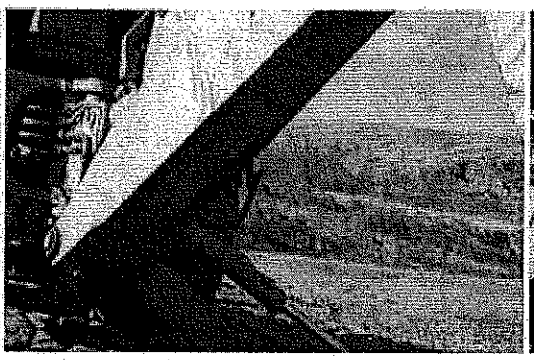


DSC_0014.JPG

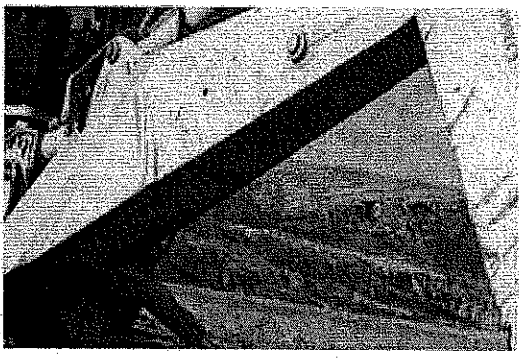


DSC_0015.JPG

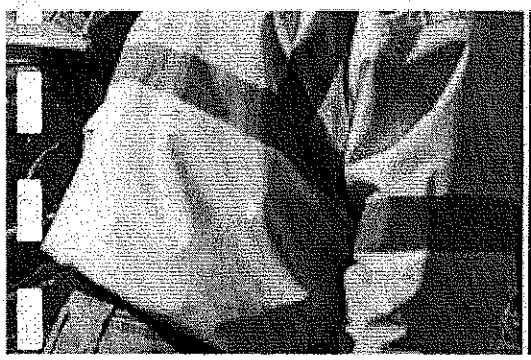
DSC_0016.JPG



DSC_0017.JPG

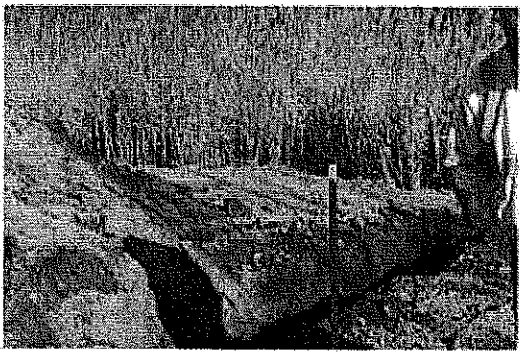


DSC_0018.JPG

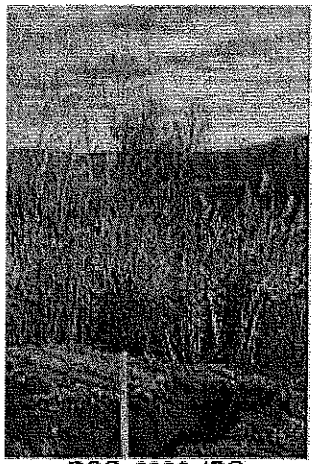


DSC_0019.JPG

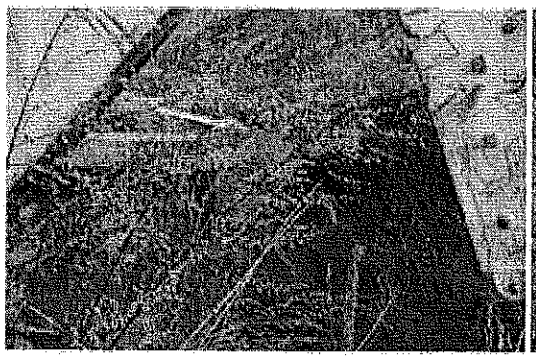
DSC_0020.JPG



DSC_0021.JPG



DSC_0022.JPG



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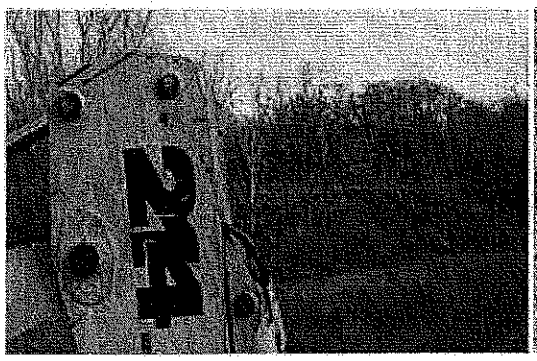

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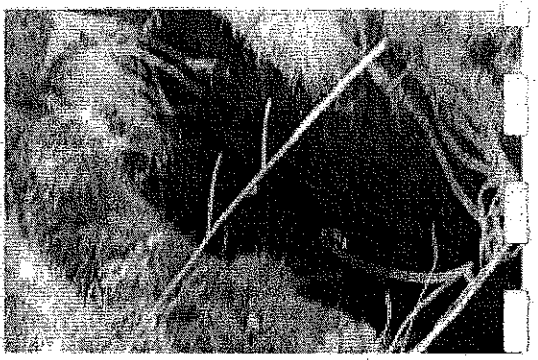

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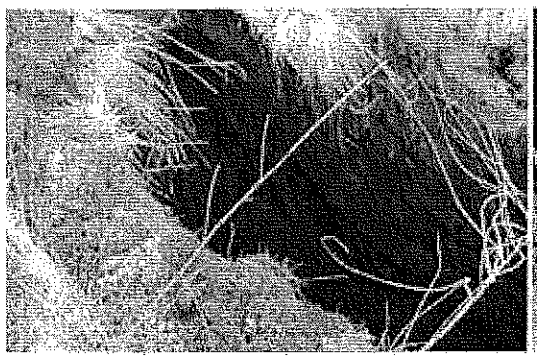

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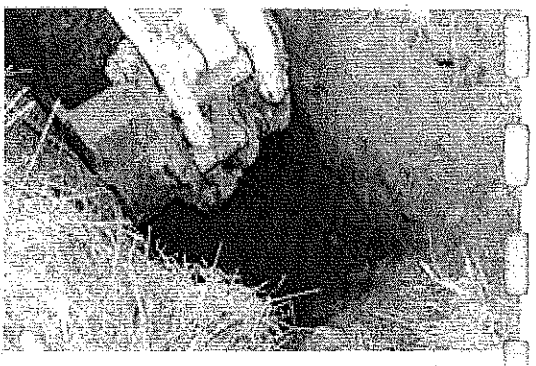

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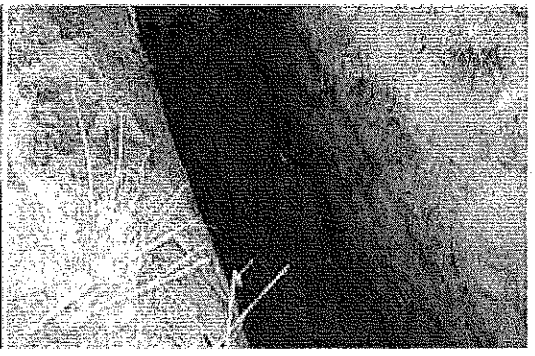

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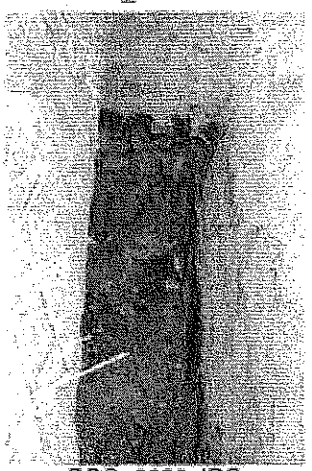

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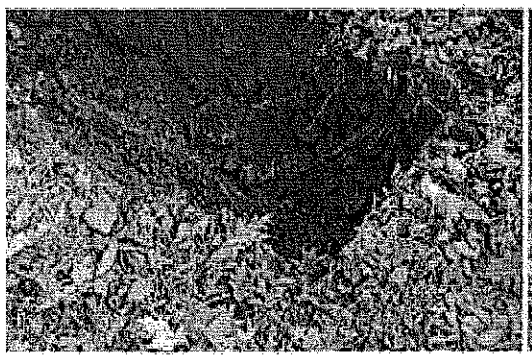

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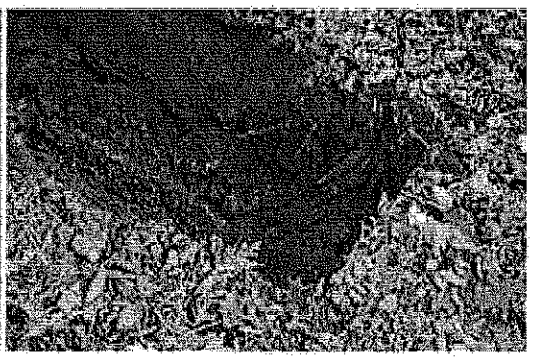

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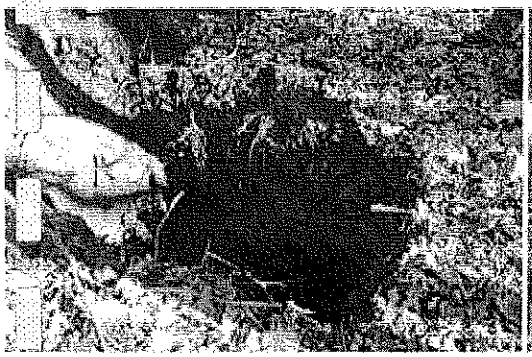

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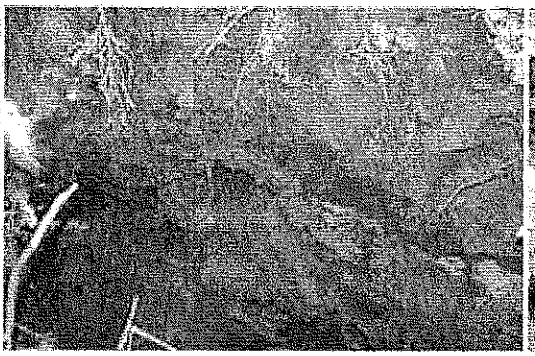

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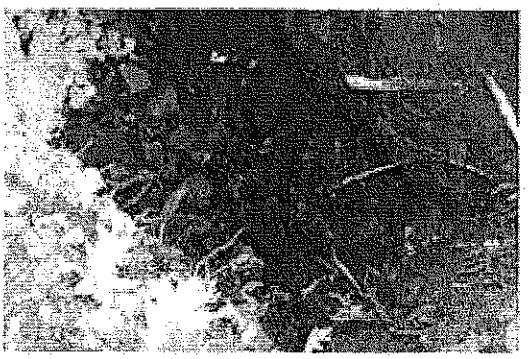

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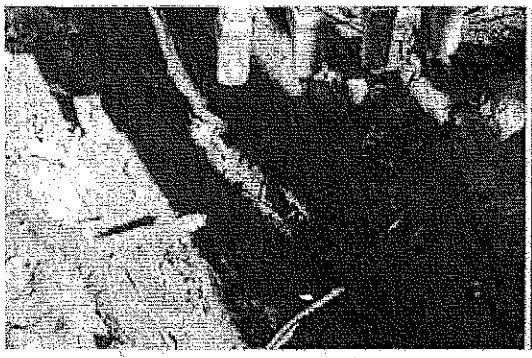

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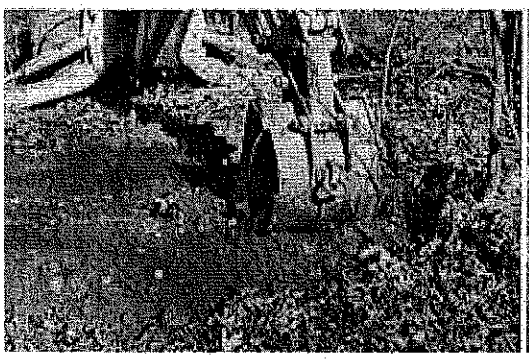

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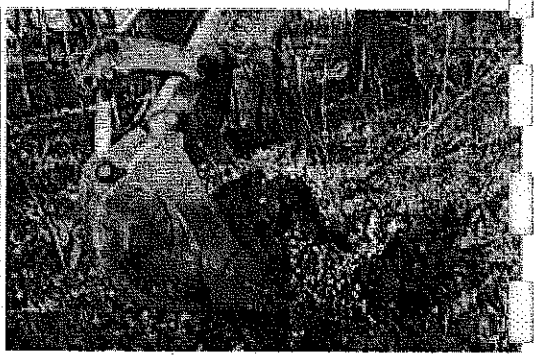

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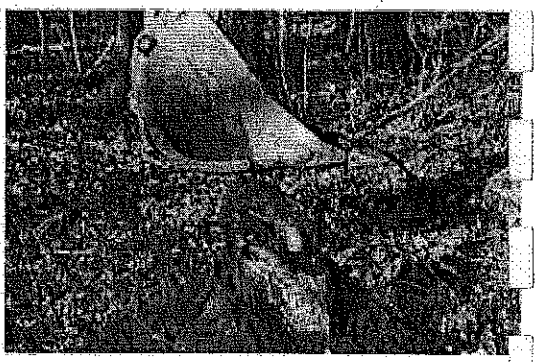

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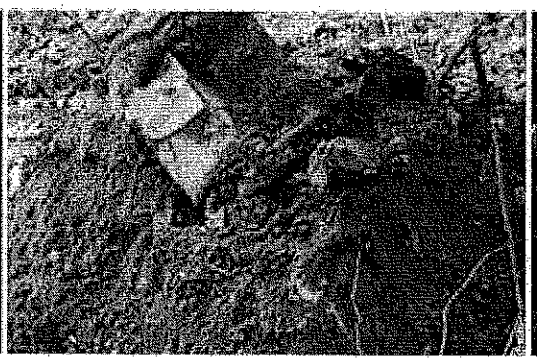

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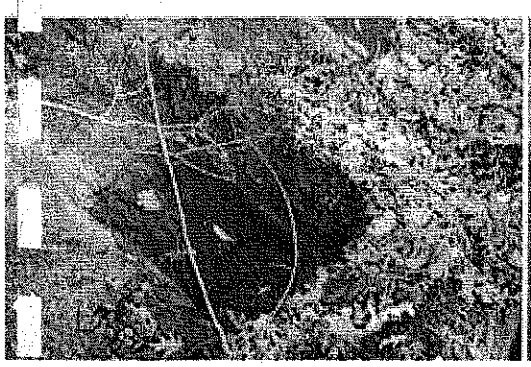

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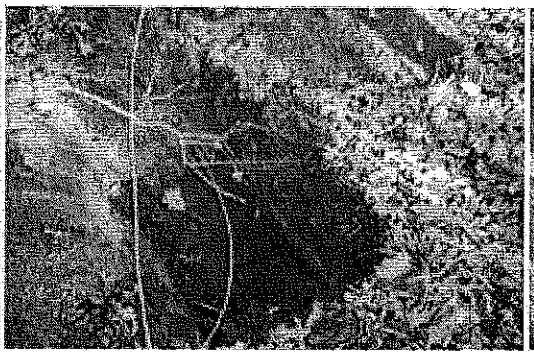

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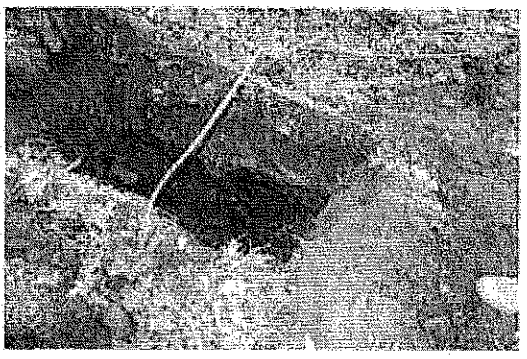

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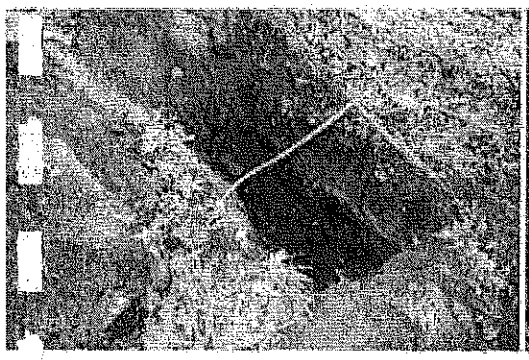

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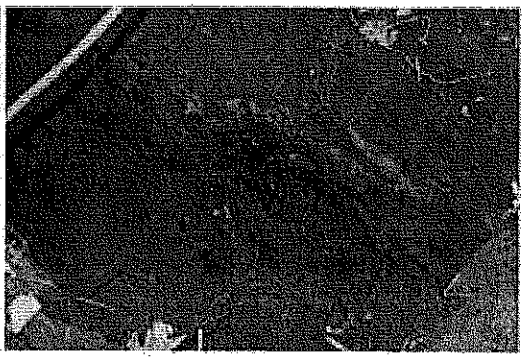

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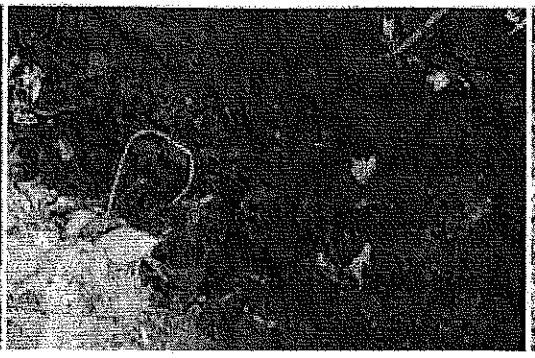

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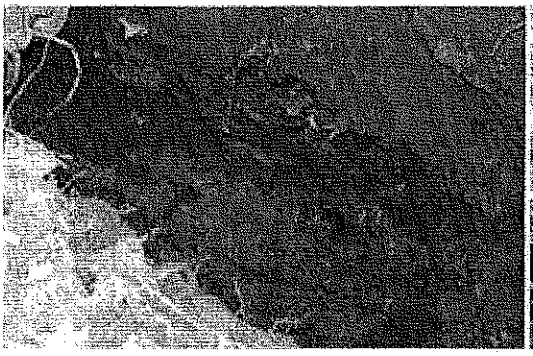

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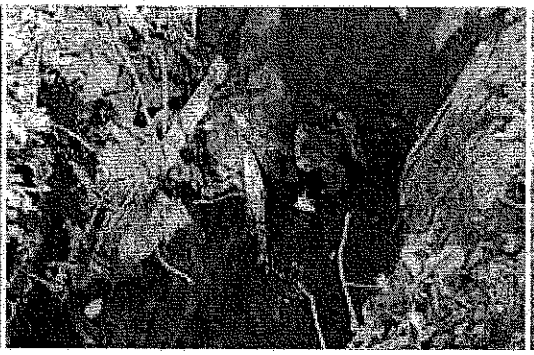

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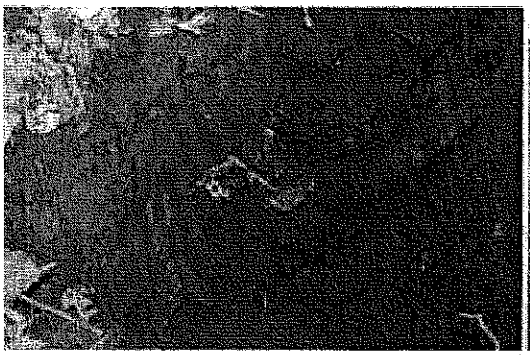

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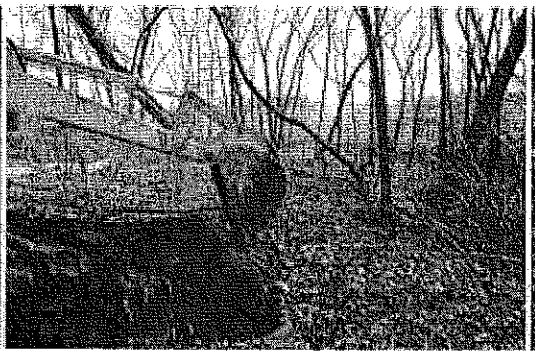

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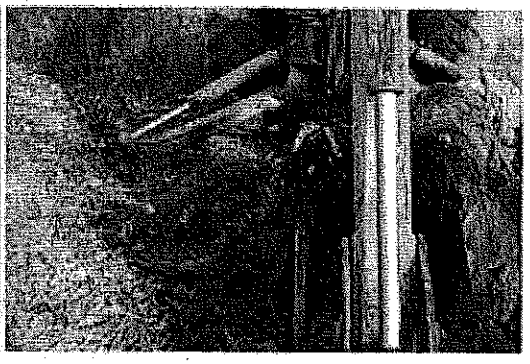

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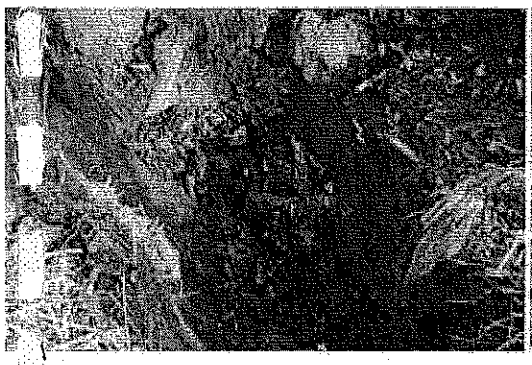

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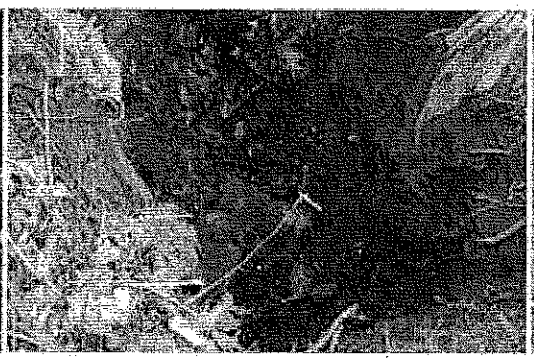

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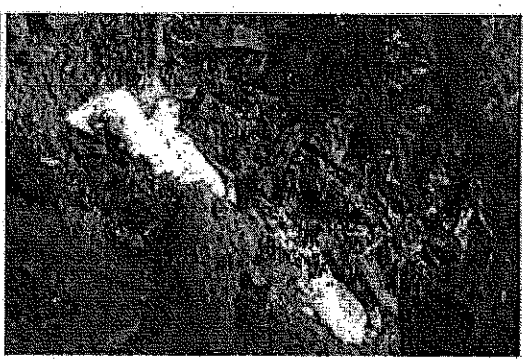

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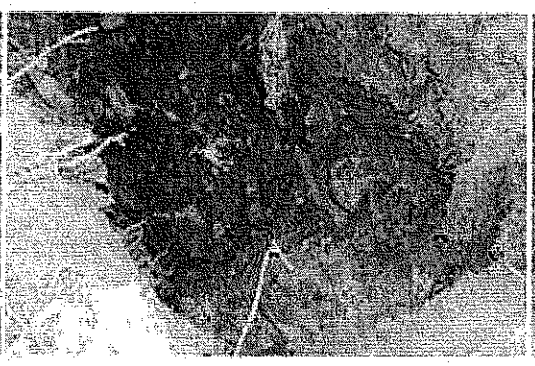

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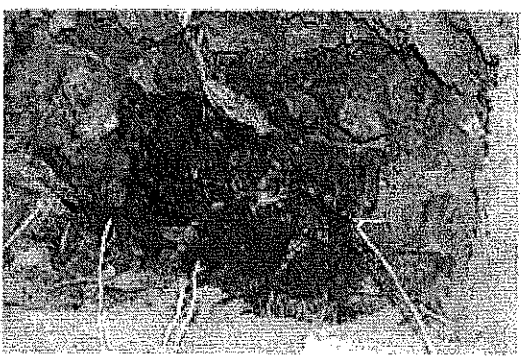

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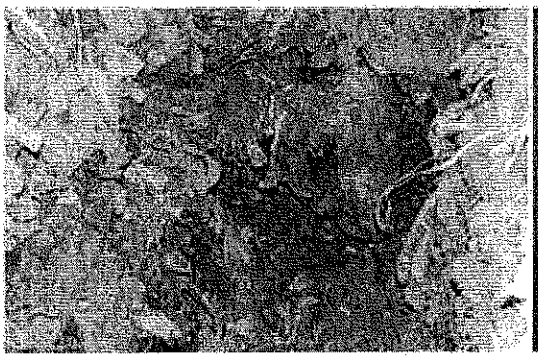

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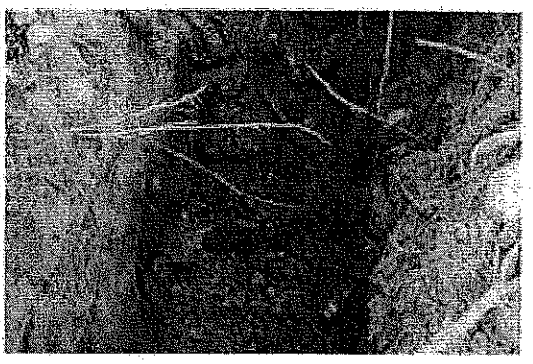

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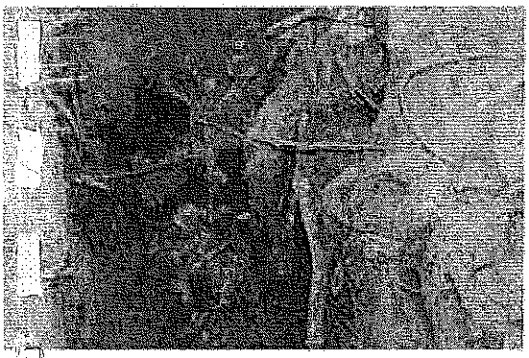

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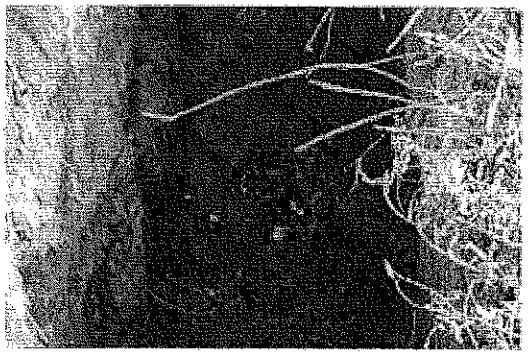

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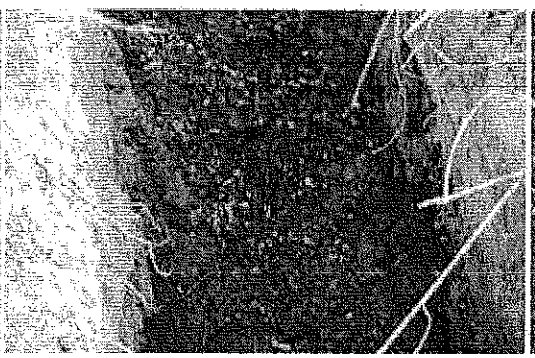

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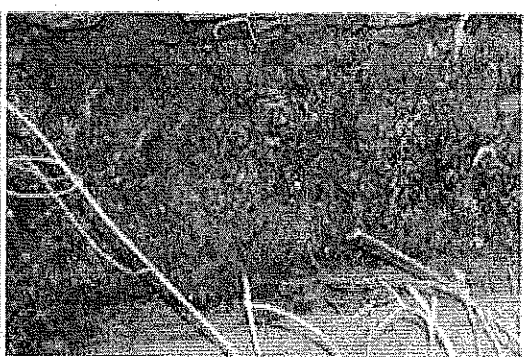

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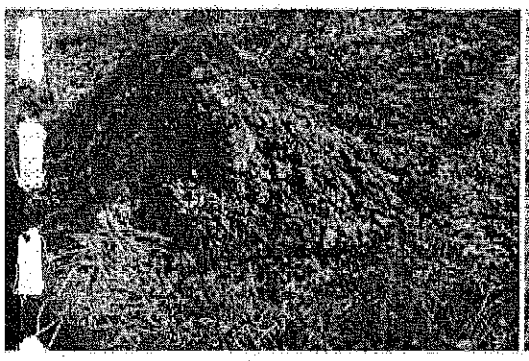

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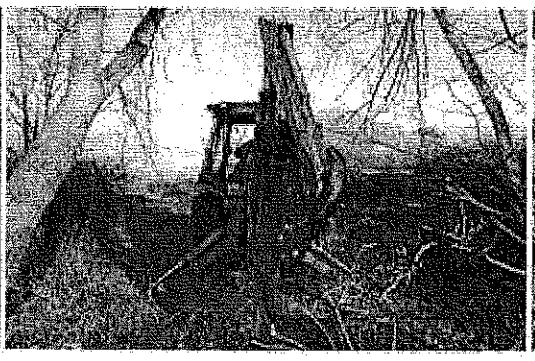

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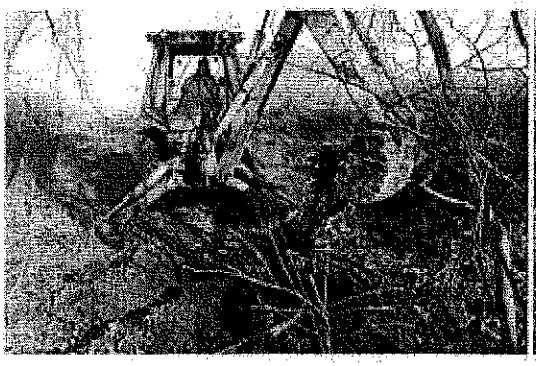

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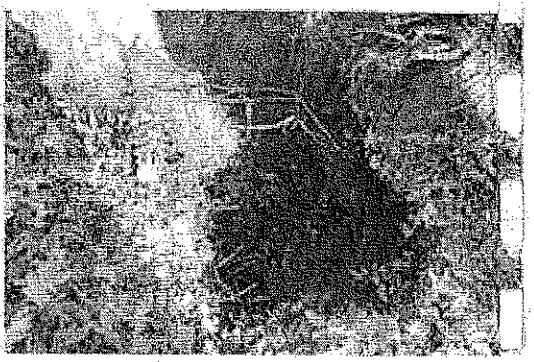

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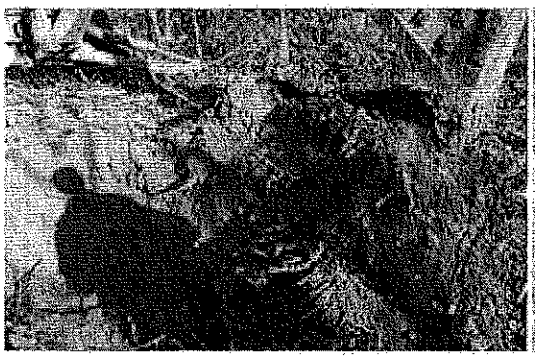

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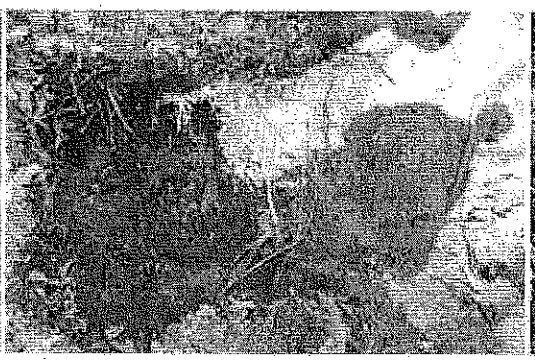

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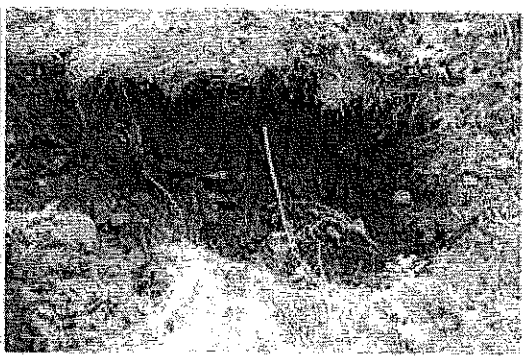

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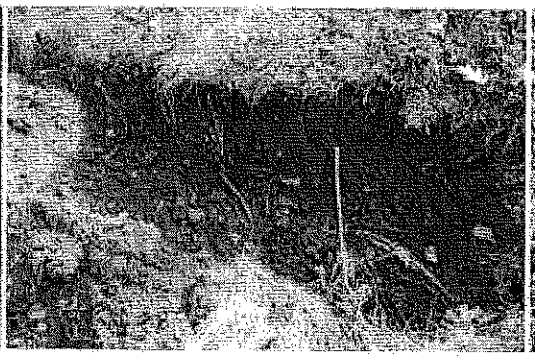

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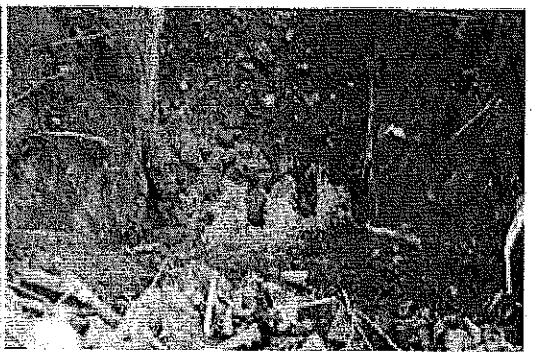

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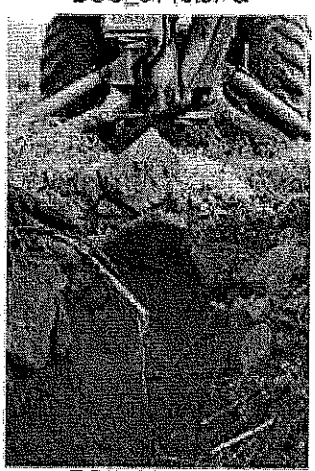

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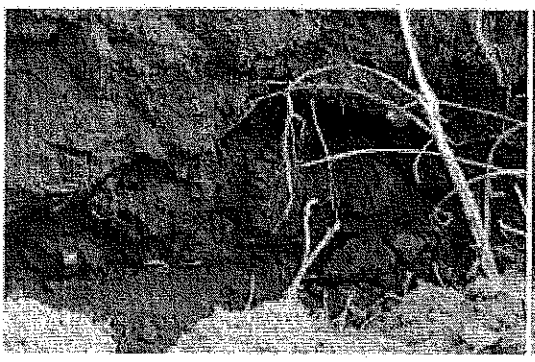

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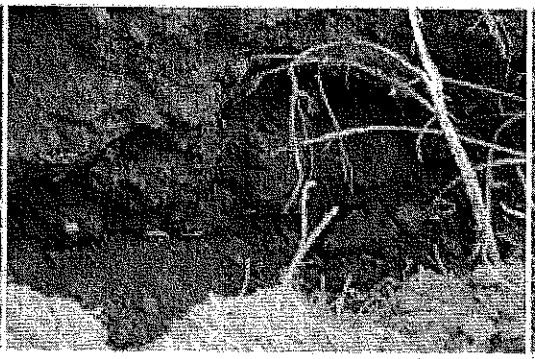

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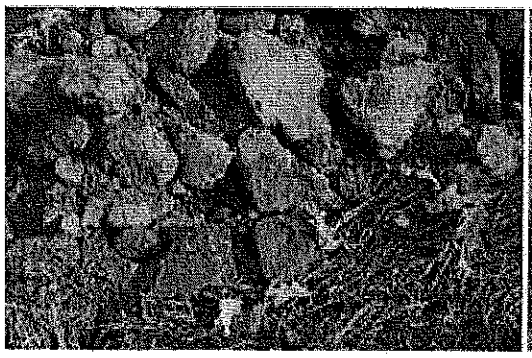

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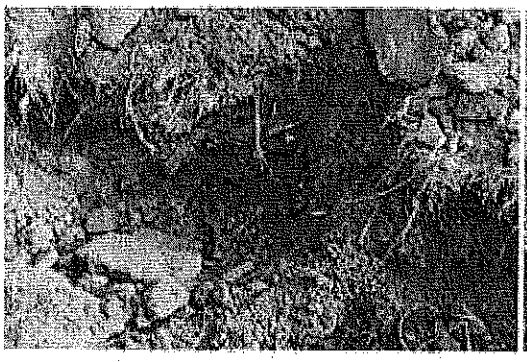

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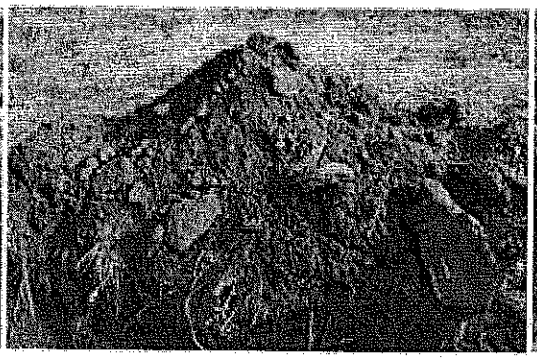

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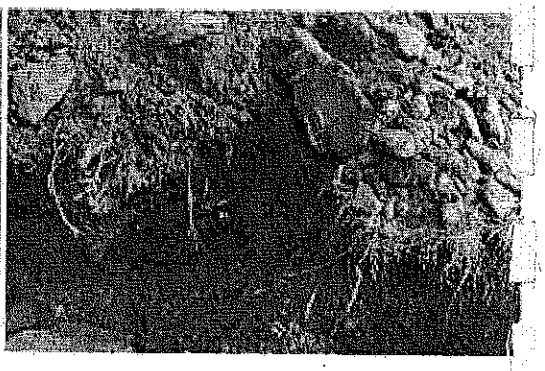

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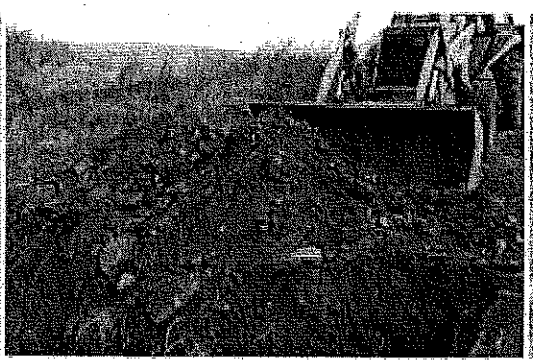
DSC_0157.JPG



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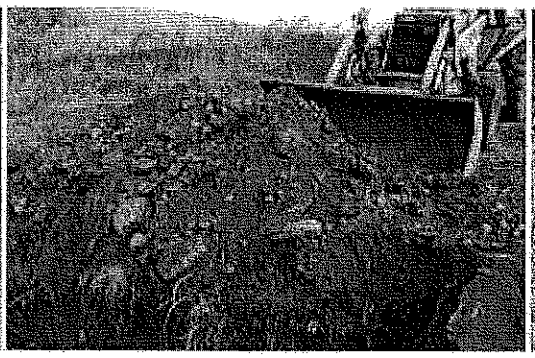

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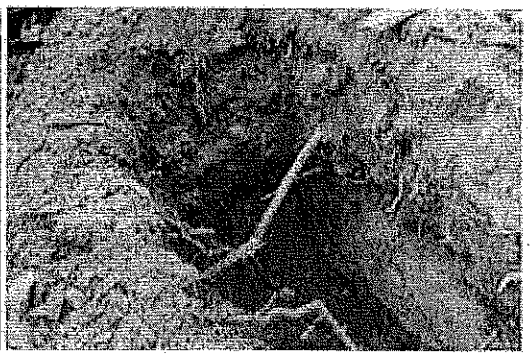

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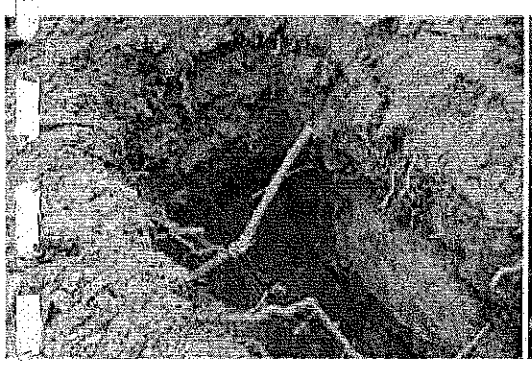

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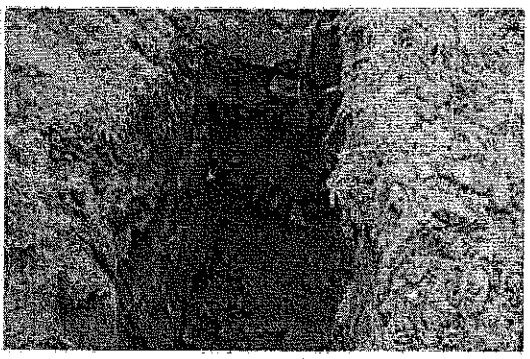

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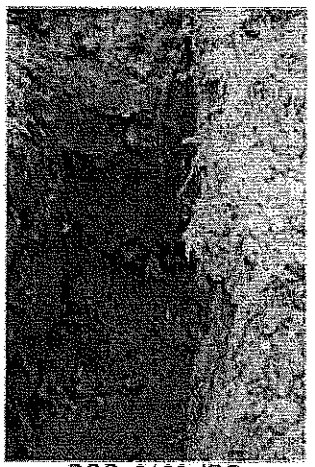

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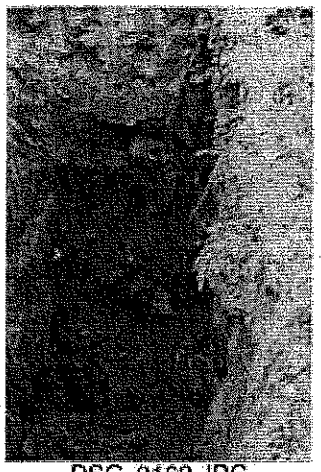

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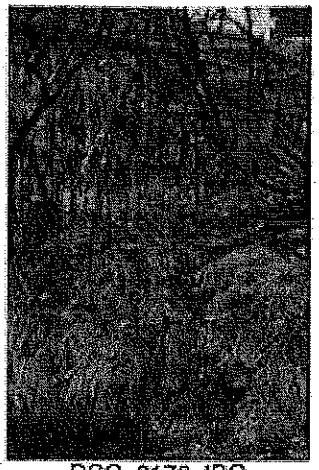

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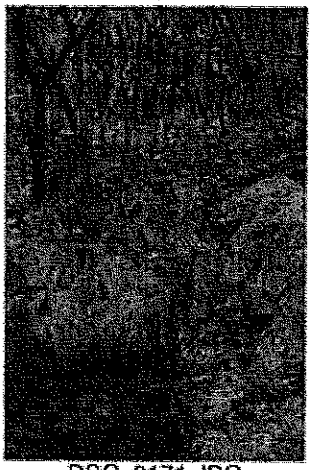

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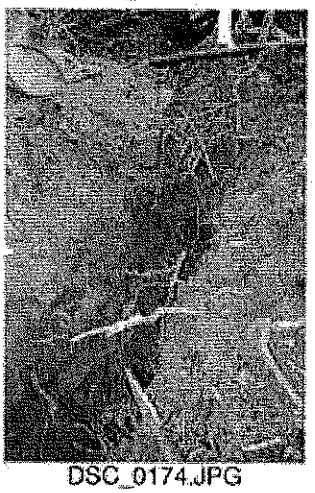

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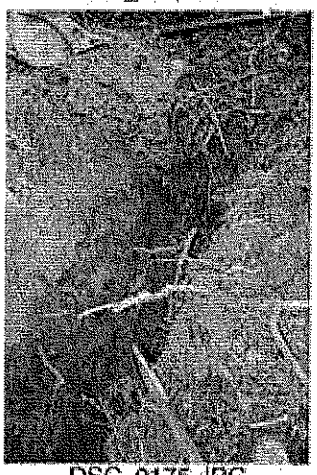

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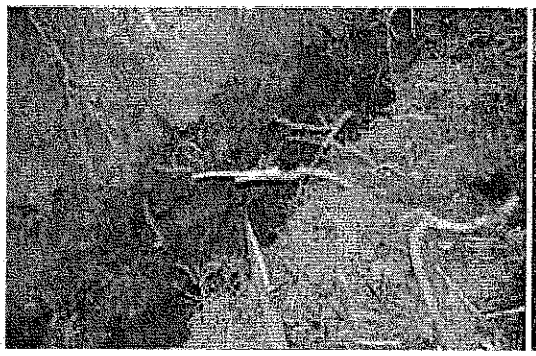

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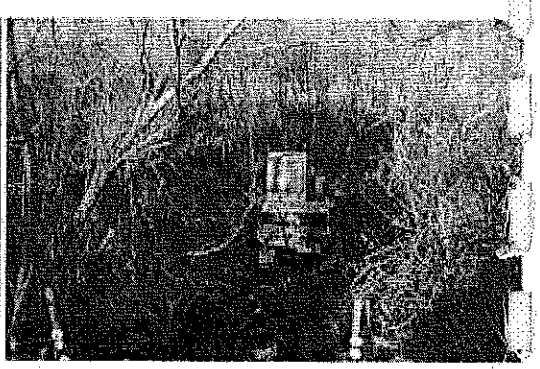

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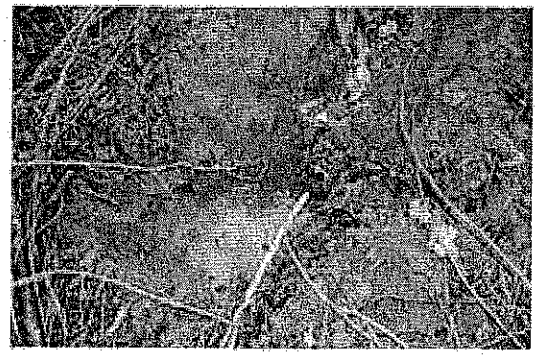
DSC_0178.JPG



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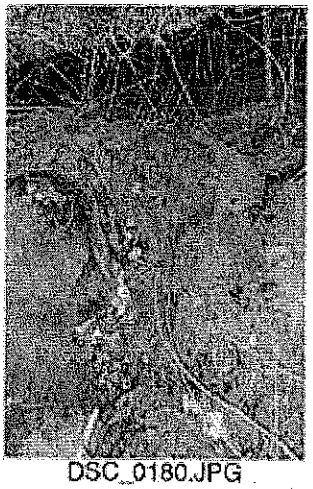

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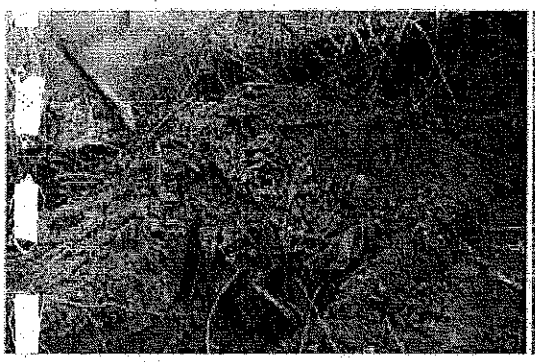

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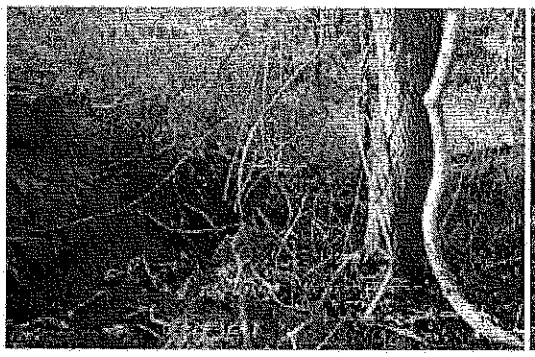
DSC_0182.JPG

DSC_0183.JPG

DSC_0184.JPG



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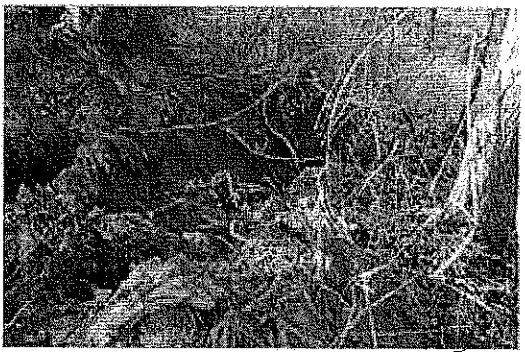

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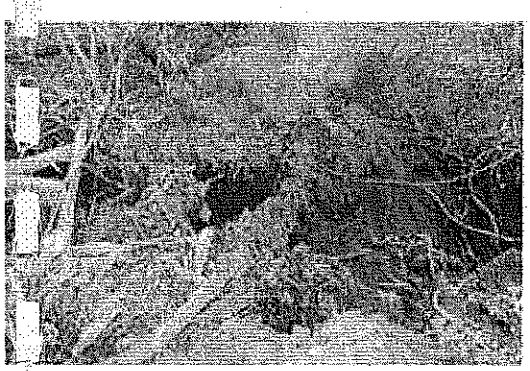

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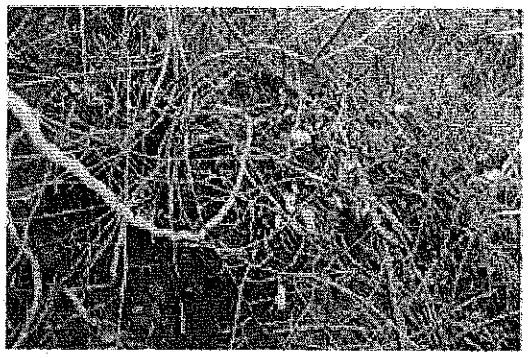

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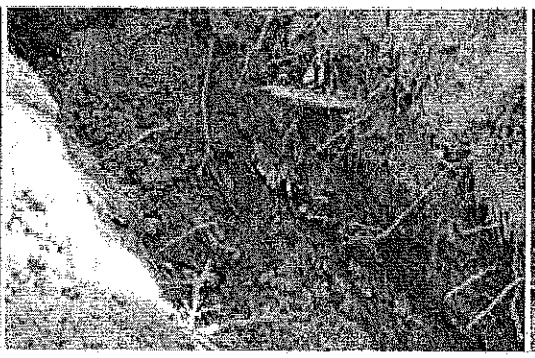

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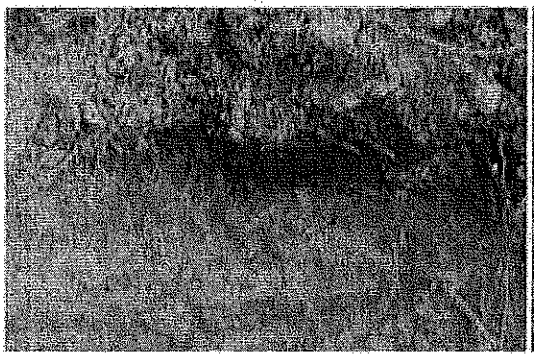

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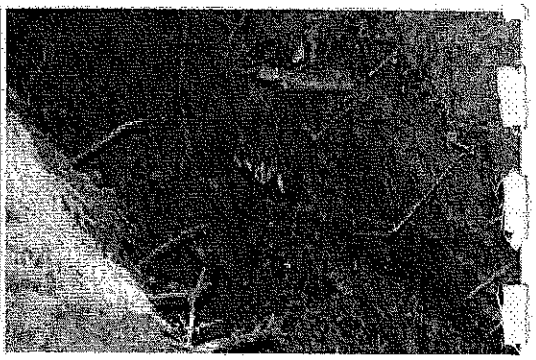

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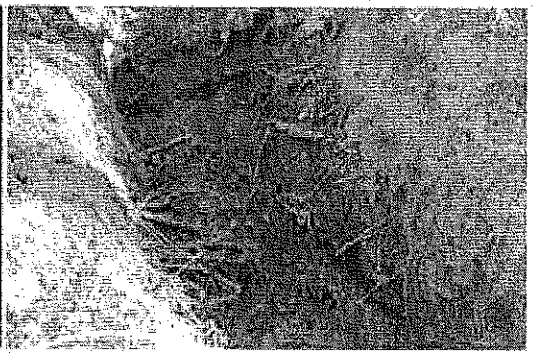

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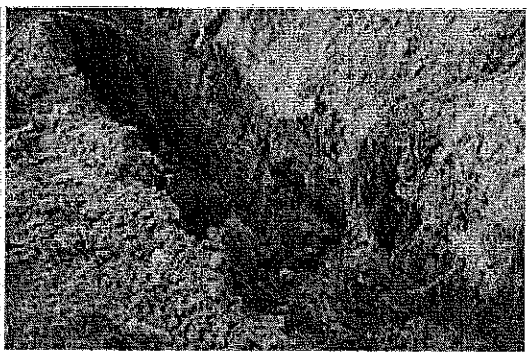
DSC_0198.JPG

DSC_0199.JPG



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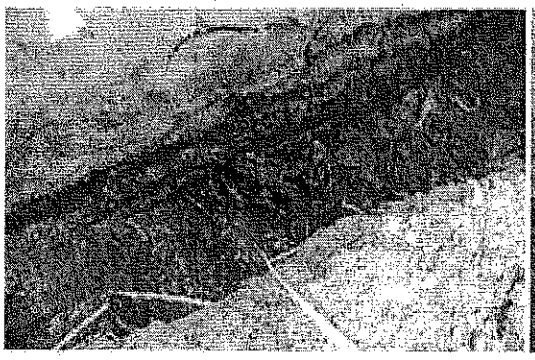

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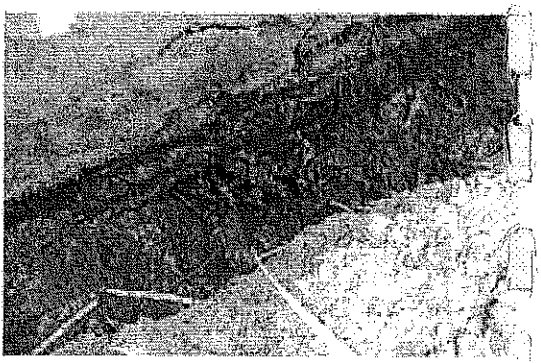

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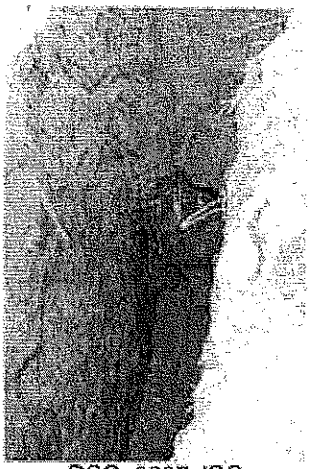

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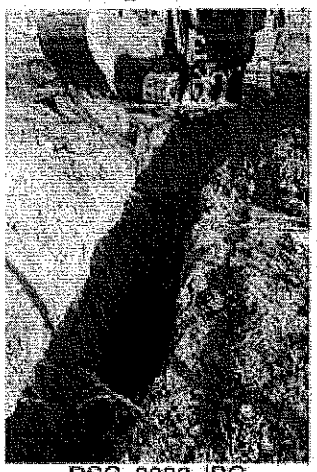

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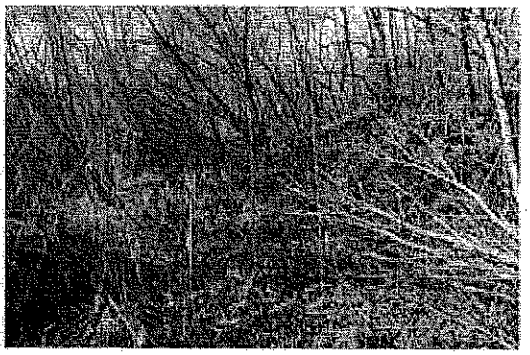

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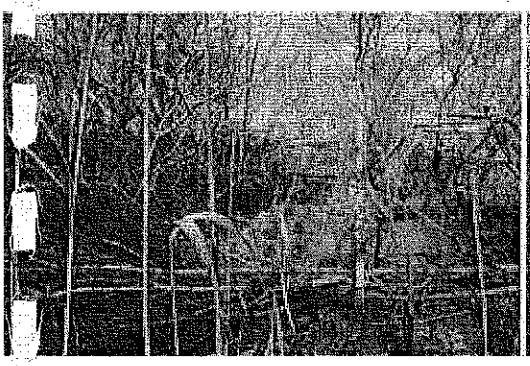

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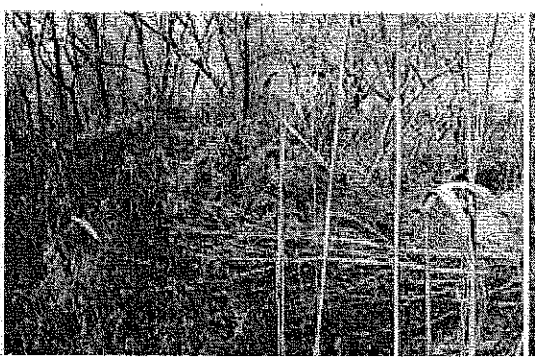

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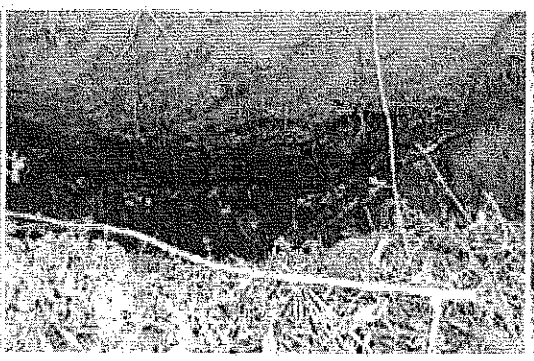
DSC_0213.JPG

DSC_0214.JPG



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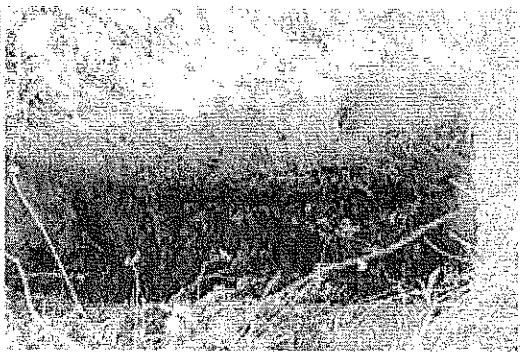

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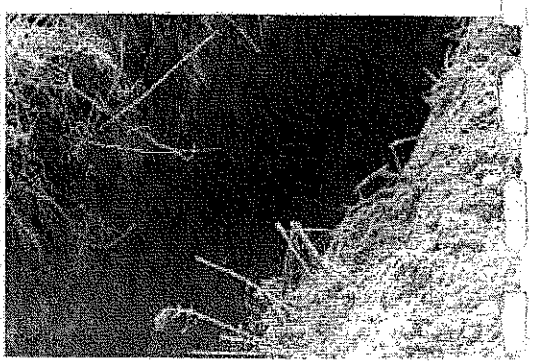

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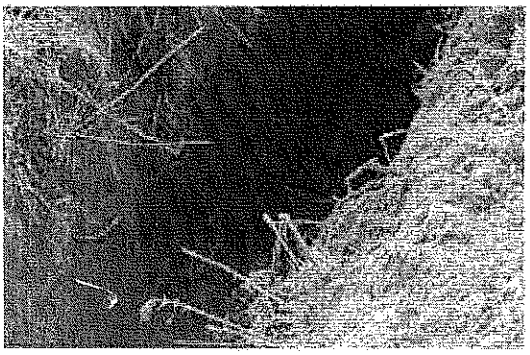

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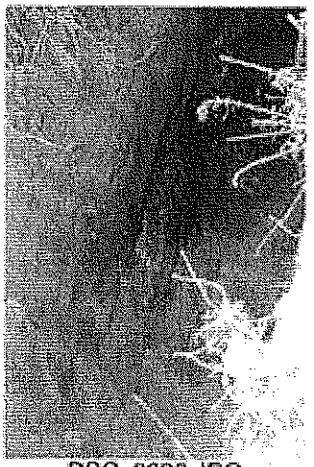

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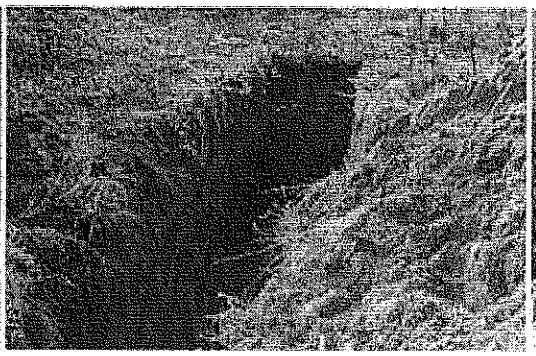

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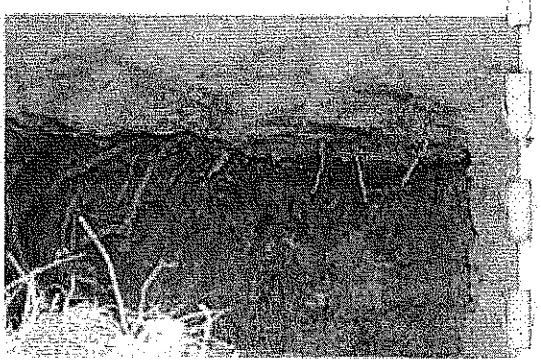

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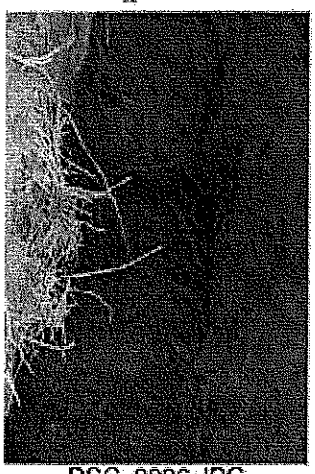

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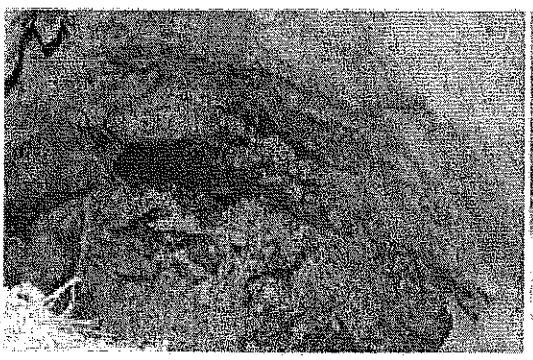

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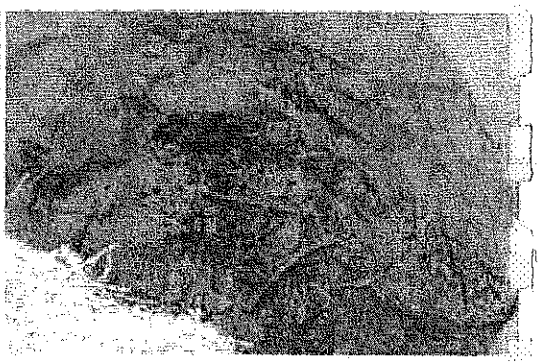

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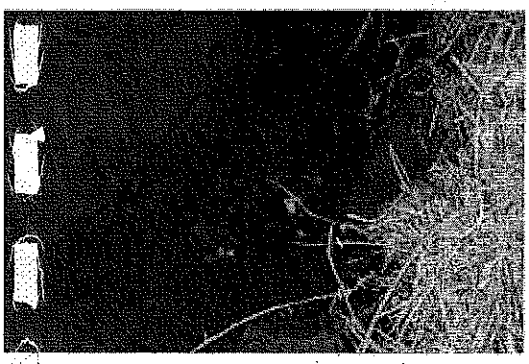

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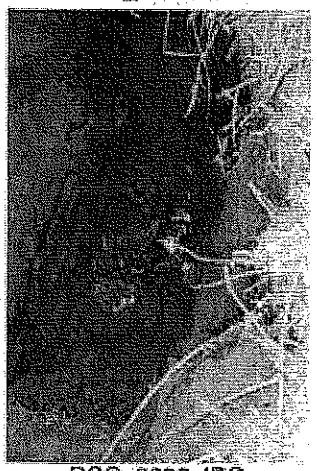

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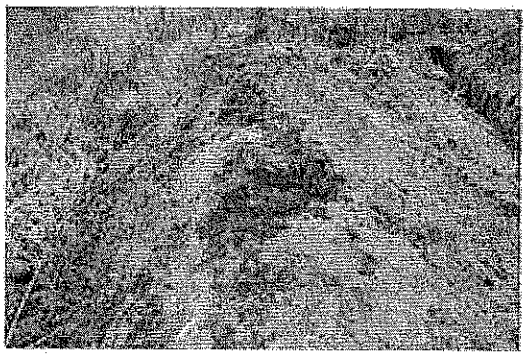

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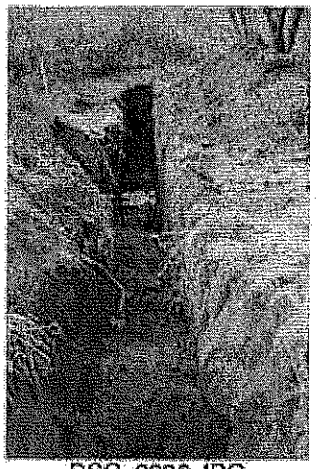

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DSC_0238.JPG

DSC_0239.JPG

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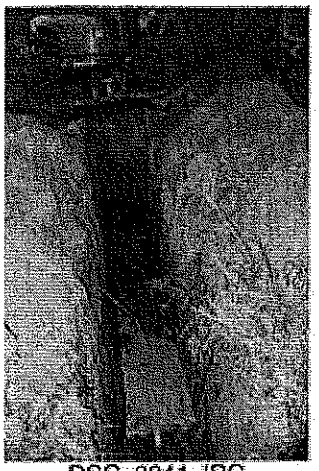


DSC_0241.JPG

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

Area K - TP1
Sheet 1 of 2

CLIENT: City of Haverhill/Aggregate Industries
SITE : Haverhill Landfill
PROJECT #: Phase IIB Buried Drum Removal 0522-46132
DEPTH TO WATER : Not Encountered.
LOG PREPARED BY : Scott Monroe - CDM

DATE : 9/14/2006
CONTRACTOR : Charter Environmental
EQUIPMENT: Katmatsu PC35 MR Excavator & Komatsu PC 300 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Brown, Sandy, Silty Gravel NO Trash or Drums		
2			
3			
4			
5			
6			
7	Gray silty gravel		
	Bottom of Excavation		
8			
9			
10			
11			
12			
13			

REMARKS

Test Pit size: 12' x 2.5' x 7'

Stackes placed ends of test pit

See photos on page 2 of 2

CDM

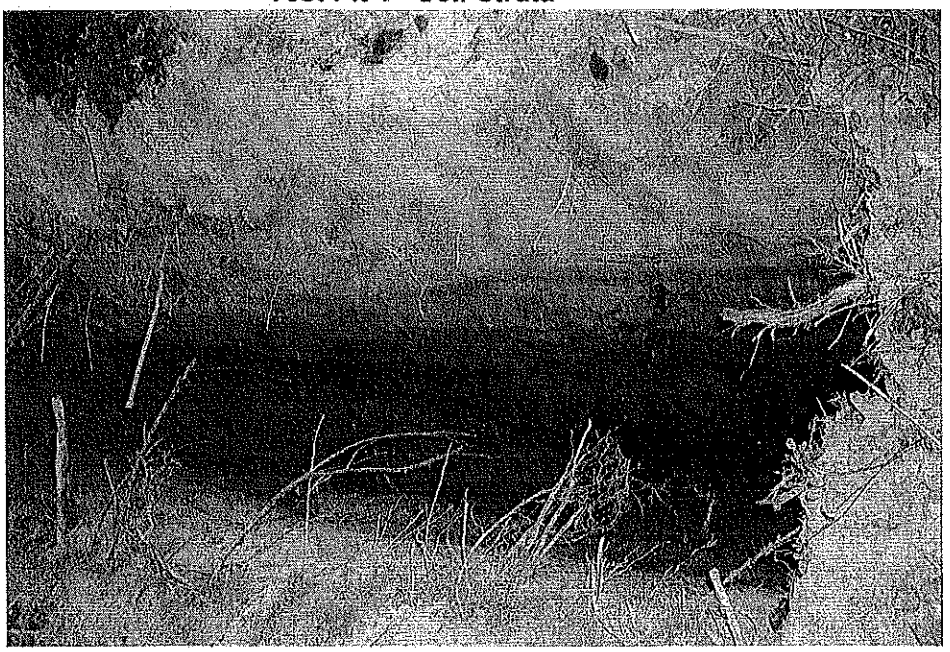
TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

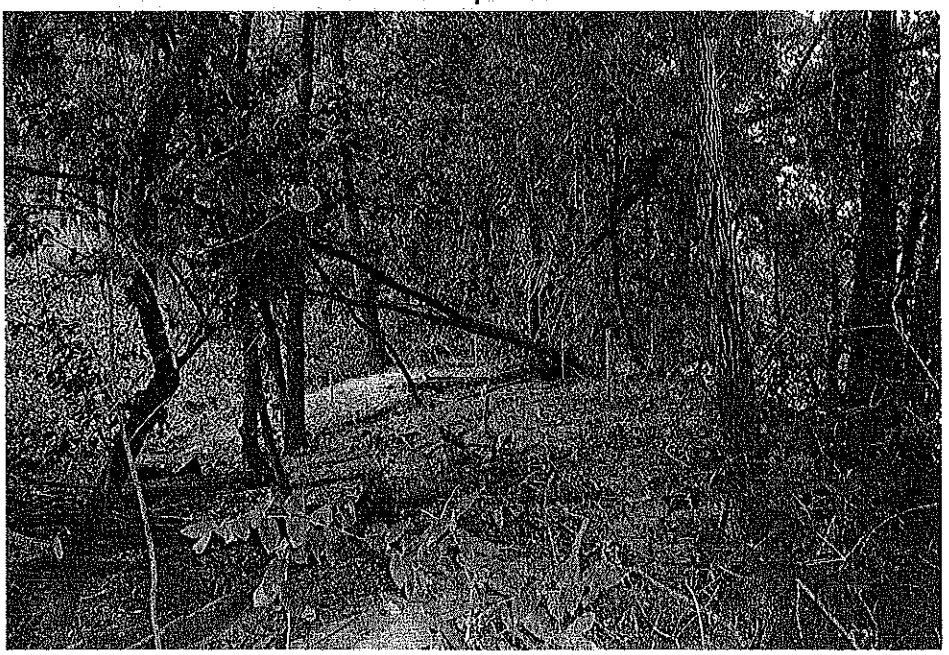
CLIENT: City of Haverhill/Aggregate Industries
SITE : Haverhill Landfill
PROJECT #: Phase IIB Buried Drum Removal 0522-46132
DEPTH TO WATER : Not Encountered.
LOG PREPARED BY : Scott Monroe - CDM

DATE : 9/14/2006
CONTRACTOR : Charter Environmental
EQUIPMENT: Katmatsu PC35 MR Excavator & Komatsu PC 300 Excavator

Test Pit 1 - Soil Strata



Test Pit 1 - Completed



TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

Area K - TP2
Sheet 1 of 2

CLIENT: City of Haverhill/Aggregate Industries
SITE : Haverhill Landfill
PROJECT #: Phase IIB Buried Drum Removal 0522-46132
DEPTH TO WATER : Not Encountered.
LOG PREPARED BY : Scott Monroe - CDM

DATE : 9/14/2006
CONTRACTOR : Charter Environmental
EQUIPMENT: Katmatsu PC35 MR Excavator & Komatsu PC 300 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Brown, Sandy, Silty Gravel NO Trash or Drums		
2			
3			
4			
5			
6			
7	Gray silty gravel Bottom of Excavation		
8			
9			
10			
11			
12			
13			

REMARKS

Test Pit size: 12' x 2.5' x 6.5'

Stackes placed ends of test pit

See photos on page 2 of 2

CDM

MJ2197a.xls

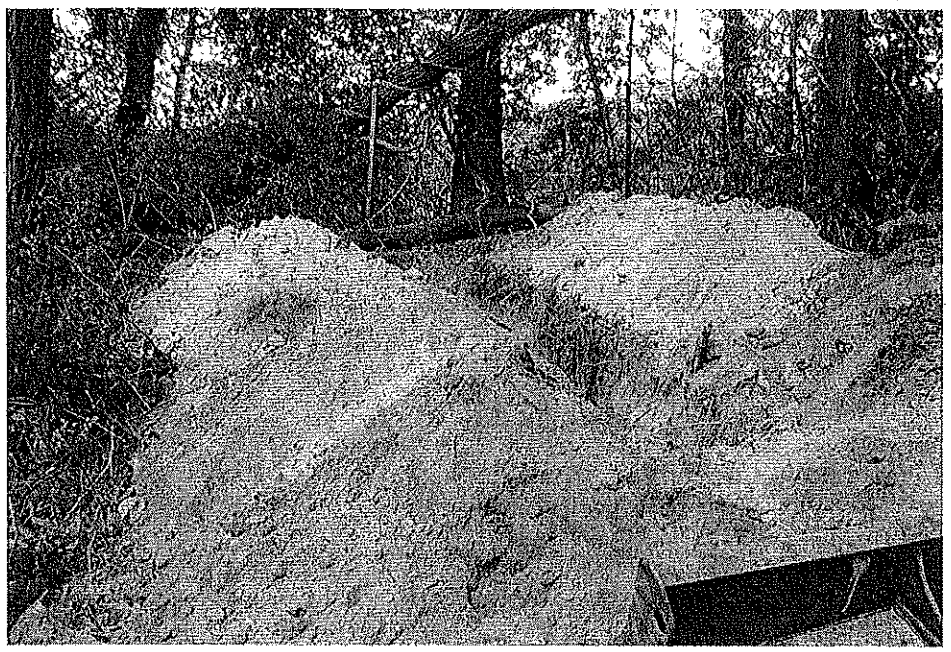
TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

CLIENT: City of Haverhill/Aggregate Industries
SITE : Haverhill Landfill
PROJECT #: Phase IIB Buried Drum Removal 0522-46132
DEPTH TO WATER : Not Encountered.
LOG PREPARED BY : Scott Monroe - CDM

DATE : 9/14/2006
CONTRACTOR : Charter Environmental
EQUIPMENT: Katmatsu PC35 MR Excavator & Komatsu PC 300 Excavator

Test Pit 2 - Excavation Material



Test Pit 2 - Completed

CDM
One Cambridge Place
50 Hampshire Street
Cambridge, MA 02139
(617) 452-6000

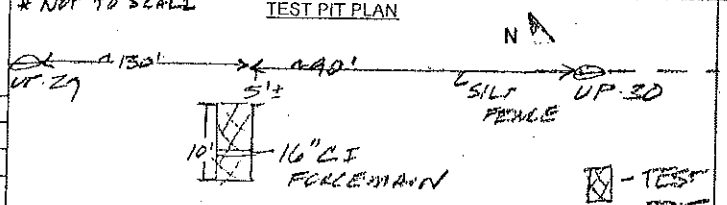
Test Pit Log

Client:	CITY OF HAVERHILL, MA & AGGREGATE INDUSTRIES	Contractor:	City of Haverhill	Test Pit No.	TP-1
Project Name:	Haverhill Landfill Closure	Equipment:	JCB Sitemaster/214 Series 2 backhoe	Logged By:	JRL
Project Location:	Haverhill, MA	Depth to Water:	(ground surface - test pit in swale area)	Date:	12/20/2005
Project Number:	25352-46212	Ground Surface EL:	32.98'	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	(0 - 1.5') Loose, moist to very moist dark brown fine to medium sand, some silt, few roots (FILL). Top 6" + frozen.	FILL (TOPSOIL)	E
2	(1.5' -3.5') Loose -medium dense, slightly moist dark tan/ light brown fine sand and silt grading into medium brown-gray fine to medium sand, some silt (FILL).	FILL (SAND with silt)	
4	(3.5 - 9.0) Loose, slightly moist, light brown - tan with rust-brown fine SAND, little to some medium sand, little to some silt.	SAND	E
6	Plastic (trash) noted at 6' depth.		
9	BOTTOM OF EXCAVATION at 9'		

T.P. DIMENSIONS
Width (ft): 5
Length (ft): 10
Depth (ft): 9
Vol (ft³): 450

TEST PIT PLAN

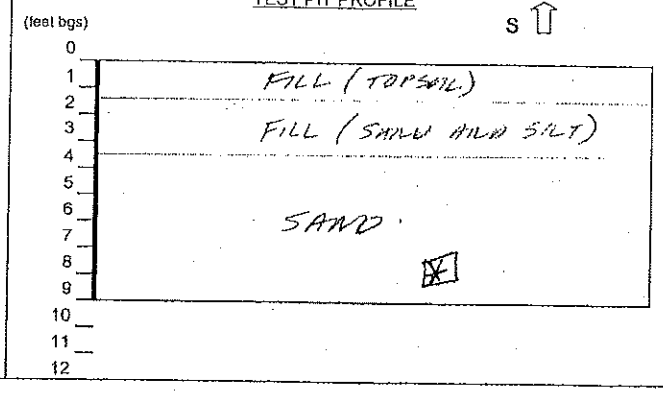


BOULDER COUNT

6 in-12 in:	< 50
12 in-18 in:	< 25
18 in-24 in:	< 10
24 in-30 in:	NA

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PROFILE



EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

☒ LOCATION OF 16" CI FORCEMAIN

Remarks: TP-1 location moved 90 feet to west of UP-30 (300 feet west of original location) due to access - see plan.
TOP OF PIPE at 7.73' BGS (EL. 25.25) - surveyed 12-20-05.

Updated On: 12/19/05

One Cambridge Place
50 Hampshire Street
Cambridge, MA 02139
(617) 452-6000

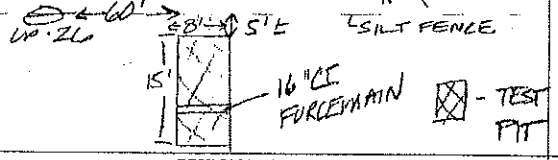
Test Pit Log

Client:	CITY OF HAVERHILL, MA & AGGREGATE INDUSTRIES	Contractor:	City of Haverhill	Test Pit No.	TP-3
Project Name:	Haverhill Landfill Closure	Equipment:	JCB Sitemaster/214 Series 2 backhoe	Logged By:	JRL
Project Location:	Haverhill, MA	Depth to Water:	10' (seeps at 1' - 6' bgs)	Date:	12/20/2005
Project Number:	25352-46212	Ground Surface El.:	36.20'	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	(0' - 1.5') Loose, moist to wet, dark brown fine to medium sand, little silt, little to trace pebbles, cobbles, some to little roots and organic material (FILL). Top 6"± frozen.	FILL (TOPSOIL)	E
2	(1.5' - 3.0') Loose, wet, light brown- tan (with orange/rust) fine to medium sand and silt, little cobbles, pebbles, gravel grading into medium brown-gray fine to medium sand with some silt (FILL)	FILL (SAND with silt)	
3			
4	(3.0' - 6.0') Loose - medium dense, moist, dark brown-gray, fine to medium sand, some silt, little cobbles, pebbles, trace boulders (FILL)	FILL (SAND)	
5			
6			
7	(6.0' - 18.0' Similar to above, little asphalt, cinders; some plastic scraps (20 - 25%); trace aluminum (<10%); trace metal (<10%) (LANDFILL MATERIAL/TRASH).	LANDFILL MATERIAL/ TRASH	M-D
8			
9			
10			
11			
12			E-M
13			
14			
15			
16			
17			
18	BOTTOM OF EXCAVATION at 18.0' ±		

T.P. DIMENSIONS
Width (ft): 8
Length (ft): 15
Depth (ft): 18
Vol (ft³): 2160

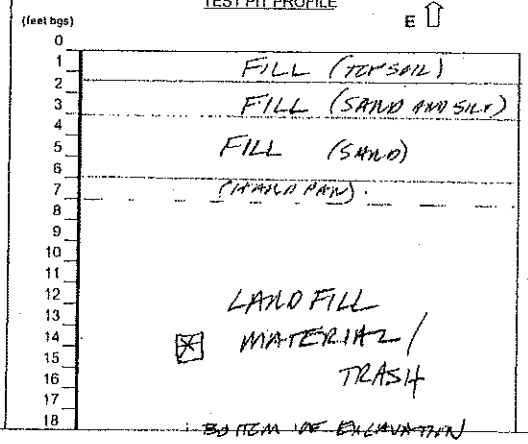
TEST PIT PLAN



BOULDER COUNT
6 in-12 in: some - little
12 in-18 in: little
18 in-24 in: little
24 in-30 in: little-trace

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PROFILE



EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

☒ LOCATION OF 16" CI FORCEMAIN

Remarks: "Hardpan" (medium dense to dense material) noted between 6 - 7' bgs by backhoe operator.
TOP OF PIPE at 13.81' bgs (EL 22.39) - surveyed 12-20-05. Deepest point in excavation (S end of test pit) : ~18' bgs.

Updated On: 12/19/05

One Cambridge Place
50 Hampshire Street
Cambridge, MA 02139
(617) 452-6000

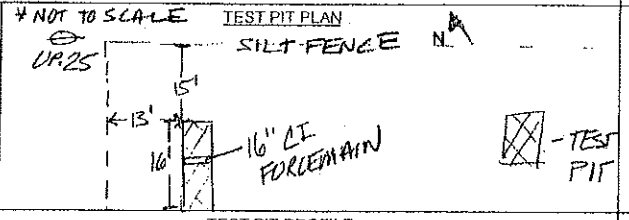
Test Pit Log

Client:	CITY OF HAVERHILL, MA & AGGREGATE INDUSTRIES	Contractor:	City of Haverhill	Test Pit No.	TP-4
Project Name:	Haverhill Landfill Closure	Equipment:	JCB Sitemaster/214 Series 2 backhoe	Logged By:	JRL
Project Location:	Haverhill, MA	Depth to Water:	NA	Date:	12/20/2005
Project Number:	25352-46212	Ground Surface EL:	32.00	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	(0' - 1.0') Loose, moist, light-medium brown fine sand, some silt, some to little roots, little to trace pebbles, cobbles (FILL). Top 6" ± frozen.	FILL (TOPSOIL)	
2	(1.0' - 5.0') Loose, moist, medium-dark brown sand and trash (FILL), trace to little metal (10 - 15%), little wood debris (2 x 4s, scrap lumber, etc.). Note: bottom of FILL layer pinches off to ± 2' bgs towards northern limit of test pit.	FILL (SAND)	E
6	(5.0' - 12.0' Loose to medium dense, slightly moist to moist, medium-light tan medium to fine SAND, little silt, little cobbles. (FILL).	FILL (tan SAND)	E
13	Loose, slightly moist, gray medium SAND with some to little fine sand, little silt, little pebbles, trace cobbles.	gray SAND	E
15	BOTTOM OF EXCAVATION at 14.5'		

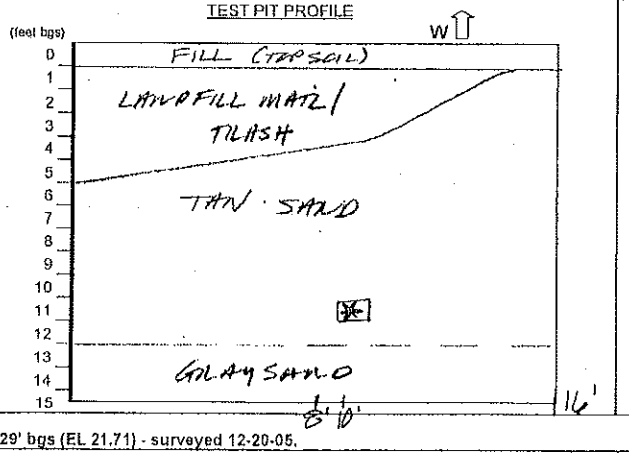
T.P. DIMENSIONS
Width (ft): 5
Length (ft): 16
Depth (ft): 14.5
Vol (ft³): 1160

TEST PIT PLAN



BOULDER COUNT
6 in-12 in: < 100
12 in-18 in: < 50
18 in-24 in: < 25
24 in-30 in: NA

TEST PIT PROFILE



DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT
E : Easy
M : Moderate
D : Difficult

⊠ - LOCATION OF 16" CI FORCEMAIN

Remarks: TOP OF PIPE at 10.29' bgs (EL 21.71) - surveyed 12-20-05.

Updated On: 12/19/05

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-26- A-1
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	7/10 & 7/14/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Topsoil, Moist brown to light brown sand, fine to coarse sand, little silt, gravel, roots		
4	Moist, light brown, fine to coarse sand, little silt, gravel Trash: metal rod, black metal pole, metal pipe, black cables, metal plate		
6	3 metal screens, blue plastic cap, 6" metal pole, 2' metal rod , steel metal, dark brown , fine to coarse sand, little silt, gravel, cobbles, rubber tire, plastic bags, metal rod		
8			
10			
12			
14	Moist, brown, fine to coarse sand, little silt, gravel, cobbles, tar, wood , small metal pieces		
16	Moist brown, yellow, cream gray fine sand, silt, wood pieces, trace tar		
18	Water at 16.5 + trace clay		
20	BOE = 18.5'		

T.P. DIMENSIONS
Width (ft): NA
Length (ft): NA
Depth (ft):
Vol (ft^3):

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
---	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Test Pit dimesions were not noted

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client: City of Haverhill	Contractor: TFORD	Test Pit No. TP-26- A-2	
Project Nan Hot Spot Investigation	Equipment: Excavator	Logged By: Murat Yavuz	
Project Location: Haverhill, MA	Depth to Water: N/A	Date: 7/10/2003	
Project Number: 0522-37609	Ground Surface EL:	Page: 1 of 1	

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Moist brown sand, fine to coarse sand, little silt, piece of metal sheet (plate) approx 3', rusted chain (3'); metal rusted cover, metal pieces w/ tar, wire, blue cloth, metal- cone shp		
4	Moist, brown, fine to coarse sand, little silt, gravel, piece of metal plate (1.5' x 1.5') , blue cloth, belt, metal spring, rubber, metal cans, wood with tar, glass bottles, inner tube		
6	Moist, brown, fine to coarse sand, little silt, gravel, white cloth, rusted shovel, metal pipe blue powder (cyrstalized), black metal screen & wire, 1' boulder with tar, light bulb, VOIDs		
8	1 TRASH DRUM (orange); metal mesh, metal box (1.5' x 2'); metal screen, rubber tire, rusted transmission, metal plate & cables, plastic cables, tire rim2' boulder w/ asphalt		
10	Metal sheet painted red, black plastic pieces, metal screen, small green glass3' metal rod metal screen, red brick, 4' rounded metal sheet, 15" metal ring, black rubber tire		
12	Moist, brown/ light brown / yellow, fine to coarse sand, little silt, metal rod, plastic pieces metal screens, plastic pieces; BOE = 12.5'		
14			
16			
18			
20			

T.P. DIMENSIONS

Width (ft):	NA
Length (ft):	NA
Depth (ft):	12.5
Vol (ft^3):	

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
5 - 6'	0	1

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client: City of Haverhill	Contractor: TFORD	Test Pit No.	TP-26- A-3 and -4
Project Name: Hot Spot Investigation	Equipment: Excavator	Logged By:	Murat Yavuz
Project Location: Haverhill, MA	Depth to Water: 16.5	Date:	7/10/2003
Project Number: 0522-37609	Ground Surface EL.:	Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
	Moist, dark brown, fine to coarse sand, little silt, trace roots, gravel		
2	pink/green plastic, ceramic pieces, small asphalt, 1' wood, cobbles, glass, blue powder		
	Moist, brown/ light brown fine to coarse sand, little gravel, silt		
4	metal plate insulation, wire, metal sign (ATLANTIC); metal rod & sheets		
	Moist, brown/ dark brown/ light brown fine to coarse sand, little gravel, silt, cobbles		
6	metal screen, rings, pipes, sheets, rod & roller, drumlike object possible muffler/air tank		
	Moist, brown/ dark brown/ light brown fine to coarse sand, little gravel, silt, cobbles		
8	bucket full of metal rings, rods, plates, sheets & cables; glass & plastic bottles		
	Moist, brown/ dark brown/ light brown fine to coarse sand, little gravel, silt, cobbles		
10	metal rods & screens, plastic cables, clear glass bottles, metal pipe		
	Moist, brown/ dark brown/ light brown fine to coarse sand, little gravel, silt, cobbles		
12	asphalt (3' x 2'), white plastic bags, glass bottles, metal cables (10'), metal rod (2.5')		
	Moist, brown/ light brown, fine to coarse sand, little gravel, silt, cobbles, black plastic		
14	cable, white plastic bag, small glass jars, tar		
	Moist, brown, fine to coarse sand, little silt, gravel, cobbles, metal plate(3' x 2.5'),		
16	rusted metal screen (2.5' x 2') metal plate (2' x 4'); rubber cable, springs		
	Moist, brown, fine to coarse, sand, little silt, gravel, cobbles, metal cable (4'), glass,		
18	metal plate, (1' x 2', 4'x 4'), asphalt (2' x 2.5'), metal rod; BOE = 18'		
20			

T.P. DIMENSIONS

Width (ft):	21
Length (ft):	21
Depth (ft):	18
Vol (ft^3):	7938

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
---	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Updated On: 09/10/03

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client: City of Haverhill	Contractor: TFORD	Test Pit No. TP-26- A-5	
Project Nan Hot Spot Investigation	Equipment: Excavator	Logged By: Murat Yavuz	
Project Location: Haverhill, MA	Depth to Water: 16.5	Date: 7/10/2003	
Project Number: 0522-37609	Ground Surface EL:	Page: 1 of 1	

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Moist brown sand, fine to coarse sand, little silt, gravel, cobbles,5' x 1' asphalt metal cable		
4	Moist brown sand, fine to coarse sand, little silt, gravel, cobbles, green paper asphalt (2' x 5' , 3' x 6', 12" x 15", & 3' x 5'), small metal rods, 1" plastic pieces, glass bottles		
6	Moist, brown/ light brown/ dark brown fine to coarse sand, little silt, gravel, cobbles, asphalt brown, glass jar10' metal cable, asphalt (3' x 2'; 4' x3'), blue powder		
8	Moist, brown, light brown, dark brown, fine to coarse, sand little silt, gravel perfume bottle, asphalt, plastic pieces, plastic bags		
10	Moist , brown/ light brown/ dark brown, fine to coarse sand, little silt, gravel, cobbles brick, beer bottles, asphalt (6" x 2' c 2.5', 2' x 4"x 2.5', 2' x 3')		
12	Moist, brown, light brown, dark brown, fine to coarse, sand little silt, gravel, cobbles 1 TRASH DRUM; 5' wood, metal sheet, asphalt		
14	Moist, brown/ dark brown/ light brown fine to coarse sand, little silt, gravel, cobbles metal pieces, asphalt (2' x 3') , metal cable		
16	Moist, brown/ dark brown/ light brown fine to coarse sand, little silt, gravel, cobbles, metal screen, 3' metal rod, 4' wood pole, metal sheets, asphalt, tar, metal cable, metal sheets		
18	Wet, brown,/ light brown/ dark brown, fine to coarse sand, little silt, gravel, cobbles metal cable, wood, 2' black wood, 4" metal pieces, 1' wood pole, plastic cable;		
20	BOE = 19'		

T.P. DIMENSIONS

Width (ft):	NA
Length (ft):	NA
Depth (ft):	19
Vol (ft^3):	

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
10 - 11'	0	1

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Test Pit dimesions were not noted

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- A-1
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:		Date:	7/14/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
	Moist, dark brown, fine to coarse, sand, little gravel, silt, roots		
2	black & blue plastic bags, clear water bottles, small metal pieces, metal rod		D
	Moist, dark brown, fine to coarse, sand, little gravel, silt, roots		
4	black, white, & blue plastic bags, glass bottles, metal rod, brick pieces, paper		
	Moist, dark brown, fine to coarse, sand, little silt, roots		
6	Trash 40% - 50%: plastic pieces, rubber, paper, glass bottles, insulation		
	+ cloth		
8	+ black tar		
	+ white metal plate (5' x 4.5')		
10	+ black tar		
	+ pink plastic, black tar		
12	Moist, black fine to coarse , sand, little gravel, cobbles, silt, wood pieces, metal rod & wire		
14			
16			
	+ rubber tire		
18	+ brown, clear bottles		
	+ newspaper (dated 2/15/1942)		
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	3.5
Length (ft):	25
Depth (ft):	20
Vol (ft^3):	1750

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
---	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- A-2
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:		Date:	7/14/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Moist, dark brown, fine to coarse, sand, little silt, gravel Trash 35%: glass bottles, plastic pieces metals cans, paper, roots		
4	Moist, dark brown, fine to coarse, sand, little silt, gravel Trash 50%:plastic bags, glass & plastic bottles, wood, metal rod, metal pipe		
6			
8	Trash 50 to 60%: rubber tire		
10	Moist, black to brown fine to coarse sand, little silt, gravel metal pieces, glass bottles, pieces, rubber tire, wood, plastic, paper, metal rod		
12			
14	Moist, black, fine to coarse sand, little silt, gravel, plastic, glass, plastic bottles		
16			
18			
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	4
Length (ft):	5
Depth (ft):	20
Vol (ft^3):	400

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
---	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- A-3
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:		Date:	7/15/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Moist to wet, dark brown, fine to coarse, sand, little silt, gravel, glass bottles & jars Trash 40 - 50%: plastic bags, paper, roots, cloth pieces, metal rods, wood, rubber cable		
4	Moist, dark brown, fine to coarse, sand, little silt, gravel, glass bottles plastic cloth, glass & plastic bottles, paper, metal sheets, wood asphalt pieces, brick pieces		
6			
8			
10	Moist dark, dark brown, fine to coarse sand, metal cans, paper Trash 50 - 60%: plastic & glass bottles, glass jars, rubber tire, boulders (1' x 2'), wood		
12			
14	+ gray boulder (3' x 3')		
16			
18			
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	4.5
Length (ft):	22
Depth (ft):	20
Vol (ft^3):	1980

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
---	0	0

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- A-4
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:		Date:	7/15/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Moist dark brown, fine to coarse, sand, little gravel, silt plastic bags & bottles, glass pieces, clothes, metal cans, wood, metal cable		
4	Moist, dark brown, fine to coarse, sand, little silt, gravel, glass bottles plastic bags & bottles, glass pieces, clothes, wood, metal cable, metal plate (2' x 4')		
6	Molst, dark brown, fine to coarse, sand, little silt, gravel plastic bags, metal pieces, cloth pieces, brick , glass bottles, plastic bottles		
8			
10			
12			
14			
16			
18			
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	4.5
Length (ft):	22
Depth (ft):	20
Vol (ft^3):	1980

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
---	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

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One Cambridge Place
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Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- A-5
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:		Date:	7/15/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Moist brown to dark brown, fine to coarse, sand, little silt, gravel. Roots , plastic bags glass pieces		
4	Moist, dark brown, fine to coarse, sand, little silt, gravel, glass bottles, rubber tire, plastic bags, clothes, wood pieces- timber (4' to 5')		
6			
8			
10			
12			
14			
16			
18			
20	BOE = 20'		

TEST PIT PLAN

T.P. DIMENSIONS

Width (ft):	4.5
Length (ft):	24
Depth (ft):	20
Vol (ft^3):	2160

Drum Quantity

Elevation	Recovered	Trash
---	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- B -1
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:		Date:	7/16/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Dry, cream to gray fine to coarse sand, little gravel, silt cobbles, roots, trace glass		
4	Moist dark, brown, fine to coarse sand, little silt, clay, gravel, cobbles, trace glass, plastic		
6	Moist, brown to black, fine to coarse sand, little gravel, silt, cobbles		
8	Trash 30 - 60%: plastic bags, clothes, glass, glass bottles, wood, timber, metal rods small pipes, brick pieces		
10	Moist, brown/ black/ red fine to coarse sand, little gravel, cobbles Trash 20%: plastic bags, clothes, metal pieces, wood, glass bottles		
12			
14	Trash 15 %		
16			
18	Moist, brown to light brown, fine to coarse, sand, little gravel, silt, cobbles (Natural)		
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	4.5
Length (ft):	25
Depth (ft):	20
Vol (ft^3):	2250

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
---	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- B -2
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:		Date:	7/16/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Moist, brown, fine to coarse sand, little gravel, silt, cobbles, trace clay, roots plastic glass, piece of metal, roots		
4	Moist, brown, fine to coarse sand, little gravel, silt, cobbles Trash 5 - 10%: metal rods, plastic, glass bottles & jars		
6	Trash 25 - 30%: brick		
8	+ timber pieces		
10	black and brown sand		
12			
14			
16			
18			
20	Moist, brown, to olive brown, fine to coarse sand, little silt, trace gravel ; BOE = 20'		

T.P. DIMENSIONS

Width (ft):	4
Length (ft):	25
Depth (ft):	20
Vol (ft^3):	2000

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
---	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- B -3
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:		Date:	7/16/2003
Project Number:	0522-37609	Ground Surface El.:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Dry, light brown, fine to coarse sand, little gravel, cobbles, silt, clay, brown glass bottle		
4	Dry, light brown, fine to coarse sand, little gravel, cobbles, silt, clay, bricks		
6	Moist, dark brown, fine to coarse sand, little silt, gravel, clay, cobbles, bricks, roots, piece of cloth, brick pieces, small plastic pieces (1" x 3")		
8	Moist, dark brown/ black/ re, fine to coarse sand, little gravel, bricks, glass pieces, plastic pieces, wood pieces		
10	Moist, dark brown. Black/ red fine to coarse sand, little gravel, silt, glass bottles bricks, broken glass, wood, hay, small metal pipe.		
12	Moist, brown/ dark brown/ black fine to coarse sand, little gravel, silt, bricks, boulders (2' x3'); timber, glass bottles, glass jars, pieces of paper , pieces of metal		
14			
16			
18	Moist, light brown fine to coarse, sand, little silt, gravel; BOE = 18'		
20			

T.P. DIMENSIONS

Width (ft):	4
Length (ft):	25
Depth (ft):	20
Vol (ft^3):	2000

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
---	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- B -4
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:		Date:	7/16/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Dry, light brown, fine to coarse sand, little silt, trace clay, gravel, cobbles, roots		
4	Moist, dark brown, fine to coarse sand, little silt, clay, gravel, Trash 30 - 35%: bricks, glass bottle, glass jars, wood, small plastic pieces, metal cans		
6			
8			
10			
12			
14			
16	+ white sand		
18	Moist, light brown fine to coarse, sand, little silt, gravel; BOE = 18'		
20			

T.P. DIMENSIONS

Width (ft):	6
Length (ft):	20
Depth (ft):	18
Vol (ft^3):	2160

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
---	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client: City of Haverhill	Contractor: TFORD	Test Pit No. TP-27- C-1	
Project Nan Hot Spot Investigation	Equipment: Excavator	Logged By: Murat Yavuz	
Project Location: Haverhill, MA	Depth to Water:	Date: 7/17/2003	
Project Number: 0522-37609	Ground Surface EL:	Page: 1 of 1	

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Moist, brown/ dark brown, fine to coarse sand, little, gravel, silt, trace clay, roots Matting at 6" - 1'		
4	Moist, light brown to gray, fine to medium sand, little clay, gravel, cobbles, silt 6' to 2' timber, plastic bags, plastic, cloth, 2 white plastic lids (2 - 2.5' diam.)		D
6	Moist, light brown, cream/ gray, fine sand, little clay, gravel timber, plastic, plastic lid (possible drum lid)		
8	BOE = 7.0'		
10			
12			
14			
16			
18			
20			

T.P. DIMENSIONS

Width (ft):	4.5
Length (ft):	40
Depth (ft):	7
Vol (ft^3):	1260

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
---	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client: City of Haverhill	Contractor: TFORD	Test Pit No. TP-27- C-2	
Project Nan Hot Spot Investigation	Equipment: Excavator	Logged By: Murat Yavuz	
Project Location: Haverhill, MA	Depth to Water:	Date: 7/17/2003	
Project Number: 0522-37609	Ground Surface EL:	Page: 1 of 1	

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Moist, brown, fine to coarse sand, little, gravel, silt matting, plastic pieces		
4	Moist, brown, fine to coarse sand, little gravel, silt 6' to 2' timber, plastic bags, plastic, cloth, 2 white plastic lids (2 - 2.5' diam.)		
6			
8	BOE = 7.0'		
10			
12			
14			
16			
18			
20			

T.P. DIMENSIONS

Width (ft):	4.5
ngth (ft):	40
Depth (ft):	7
Vol (ft^3):	1260

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
---	0	0

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client: City of Haverhill	Contractor: TFORD	Test Pit No. TP-27- C- 3	
Project Nan Hot Spot Investigation	Equipment: Excavator	Logged By: Murat Yavuz	
Project Location: Haverhill, MA	Depth to Water:	Date: 7/17/2003	
Project Number: 0522-37609	Ground Surface EL:	Page: 1 of 1	

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Top 4" Grass; 1' Topsoil; 1' Moist brown fine to coarse sand, little silt, gravel timber, cloth, plastic, sausage boom, 7-8' of plastic, metal wiring		
4	+ red canvas tarp (30'), small piece of plastic, metal plate (3' x 2') blue, rubber barrel , black cables, metal plate		
6	Moist brown to gray, fine to coarse and, little silt, gravel, cobbles, plastic, timber, cobbles		
8	Moist, gray to yellowish brown, f/c sand, little silt, cobbles, gravel, gray, boulders (8 - 12") BOE = 7'		
10			
12			
14			
16			
18			
20			

T.P. DIMENSIONS

Width (ft):	4.5
Length (ft):	20
Depth (ft):	7
Vol (ft^3):	630

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
---	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client: City of Haverhill	Contractor: TFORD	Test Pit No. TP-27- C-4
Project Nan Hot Spot Investigation	Equipment: Excavator	Logged By: Murat Yavuz
Project Location: Haverhill, MA	Depth to Water:	Date: 7/17/2003
Project Number: 0522-37609	Ground Surface EL:	Page: 1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Moist, dark brown, fine to coarse, sand, little gravel, silt, cobbles, trace roots, timbers		
4	Moist dark brown fine to coarse sand, little gravel, cobbles metal springs, timbers, metal machine piece (5' x 3' x3'); metal rods, plastic, rubber tire.		
6	Moist, brown to gray fine to coarse san, little gravel, silt, clay, metal rod, stump (4' x 3' x 2') plastic piece, timber, cobbles, 2 boulders (12 - 18")		
8	Moist, gray/ yellow/ brown, fine to coarse sand, little silt BOE = 7'		
10			
12			
14			
16			
18			
20			

T.P. DIMENSIONS

Width (ft):	4.5
ngth (ft):	25
Depth (ft):	7
Vol (ft^3):	787.5

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
---	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- D-1
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:		Date:	7/16/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Dry, light brown, fine to coarse sand, little gravel, cobbles, silt, clay, brown glass bottle		
4	Dry, light brown, fine to coarse sand, little gravel, cobbles, silt, clay, bricks		
6	Moist, dark brown, fine to coarse sand, little silt, gravel, clay, cobbles, bricks, roots, piece of cloth, brick pieces, small plastic pieces (1" x 3")		
8	Moist, dark brown/ black/ red, fine to coarse sand, little gravel, bricks, glass pieces, plastic pieces, wood pieces		
10	Moist, dark brown. Black/ red fine to coarse sand, little gravel, silt, glass bottles bricks, broken glass, wood, hay, small metal pipe.		
12	Moist, brown/ dark brown/ black fine to coarse sand, little gravel, silt, bricks, boulders (2' x3'); timber, glass bottles, glass jars, pieces of paper , pieces of metal		
14	+ newspaper (The Haverhill Gazette, dated 4/29/1970)		
16	Trash 80%: insulation, rubber		
18	+ rubber tire		
20	+ timber BOE = 20'		

T.P. DIMENSIONS
Width (ft):
Length (ft):
Depth (ft): 20
Vol (ft^3):

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
---	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- E-1
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	7/21/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Dry, light brown fine to coarse sand, little silt, gravel, cobbles roots, plastic lid		
4	Moist, black/ gray/ brown, fine to coarse sand, little silt, clay, gravel, coal tar, plastic bags gray plastic sheet, black plastic bag, cloth, glass bottles, wood, rubber tire		
6	Moist, black/ gray/ brown, fine to coarse sand, little gravel, silt, cobbles glass bottles, plastic bags, steel iron, 2 rubber tires, fabric, leather, metal rods & screen		
8	+ burned trash (ash)		
10	Moist, brown/black/ gray f/c sand, little silt, gravel, cobbles, fabric, metal rods, paper metal cans & sheets , shoe leather, cables, plastic bags & bottles, glass bottles & jars		
12	Moist, black/ gray f/c sand, little silt, gravel Trash 60%: plastic bags & cables, paper, fabric, hose, pot, leather, metal rods, glass bottles		
14	+ timber, possible drum in sidewall		
16			
18			
20	BOE = 20'		

TEST PIT PLAN

T.P. DIMENSIONS

Width (ft):	5
Length (ft):	22
Depth (ft):	20
Vol (ft^3):	2200

Drum Quantity

Elevation	Recovered	Trash
--	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

possible drum identified after further investigation

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- E-2
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	7/21/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Top 6" Dry, light brown f/c sand; 18" of Moist, brown to gray, f/c sand, little silt, gravel cobbles metal rods, 2 boulders (1 and 1.5') concrete block (5' x 2' x1.5')		
4	Moist, black/ gray/ brown, fine to coarse sand, little silt, gravel, cobbles Trash 50%: brick, metal cables, tar, metal cans, paper, fabric, glass bottles, timber		
6	Moist, black/ gray/ brown, fine to coarse sand, silt, gravel, cobbles Trash 80%: rubber tires, plastic bags, metal rods, fabric, leather, timber, metal mesh (1'x1')		
8			
10	+ drum cover, cream leather		
12	+ 5 gallon metal pail (empty)		
14	+ wood (timber)		
16	+ shredded paper		
18			
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	5
Length (ft):	22
Depth (ft):	20
Vol (ft^3):	2200

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
--	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- E-3
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	7/21/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Dry, light brown fine to coarse sand, little silt, gravel, cobbles		
4	Moist, brown/ yellowish brown, fine to coarse sand, little silt, gravel		
6	Moist, black/ gray/ brown, fine to coarse sand, little silt, gravel, roots		
8			
10			
12	Moist, gray/ brown/ black, fine to coarse sand, little silt, gravel Trash 60%: plastic bags, wood, glass, cloth, plastic bottles metal cables, tar, glass jars		
14			
16	+ shredded paper		
18			
20	BOE = 20'		

TEST PIT PLAN

T.P. DIMENSIONS

Width (ft):	5
Length (ft):	22
Depth (ft):	20
Vol (ft^3):	2200

Drum Quantity

Elevation	Recovered	Trash
--	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

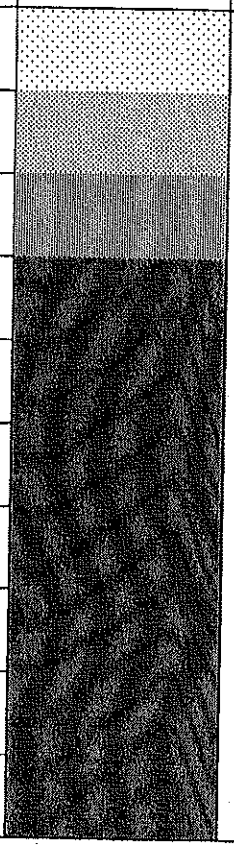
CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- E-4
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	7/21/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Dry, light brown fine to coarse sand, little silt, gravel, roots		
4	Moist, gray/ brown, fine to coarse sand, little silt, clay, gravel 1 TRASH DRUM; Trash 20%		
6	Moist, black/ gray/ brown, fine to coarse sand, little silt, gravel, clay Trash 50%: glass bottles, paper, plastic bags, metal cans, wood fabric leather fabric		
8	Trash 60%: metal bin, metal springs, timber		
10	+ paper		
12			
14			
16			
18			
20	BOE = 20'		



T.P. DIMENSIONS

Width (ft):	5
Length (ft):	21
Depth (ft):	20
Vol (ft^3):	2100

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
2 - 4'	0	1

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- E-5
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	7/22/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	10" Topsoil; Dry, light brown fine to coarse sand, little silt, gravel, roots 14" Moist, brown to dark brown, fine to coarse sand, little silt, clay, gravel		
4	Moist, dark brown/ light brown, fine to coarse sand, little silt, clay, gravel		
6	Moist, dark brown/ gray/ brown fine to coarse sand, little silt, gravel, clay Trash 50%: glass bottles plastic bags leather fabric		
8	Moist black, fine to coarse sand, little silt Trash 80%: plastic bags, glass & plastic bottles, metal rim, wood, fabric, paper, cables		
10	Trash 80%		
12	+ rubber tire, timber		
14	LEL detected in excavation area for 5- 10 sec.		
16	+ metal sheets & shredded paper & plastic bags (1/2 bucket)		
18			
20	BOE = 20'		

TEST PIT PLAN

T.P. DIMENSIONS

Width (ft):	5
Length (ft):	21
Depth (ft):	20
Vol (ft^3):	2100

Drum Quantity

Elevation	Recovered	Trash
--	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- E-6
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	7/22/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Top 8" Topsoil 6" Moist brown, fine to coarse sand little silt, gravel, clay		
4	Moist, brown/ dark brown fine to coarse sand, little silt, gravel clay, piece of cloth		
6	Moist, gray/ brown/ black, fine to coarse sand, little silt, Trash 80%: plastic bags, glass bottles, wood, metal cans, paper metal rods,		
8	Trash 90%: 1 TRASH DRUM		
10	Trash 80 % : rubber tire		
12	+ plastic cables, timber		
14	+ white metal heater (3' x 5')		
16	+ white metal heater		
18			
20	BOE = 20'		

TEST PIT PLAN

T.P. DIMENSIONS

Width (ft):	5
Length (ft):	22
Depth (ft):	20
Vol (ft^3):	2200

Drum Quantity

Elevation	Recovered	Trash
6 - 8'	0	1

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- E-7
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	7/22/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Dry, light brown, fine to coarse sand, little silt, gravel, roots		
4	Moist, dark brown/ brown/ gray fine to coarse sand, little silt, gravel, cobbles clay, 1 TRASH DRUM		
6	Moist, black, fine to coarse sand, little silt, wood; Newspaper - Atalntie - 10/26/1969) plastic bags, glass bottles, metal cans, plastic bottles, metal cans & rods		
8	Trash 80%: rubber truck tire		
10	+ 6' stump, 3' wood, wood log (5' x 2')		
12	+ 6' x 3' wood; 1 TRASH DRUM		
14	Trash 80%:red license plate(# B56.316, date 1964), burned paper, plastic cables, metal cans		
16	+ burned trash		
18			
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	5
Length (ft):	22
Depth (ft):	20
Vol (ft^3):	2200

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
2- 4'	0	1
10 - 12'	0	1

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- F-1
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	7/24/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	6" Topsoil; Bottom 18" Moist brown/ light brown fine to coarse sand, little silt, gravel, cobbles		
4	Moist brown/ gray fine to coarse sand, little silt, clay, cobbles, gravel Trash 5%: plastic bags , glass bottles		
6	Moist gray/ black/ brown fine to coarse sand little silt Trash 60%: plastic bags, glass bottles, timber, metal rods, rubber tire, clothes, blk leather		
8	Trash 70%: + 2 rubber tires, metal rod		
10	Trash 80%		
12	Trash 80%		
14	+ metal white box (possible washing machine)		
16	+ metal cylindrical tank (possible water heater)		
18	+ leather		
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	5
Length (ft):	22
Depth (ft):	20
Vol (ft^3):	2200

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
---	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- F-2
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	7/24/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	6" Topsoil; Bottom 18" Moist brown/ light brown fine to coarse sand, little silt, gravel, cobbles, roots		
4	Moist brown/ gray/ black fine to coarse sand, little silt, gravel , cobbles small pieces (2" to 5") of plastic		
6	Trash Bottom 12" Moist, gray/ black f/c sand, clay, little silt,		
8	Trash 80%: plastic bags, glass bottles, paper, leather, wood + rubber tire, 2 rolls of gray leather		
10	Trash 80% + timber (1 bucket full) , metal sheets, metal rods		
12			
14	+ cream and black leather		
16	+ newspaper (The Haverhill Gazette, dated 7/24/67)		
18	+ LEL readings in excavation area		
20	1 TRASH DRUM (25 gallon) ; BOE = 20'		

T.P. DIMENSIONS

Width (ft):	5
Length (ft):	22
Depth (ft):	20
Vol (ft^3):	2200

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
20'	0	1

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- F-3
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	7/24/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	6" Topsoil; Bottom 18" Moist brown/ light brown fine to coarse sand, little silt, gravel, cobbles		
4	Moist brown/ light brown/ yellow fine to coarse sand, little silt, gravel , cobbles		
6	Top 6" Moist, gray,/ brown fine to coarse sand, clay, little silt, gravel cobbles, wood some black sand; Trash: plastic bags, glass bottles, shredded paper, metal cans & rods		
8	+ 2' cylindrical metal tank		
10	+ metal , NEWSPAPER dated 3/2/69		
12	+ metal cable & sheet (3' with holes)		
14	+ white metal box (possible part to washing machine)		
16	+ 1 TRASH DRUM		
18	+ metal rods (4' - 5') , metal tire rim, rubber tire, insulation		
20	+ shredded leather , metal chain, cylindrical metal tank, metal springs BOE = 20'		

T.P. DIMENSIONS

Width (ft):	6
Length (ft):	23
Depth (ft):	20
Vol (ft^3):	2760

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
14 -16'	0	1

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- F-4
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	7/24/2003
Project Number:	0522-37609	Ground Surface EL.:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	6" Topsoil; Bottom 18" Moist brown/ light brown fine to coarse sand, little silt, gravel, cobbles		
4	Moist brown/ light brown/ yellow fine to coarse sand, little silt, gravel , cobbles		
6	Moist brown/ gray/ black fine to coarse sand, little silt,		
8	Trash 70%:plastic bags, glass bottles, metal rods, sheet metal, metal cans, tire		
10			
12			
14	+ 1' boulder		
16	+ metal plate (3' x 2.5'), brushes		
18	+ sheet metal, metal plates		
20	BOE = 20'		

TEST PIT PLAN

T.P. DIMENSIONS

Width (ft):	4.5
Length (ft):	24
Depth (ft):	20
Vol (ft^3):	2160

Drum Quantity

Elevation	Recovered	Trash
---	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- F-5
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	7/24/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	6" Topsoil; Bottom 18" Moist brown/ light brown fine to coarse sand, little silt, gravel, cobbles		
4	Top 12" Moist, brown/ black fine to coarse sand, clay, little silt, gravel, cobbles Bottom 12" Moist, brown/ black/ gray fine to coarse sand, little silt, cobble, gravel		
6	Trash: plastic bags, glass bottles, rubber tires, fabric, shredded paper,		
8	metal plate (4' x 3') phone line cables 'Trash 80%: + pocket of yellow grounded plastic		
10	Trash 80%: + 2 buckets of cream-colored leather		
12	Trash 80%		
14	Trash 80%		
16			
18			
20	BOE = 20'		

TEST PIT PLAN

T.P. DIMENSIONS

Width (ft):	6
Length (ft):	20
Depth (ft):	20
Vol (ft^3):	2400

Drum Quantity

Elevation	Recovered	Trash
---	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- F-6
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	7/24/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	6" Topsoil; Bottom 18" Moist brown/ light brown fine to coarse sand, little silt, gravel, cobbles		
4	Moist, brown/ black fine to coarse sand, little silt, plastic bags, glass bottles, wood, timber, metal rods, rubber tire, metal sheets		
6			
8	+ rubber tires, metal cylindrical tank, leather		
10	+ 2 buckets of cream-colored leather		
12	+ rubber tires		
14	+ black leather, timber, shredded plastic		
16			
18			
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	6
Length (ft):	20
Depth (ft):	20
Vol (ft^3):	2400

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
---	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-1
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/14/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

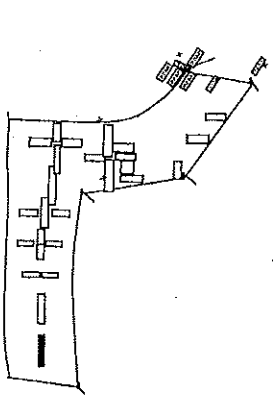
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Brown fine-coarse, moist sand, trace gravel, some silt, little clay		Easy
4			
6	Gray fine-coarse, moist sand, trace gravel, some silt, little clay Trash: plastic bags; glass bottles; metal sheets		
8			
10			
12			
14			
16			
18			
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	30
Depth (ft):	20
Vol (ft^3):	1800

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-2
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/14/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

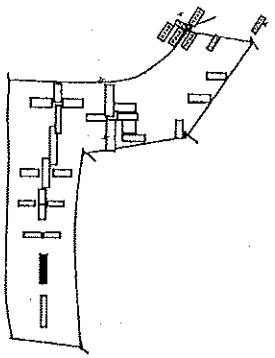
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Brown fine-coarse, moist sand, gravel, little silt		Easy
4	BOE = 4'		
6			
8			
10			
12			
14			
16			
18			
20			

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	30
Depth (ft):	4
Vol (ft^3):	360

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-3
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/25/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

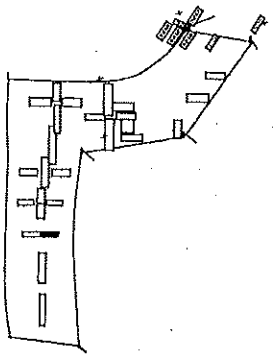
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Brown and tan fine-coarse, moist, soil, gravel, roots		Easy
4	Gray, tan and black fine-coarse moist soil, some cobble Trash 20%: crushed refrigerator		
6	Trash 40 - 60%		
8	Trash 60 - 80%		
10	Trash 60 - 80%		
12	Gray, tan and black fine-coarse dry soil Trash 60 - 80%: water heater		
14	1 TRASH DRUM Trash 60 - 80%: scrap metal		
16			
18	Trash 60 - 80%: tree trunk		
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	20
Vol (ft^3):	900

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
12'	0	1

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

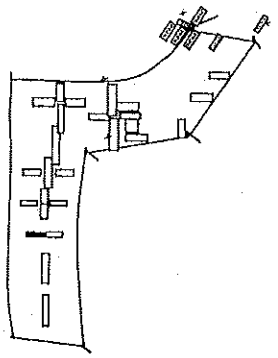
Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-4
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/26/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Brown and tan fine-coarse, moist, soil, gravel, roots		Easy
4	Gray and black fine-coarse moist soil, some cobble Trash 20%: scrap metal, piping		
6	Trash 50 - 80%: scrap metal; drum cover; glass		
8	Trash 80 - 90%: washer		
10	Trash 80 - 90%		
12	Trash 90%		
14			
16			
18	- leather material		
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	20
Vol (ft^3):	900

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
--	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

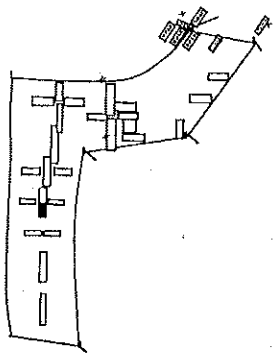
Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-5
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/26/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan fine-coarse, moist, soil, some cobble		Easy
4	Tan fine-coarse moist soil, cobble Trash 40%: can bottles		
6	Trash 80%		
8	Tan, some gray fine-coarse, moist, soil Trash 80 - 90%: metal frame		
10	Trash 80 - 90%: leather material		
12			
14	Trash 80 - 90%: scrap metal		
16			
18			
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	20
Vol (ft^3):	900

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
--	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-6
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/26/2003
Project Number:	0522-37609	Ground Surface EL.:		Page:	1 of 1

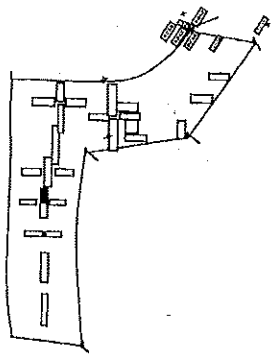
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan fine-coarse, moist, soil, some cobble		Easy
4	Brown and gray fine-coarse moist soil Trash 20 -40%: water heater; 1 TRASH DRUM		
6	Trash 60 - 80%: washer- dryer		
8	Trash 80 - 90%		
10			
12			
14			
16			
18			
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	20
Vol (ft^3):	900

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
4'	0	1

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-7
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/26/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

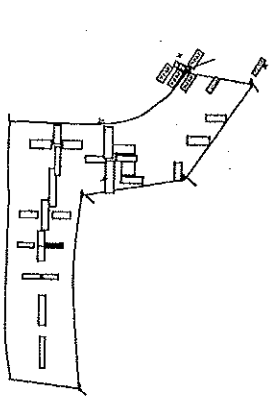
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan fine-coarse, moist, soil, some cobble		Easy
4	Brown, tan and gray fine-coarse moist soil Trash 40 - 60%: metal mesh material; tires; leather material; bottles		
6	Trash 60 - 80%: scrap metal		
8	Trash 80 - 90%		
10	Trash 80 - 90%: scrap metal from HVAC system; tree trunks		
12	Trash 80 - 90%: leather material; rubber material		
14	Trash 80 - 90%; metal piping		
16	Trash 80 - 90%: water heater		
18	Trash 80 - 90%		
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	20
Vol (ft^3):	900

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
--	0	0

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-8
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/26/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

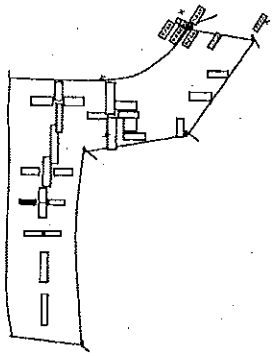
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan fine-coarse, moist, soil, some cobble		Easy
4	Brown and gray fine-coarse moist soil Trash 40 - 60%: bed springs, pot, scrap metal		
6	Trash 60 - 80%: cable wire; scrap metal		
8	Trash 60 - 80%: bottles		
10	Trash 80 - 90%		
12	BOE = 12'		
14			
16			
18			
20			

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	12
Vol (ft^3):	540

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
--	0	0

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-9
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/27/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

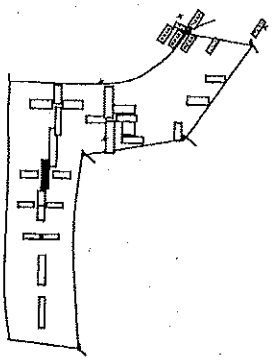
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan fine-coarse, moist, soil, some cobble		Easy
4	Brown and gray fine-coarse moist soil Trash 60 - 80%: bed springs, pot, scrap metal; 1 TRASH DRUM		
6	Trash 60 - 80%: muffler		
8	Trash 80 - 90%: dishwasher, scrap metal		
10	Trash 80 - 90%		
12	Trash 90%		
14			
16			
18			
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	30
Depth (ft):	20
Vol (ft^3):	1800

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
4'	0	1

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-10
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/27/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

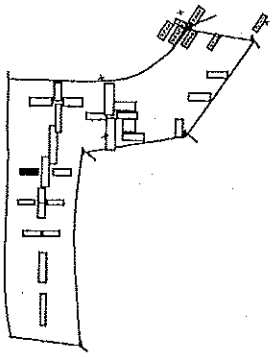
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan and brown fine-coarse, moist, soil, some cobble		Easy
4	Gray and Black fine-coarse moist soil, cobble, boulders Trash 60 - 80%: cans; pots; tires		
6	Trash 80 - 90%: scrap metal		
8	Trash 90%: cans; pipes; trash can; oil degreaser		
10	Trash 80 - 90%: pot; pipes		
12	Trash 90%: bed spring		
14	Trash 90%		
16			
18			
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	20
Vol (ft^3):	900

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
--	0	0

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

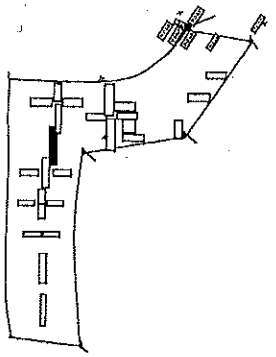
Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-11
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/27/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan, some brown fine-coarse, moist, soil, some cobble, boulders		Easy
4	Brown and gray fine-coarse moist soil Trash 80 - 90%: cans; pots; tires		
6	Trash 80 - 90%: cans; plates; wood		
8	Trash 90%: scrap metal		
10	Trash 90%: water cooler		
12	Trash 90%: scrap metal		
14	Trash 90%		
16			
18	1 TRASH DRUM		
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	35
Depth (ft):	20
Vol (ft^3):	2100

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
18'	0	1

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-12
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/28/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

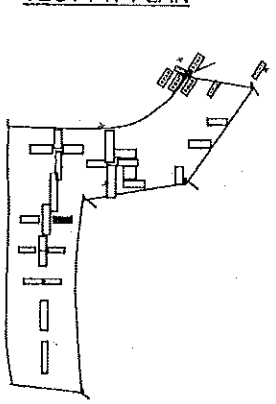
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan, some brown fine-coarse, moist, soil, some cobble, boulders		Easy
4	Brown and gray fine-coarse moist soil Trash 40 - 60%: scrap metal - cans; large rolls of fabric; wood		
6	Trash 60 - 80%: Scrap Metal- metal frame		
8	Trash 80%: wood planks; wood frames		
10			
12			
14			
16			
18			
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	20
Vol (ft^3):	900

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
--	0	0

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

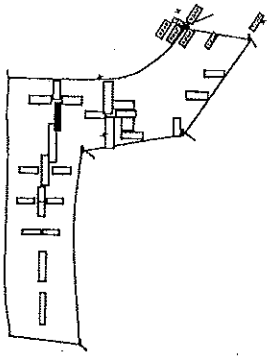
Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-13
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/28/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan, some brown fine-coarse, moist, soil, some cobble		Easy
4	Brown and gray fine-coarse moist soil Trash 40 - 60%: tires		
6	Trash 80%: Scrap Metal		
8	Trash 80 - 90%: pipes, scrap metal		
10	Trash 80 - 90%: scrap metal - cans; pipes; rebar; fabric		
12	- 1967 Newspaper (not collected)		
14			
16			
18			
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	30
Depth (ft):	20
Vol (ft^3):	1800

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
--	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-14
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/28/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

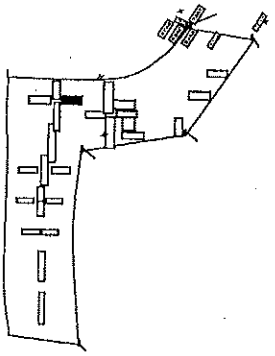
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan and Brown fine-coarse, moist, soil, roots, some cobble		Easy
4	Gray, Black and Brown fine-coarse moist soil Trash 40 - 60%: 2 car hoods and other car panel parts, fabric, tires, and metal straps		
6	Trash 60 - 80%: Bumper, scrap metal - cans; Kitchen sink		
8	- 1969 newspaper (not collected) Trash 80 - 90%: rebar, scrap metal		
10	Trash 80 - 90%:		
12			
14			
16			
18	- Heat exchanger - white powder (no readings)		
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	20
Vol (ft^3):	900

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
--	0	0

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

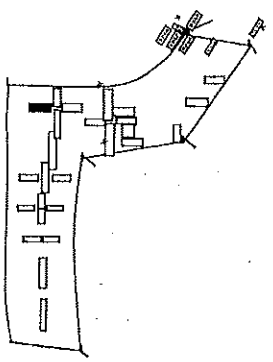
Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-15
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/28/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan and Brown fine-coarse, moist, soil, roots, some cobble		Easy
4	Gray and Brown fine-coarse soil, cobble Trash 40%		
6	Trash 80 - 90%: Sheet Metal		
8	Trash 80 - 90%: cable wire		
10	Trash 80 - 90%: Fabric, Leather Material, tires		
12			
14	Trash 90% : Sheet Metal from Heating System		
16			
18			
20	BOE = 20' ; High LEL		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	20
Vol (ft^3):	900

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
--	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-16
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/28/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

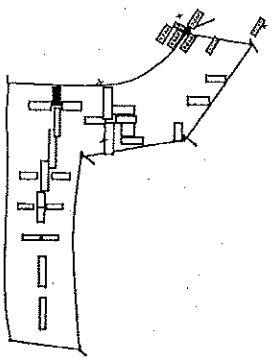
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan and Brown fine-coarse, moist, soil, some cobble		Easy
4	Brown and Gray fine-coarse soil, cobble Trash 40 - 60 %		
6			
8	Brown and Gray fine-coarse soil, cobble Trash 80%		
10	Trash 90% : Aluminum Blinds		
12			
14	Trash 90% : Sheet Metal from Heating System		
16			
18	BOE = 17'		
20			

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	17
Vol (ft^3):	765

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
--	0	0

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

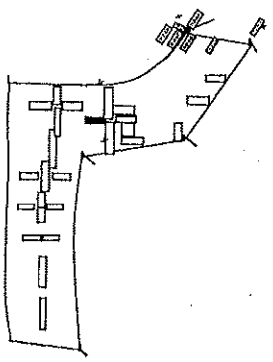
Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-17
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	9/2/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan and brown fine-coarse, moist, soil, some cobble		Easy
4	Gray, black, and tan fine-coarse soil, cobble Trash 20 -40%: wood logs, metal piping, cans , mangled metal container		
6	Gray, black, and tan fine-coarse soil, cobble Trash 40 - 80% - scrap metal, tires		
8	Gray, black, and tan fine-coarse soil, cobble Trash 80 - 90%		
10	Trash 80 - 90% - sheet metal		
12	Trash 90%: - metal frames		
14	- tires, wood planks, & rolls of material		
16			
18			
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	20
Depth (ft):	20
Vol (ft^3):	1200

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
--	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-18
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	9/2/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

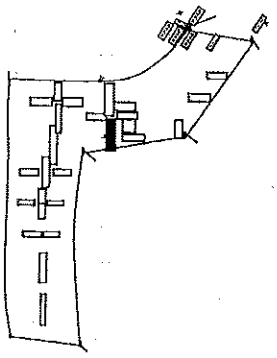
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan fine-coarse, moist, soil, some cobble		Easy
4	Gray, black, and brown fine-coarse soil, cobble Trash 40 -60%: metal pipes, wood, aluminum siding, mattress springs, tires		
6	Gray, black, and brown fine-coarse soil, cobble Trash 60 - 80% - leather material, tires, roles of plastic		
8	Gray, black, and tan fine-coarse soil, cobble, some boulders Trash 80 - 90 %: metal sheets from venting system		
10	Trash 80 - 90% - sheet metal		
12	Trash 90%: - metal frames		
14	- tires, wood planks, & rolls of material		
16			
18			
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	20
Depth (ft):	20
Vol (ft^3):	1200

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
--	0	0

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-19
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	9/2/2003
Project Number:	0522-37609	Ground Surface EL.:		Page:	1 of 1

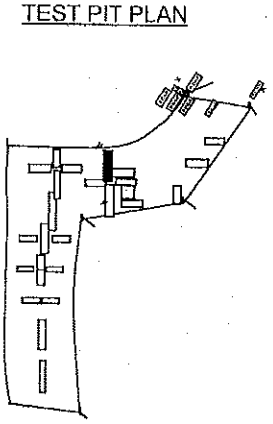
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
	Tan fine-coarse, moist, soil, some cobble		Easy
2	Drum covers (3); scrap metal		
	Gray, black, &tan f/c soil, cobble, some boulders; RECOVERED DRUMS:TP-27-G-19-2, -3		
4	Trash 40 -60%: metal wires, scrap metal, metal container, 2" metal pipe; 2 TRASH DRUMS		
	Gray, black, and tan fine-coarse soil, cobble; RECOVERED DRUMS: TP-27-G-19-1		
6	Trash 60 - 80% - pink - purple solid (LEL -0-3); 2 TRASH DRUMS		
	Gray, black, and brown fine-coarse soil, cobble		
8	Trash 80 - 90 %: metal sheets from venting system		
	Trash 90%		
10	- sheet metal; olfactory paint odors		
12	- air tanks		
14	- scrap metal, sheet metal		
16			
18			
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	30
Depth (ft):	20
Vol (ft^3):	1800

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
2-4'	2	2
4 - 6'	1	2

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Drums uncovered at north end (sidewall) and west end of excavation; Most drums identified as trash (empty);
Test pit identified edge of drum pit area

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-20
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	9/3/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

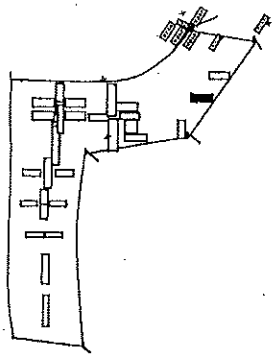
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
	Tan fine-coarse, moist, soil, some cobble; 2" metal pipe		Easy
2	3 TRASH DRUMS; RECOVERED DRUMS: TP-27-G-20-1, -2, -3, & -4		
	Tan and Brown fine-coarse, moist, soil, some boulders; OVM >50		
4	BOE=4'		
6			
8			
10			
12			
14			
16			
18			
20			

T.P. DIMENSIONS

Width (ft):	4
Length (ft):	15
Depth (ft):	4
Vol (ft^3):	240

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
0-4'	4	3

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Bottom of excavation at trash line; Test pit confirms drum pit area is continuous between east and west edge of drum pit markers

CDM

50 Hampshire Street
One Cambridge Place
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(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-21
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	9/5/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

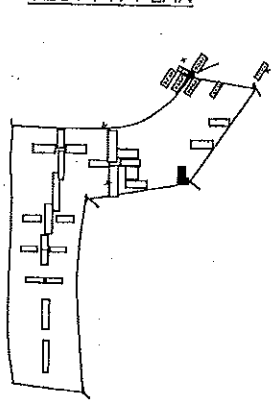
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
	Tan fine-coarse, moist, soil, some cobble		Easy
2	2" metal pipe		
	Tan and Brown fine-coarse, moist, soil, some boulders; OVM >50		
4	Trash - 10% - scrap metal - 2" metal pipe; tires; rags; drum cover		
	DRUM REMAINS IN EXCAVATION; BOE = 5'		
6			
8			
10			
12			
14			
16			
18			
20			

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	6
Vol (ft^3):	270

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
4 - 5'	1	0

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

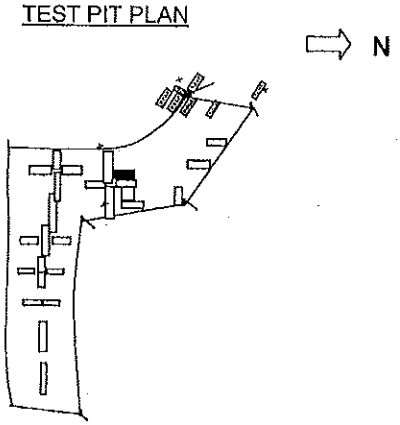
Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-22
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	9/5/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan and Brown fine-coarse, moist, soil, some cobble		Easy
4	Tan and Brown fine-coarse, moist, soil, some boulders; OVM >50 Trash - 20- 40% - leather material; RECOVERED DRUM: TP-27-G-22-1		
6	BOE = 4'		
8			
10			
12			
14			
16			
18			
20			

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	4
Vol (ft^3):	180

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
2 - 4'	1	

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

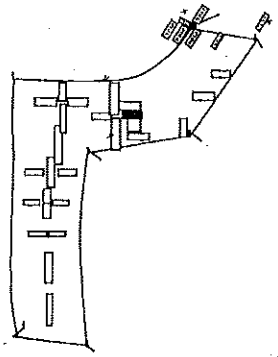
Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-23
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	9/8 - 9/9/03
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan and Brown fine-coarse, moist, soil, some cobble		Easy
4	Brown, some black, fine-coarse, moist, soil, little cobble - Scrap metal; metal straps; leather material; drum cover		
6	3 TRASH DRUMS; RECOVERED DRUMS: TP-27-G-23-1, -2, -3, 4, -5, -6, -7, -8, & -9 Brown and Black fine-coarse, moist, soil; Trash : 40 - 60 %		
8	Brown and Black fine-coarse, moist, soil Trash : 40 - 60 %		
10	Brown and Black fine-coarse, moist, soil Trash : 60 - 80 %		
12	- wood planks, plastic		
14	Black fine - coarse, moist, soil - tires		
16	Black fine - coarse, moist, soil Trash 80 - 90% : '- Scrap Metal - metal buckets; crushed sheet metal;		
18	Black fine - coarse, moist, soil Trash 80 - 90%		
20	Black fine - coarse, moist, soil; Trash 80 - 90% BOE =20'		

T.P. DIMENSIONS
Width (ft): 3 - 8
Length (ft): 15
Depth (ft): 20
Vol (ft^3): 900 -1200

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
3 - 6'	9	3

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Top 4 feet of Test Pit extended 8' In width.

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

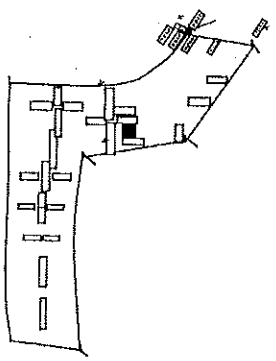
Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-24
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	9/10 - 9/15/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan and Brown fine-coarse, moist, soil, some cobble		Easy
4	Brown, black & gray, f/c, moist, soil, cobble; Trash: 20% - Tires, scrap metal, drum covers 3 TRASH DRUMS; RECOVERED DRUMS: TP-27-G-24-1 thru -12;		
6	RECOVERED DRUMS: TP-27-G-24-13 thru -20;		
8	Brown, f/c, moist, soil, cobble; OVM=150ppm; Trash - 20% : tires, auto materials, oil filters RECOVERED DRUMS: TP-27-G-24-21 thru -24;		
10	Same as above Trash - 40 - 60%		
12	Brown, fine-coarse, moist, soil Trash - 60 - 80%		
14	large scrap metal (possible refrigerators); wood planks Cardboard, tires, empty drum in sidewall; 1TRASH DRUM		
16			
18	Black, some gray, fine-coarse, moist, soil Trash - 80%		
20	Black fine-course, moist, soil Trash - 80%; BOE = 20'		

T.P. DIMENSIONS

Width (ft):	8
Length (ft):	6
Depth (ft):	20
Vol (ft^3):	960

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
2 - 4'	12	5
4 - 6'	8	0
6 - 8'	4	0
12'	0	1

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Test pit from 0-7' feet - Width: 15' ; area widened to uncover drums in sidewall.

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(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-25
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	9/15/2003
Project Number:	0522-37609	Ground Surface El.:		Page:	1 of 1

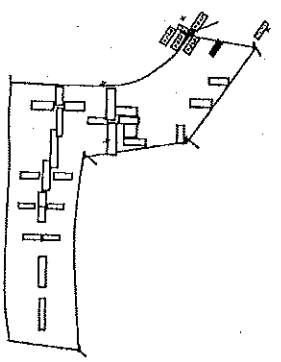
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan and Brown fine-coarse, moist, soil, some cobble RECOVERED DRUMS: TP-27-G-25-1 thru -2; BOE = 2'		Easy
4			
6			
8			
10			
12			
14			
16			
18			
20			

T.P. DIMENSIONS

Width (ft):	6
Length (ft):	15
Depth (ft):	2
Vol (ft^3):	180

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
1 - 2'	2	

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Since drums with content were not uncovered below the trash line (or within an area with more that 20% trash) in previous test pits, the bottom of this excavation was at the trash line.

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Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-26
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	9/17/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

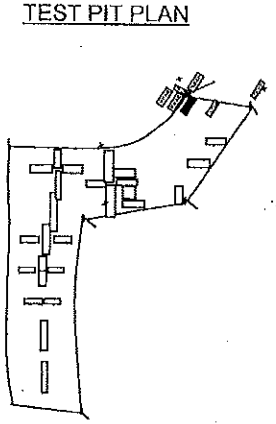
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan fine-coarse, Little green soil / paint; little gray soil; moist, soil, some cobble RECOVERED DRUMS: TP-27-G-26-1 thru -3; Little scrap metal; BOE =2'		Easy
4			
6			
8			
10			
12			
14			
16			
18			
20			

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	2
Vol (ft^3):	90

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
1 - 2'	3	

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Since drums with content were not uncovered below the trash line (or within an area with more that 20% trash) in previous test pits, the bottom of this excavation was at the trash line.

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Test Pit Log

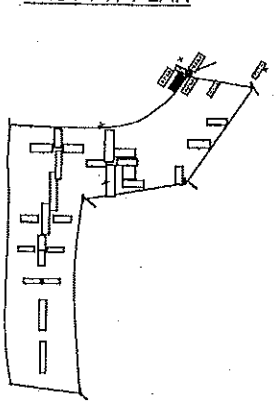
Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-27
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	9/17/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan and Brown fine-coarse, moist, soil, some cobble, little clay; Trash - 10%- bottles, rags, branches, red drum cover cardboard box 2 TRASH DRUMS; RECOVERED DRUMS: TP-27-G-27-1 AND -2; BOE = 3'		Easy
4			
6			
8			
10			
12			
14			
16			
18			
20			

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	3
Vol (ft^3):	135

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
1 - 2'	1	1
2 - 3'	1	1

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Since drums with content were not uncovered below the trash line (or within an area with more that 20% trash) in previous test pits, the bottom of this excavation was at the trash line.

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Test Pit Log

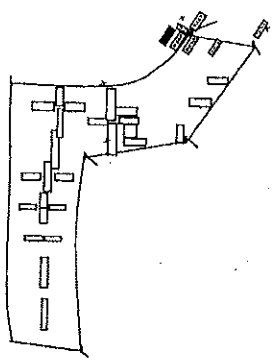
Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-28
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	9/17/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan fine-coarse, moist, soil, some cobble gray fine soil, rags; brick, automotive parts (drive shaft)		Easy
4	Gray , little brown fine-coarse, moist, soil, wood logs		
6	Gray , little brown fine-coarse, moist, soil, wood logs Trash - 10 -20%		
8	Gray , little brown fine-coarse, moist, soil Trash - 20-40% - scrap metal, automotive parts		
10	Gray , little brown fine-coarse, moist, soil Trash 60 - 80%		
12	Gray , little brown fine-coarse, moist, soil Trash 80% - wood logs; bottles; plastic		
14			
16			
18	Trash 90% - boiler		
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	20
Vol (ft^3):	900

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
--	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Test pit identified as an edge of the drum pit area

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(617) 452-6000

Test Pit Log

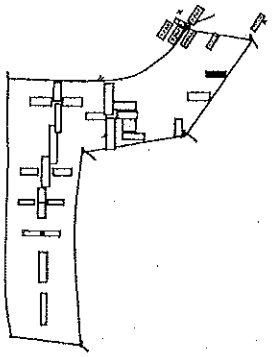
Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-29
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	9/18/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan, some brown fine-coarse, moist, soil, some cobble, gravel; tree roots		Easy
4	1 TRASH DRUM Tan, some brown f/c, moist, soil, some cobble, gravel; Trash - 10% - Scrap metal; rags		
6	4 TRASH DRUMS; RECOVERED DRUMS: TP-27-G-29-1 thru - 8 BOE = 6'		
8			
10			
12			
14			
16			
18			
20			

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	6
Vol (ft^3):	270

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
2 - 4'	0	1
4 - 6'	8	4

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Since drums with content were not uncovered below the trash line (or within an area with more that 20% trash) in previous test pits, the bottom of this excavation was at the trash line.

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Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-30
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	9/22/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

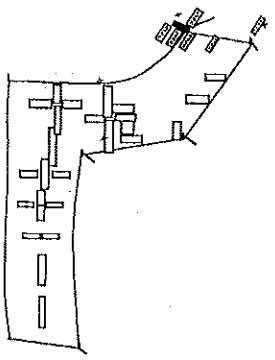
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan, some brown fine-coarse, moist, soil, some cobble, gravel; tree roots; 5-gal buckets RECOVERED DRUMS: TP-27-G-30-1 thru -4 (including two (2) 5-gal buckets)		Easy
4	Tan, some brown fine-coarse, moist, soil, some cobble, gravel Trash - 10% - Scrap metal; rags; 5-gal buckets		
6	BOE = 5'		
8			
10			
12			
14			
16			
18			
20			

T.P. DIMENSIONS

Width (ft):	9
Length (ft):	15
Depth (ft):	5
Vol (ft^3):	675

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
0 - 2'	4	0
2 - 4'	1	0

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Since drums with content were not uncovered below the trash line (or within an area with more that 20% trash) in previous test pits, the bottom of this excavation was at the trash line.

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Test Pit Log

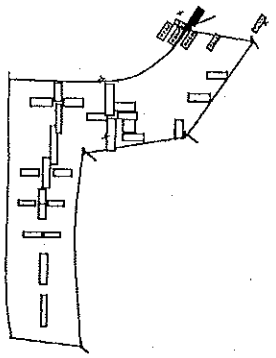
Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-31
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	9/23/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Brown fine-coarse, moist, soil, some cobble, boulders.		Easy
4	Brown fine-coarse, some gray silty moist, soil, some cobble, boulders.		
6	Black, some tan fine soil, moist; Trash - leather material RECOVERED DRUM: TP-27-G-31-1		
8	Gray and black fine-coarse, moist, soil, cobble Trash - 10% : pipes, drum covers, bottles, empty 5-gal buckets		
10	Gray and black fine-coarse, moist, soil, cobble Drum Cover		
12	Gray and black fine-coarse, moist, soil, cobble Trash 60 - 80%		
14			
16			
18			
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	20
Vol (ft^3):	900

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
4 - 6'	1	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Test pit identified as western edge of drum pit area

CDM

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Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-32
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	9/24/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

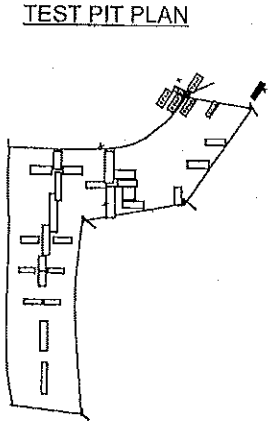
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Brown fine-coarse, moist, soil, some cobble, boulders.		Easy
4	Tan fine-coarse, some gray silty moist, soil, some cobble, boulders.		
6	Tan, some black/gray fine soil, moist RECOVERED DRUM: TP-27-G-32-1		
8	Tan, some black/gray fine soil, moist; Trash - 20%; BOE = 7'		
10			
12			
14			
16			
18			
20			

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	7
Vol (ft^3):	315

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
4 - 6'	1	0

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Test pit identified as northern edge of drum pit area.

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

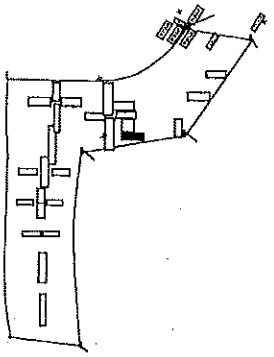
Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- G-33
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	9/24/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Brown and Tan fine-coarse, moist, soil, some cobble		Easy
4	Gray , tan, and black fine-coarse, moist, soil, wood logs metal buckets, boulders		
6	Gray and tan fine-coarse, moist, soil, wood logs Trash - 10%		
8	Trash - 20-40% - scrap metal, automotive parts		
10	Trash 40 - 60%		
12	Trash 80 - 90% - wood planks, bed springs		
14			
16	Trash 80 - 90%		
18	BOE = 18'		
20			

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	20
Vol (ft^3):	900

TEST PIT PLAN



Drum Quantity

Elevation	Recovered	Trash
--	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Test pit identified as eastern edge of drum pit area

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One Cambridge Place
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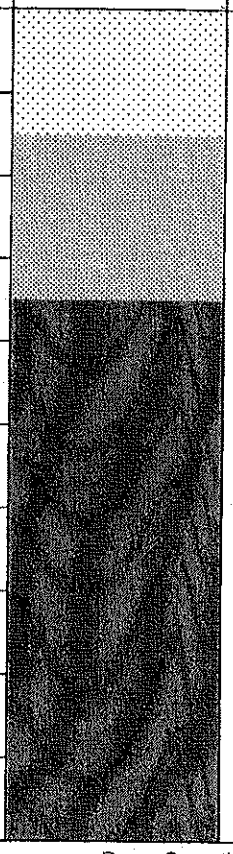
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- H-1
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	7/25/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

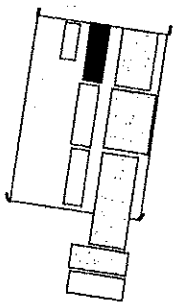
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
	Top 6" Topsoil (Moist, brown, fine to coarse sand, little silt, clay, gravel, roots, grass)		
2	Bottom 18" Moist, brown, fine to coarse sand, little silt, gravel, cobbles.		
	Moist, brown/ dark brown/ black fine to coarse, sand, little silt, clay, gravel, cobbles,		
4	Trash: cloth, plastic bags, wire, leather, 1TRASH DRUM		
	Moist, brown/dark brown/black, fine to coarse sand, little silt		
6	Trash: plastic bags, leather, shredded leather, RECOVERED DRUM: TP-27-H-1-1 thru -3		
	Moist brown/ black fine to coarse sand, little silt		
8	Trash 70%: plastic bags, glass bottles, leather, cloth, timber		
10	+ metal rods, metal cans		
12	Trash 80%: rubber tire		
14	+ timber		
16	+ metal lid		
18	+ leather		
20	BOE = 20'		



T.P. DIMENSIONS

Width (ft):	6
Length (ft):	21
Depth (ft):	20
Vol (ft^3):	2520

TEST PIT PLAN



Drum Quantity

Depth	Recovered	Trash
2 - 4'	0	1
4 - 6'	3	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

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(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- H-2
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	7/25/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

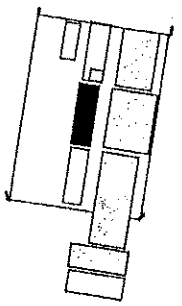
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Top 6" Topsoil, Bottom 18" Moist, brown, fine to coarse sand, little silt, clay, gravel, roots, glass bottle, plastic piece		
4	Moist, gray/ brown/ black fine to coarse sand, little silt, clay, gravel		
6	+ timber, plastic bags, cloth, glass pieces, plastic cloth, small metal pieces(3" - 5")		
8	rubber tire, blue leather, (1 bucket full)		
10	+ more leather material HCN & LEL detected		
12	Trash 70%: more leather material		
14	+ timber, metal plate (4' x 5')		
16	+ metal rods, red leather, plastic, rubber		
18	+ concrete block (5' x 6' x 4')		
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	6
Length (ft):	23
Depth (ft):	20
Vol (ft^3):	2760

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Depth	Recovered	Trash
--	0	0

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- H-3
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	7/28/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

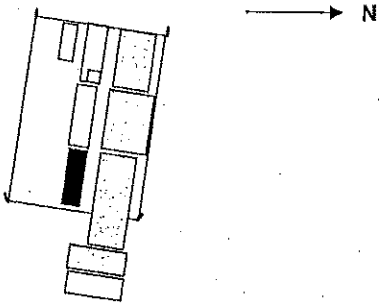
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Top 6" Topsoil, Bottom 18" Moist, brown, fine to coarse sand, little silt, clay, gravel, wood, trace cobble		
4	Moist, brown/ gray/ dark brown fine to coarse sand, little silt, clay, gravel, cobbles, wood, boulder (2' x1')		
6	Moist, brown/ gray fine to coarse sand, little silt, gravel, clay, stump (2' x 6") Trash 35%: plastic bags, glass bottles, wires, rubber plate, clothes, metal sheets		
8	Trash 40 - 45%		
10	Moist, black fine to coarse sand, little silt, Trash 80%: plastic bags, leather, metal jar lids, glass bottles, 5 rubber tires, metal springs, wood clothes, concrete block		
12	Trash 80%: concrete block (from 10' to 14')		
14			
16			
18			
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	6
Length (ft):	22
Depth (ft):	20
Vol (ft^3):	2640

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Depth	Recovered	Trash
--	0	0

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

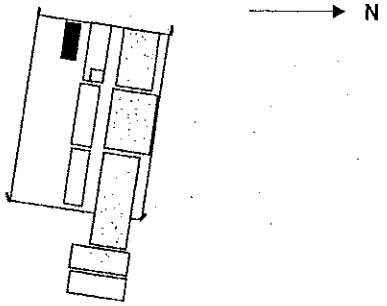
Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- H-4
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	7/28/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Moist, brown, fine to coarse sand, little silt, clay, gravel, wood		
4	Moist, gray fine to coarse sand, little silt, gravel; Trash 10%: plastic & glass pieces		
6	Moist, brown/ gray fine to coarse sand, little silt, gravel, clay, stump (2' x 6") BOE = 6'		
8			
10			
12			
14			
16			
18			
20			

T.P. DIMENSIONS

Width (ft):	4
Length (ft):	14
Depth (ft):	6
Vol (ft^3):	336

TEST PIT PLAN



Drum Quantity

Depth	Recovered	Trash
--	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

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Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- H-5
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	7/28 - 7/29/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

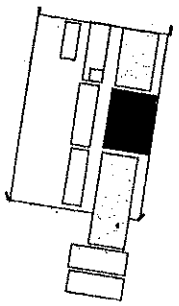
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Moist, brown, fine to coarse sand, little silt, clay, cobble		
4	Moist, brown fine to coarse sand, little silt Trash 20%: plastic & glass bottles, wood, paper		
6	Moist, brown/ gray fine to coarse sand, little silt, gravel; Trash : plastic bags, glass bottles, paper, leather; 7 TRASH DRUMS; RECOVERED DRUM: TP-27-H-5-1 thru -7		
8	Moist, brown/ gray/ black fine to coarse sand, little silt, gravel, cobbles, plastic bags, tires wood, glass, metal lid; 5 TRASH DRUMS; RECOVERED DRUMS: TP-27-H-8 thru -10		
10			
12	Trash 60 - 70%:		
14	+ 1 TRASH DRUM		
16	+ wood, cobbles, metal sheets		
18	+ blue/ black leather		
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	14
Length (ft):	25
Depth (ft):	20
Vol (ft^3):	7000

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Depth	Recovered	Trash
4 - 6'	7	7
6 - 8'	3	5
8 - 10'	0	1
12 - 14'	0	1

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- H-6
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	7/28/03 & 7/30/03
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

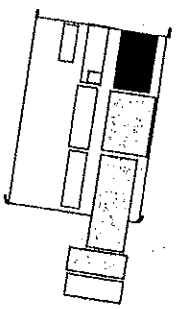
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	6" Topsoil; Bottom 18" Moist, brown/ dark brown, fine to coarse sand, little silt, gravel, cobbles, wood		
4	12" Topsoil; Bottom 12" Moist gray/ brown fine to coarse sand, little silt Trash: plastic bags, metal cans, glass bottles, amber large glassy solid material (~10 gal)		
6	RECOVERED DRUMS: TP-27-H-6-1 thru -2 RECOVERED DRUMS: TP-27-H-6-3 thru -5		
8	Moist, black/gray fine to coarse sand; Trash 60%: plastic bags, glass bottles, metal cans, wood;		
10	+ 1 TRASH DRUM		
12			
14			
16			
18			
20			

T.P. DIMENSIONS

Width (ft):	11
Length (ft):	21
Depth (ft):	20
Vol (ft^3):	4620

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Depth	Recovered	Trash
4- 6'	2	0
6 - 8'	3	0
8 - 10'	0	1
14 - 16'	0	1

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- H-7
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	7/30 - 7/31/03
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

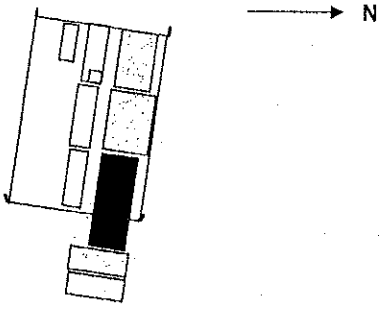
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	6" Topsoil; Bottom 18" Moist, brown cobbles, wood		
4	Moist gray/ brown fine to coarse sand, little silt Trash: plastic bags, wood, block asphalt for approximately 5'		
6			
8	Moist, brown fine to coarse sand, little silt, tar, cobbles, plastic pieces, 3 rubber tires RECOVERED DRUMS: TP-27-H-7-1		
10	RECOVERED DRUMS: TP-27-H-7-2 thru -7		
12			
14			
16			
18			
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	11
Length (ft):	33
Depth (ft):	20
Vol (ft^3):	7260

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Depth	Recovered	Trash
6 - 8'	1	2
8 - 10'	6	0

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

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Cambridge, MA 02135
(617) 452-6000

Test Pit Log

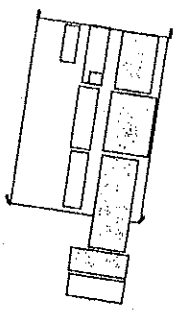
Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- H-8
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/5 - 8/7/03 & 8/11/03
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Moist , brown, fine to coarse sand, little silt, gravel, clay, cobbles, roots		
4	RECOVERED DRUM: TP-27-H-8-1 + 2" plastic piece, 1" boulder		
6	Moist, gray/ brown f/c sand, some clay, little silt, gravel, cobbles, rubber tires, metal drum lid, plastic bag, metal air tank, 1' diam cable, RECOVERED DRUM: TP-27-G-8-2 thru -8		
8	Moist, brown/ gray fine/ coarse sand, little clay, silt, gravel, cobbles RECOVERED DRUMS: TP-27-H-8-9 thru -16		
10	8 TRASH DRUMS Trash		
12			
14			
16			
18			
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	11
Length (ft):	21
Depth (ft):	20
Vol (ft^3):	4620

TEST PIT PLAN



Drum Quantity

Depth	Recovered	Trash
2 -4'	1	0
4 - 6'	7	8
6 - 8'	8	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

The depth of the drums is an estimate; based on observations, they did not extend beyond a depth of 10' in this test pit.
Information on the location of the test is not available.

CDM

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Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- H-9
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/11/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

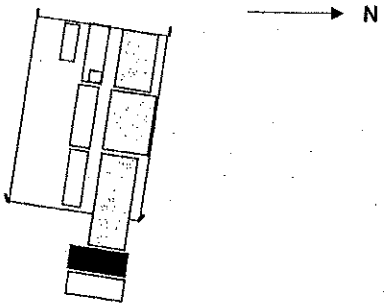
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Moist , brown, fine to coarse sand, little silt, gravel, clay, cobbles, roots		
4			
6	Moist, gray/ brown f/c sand, some clay, little silt, gravel, cobbles, rubber tires		
8	Moist, brown/ gray fine/ coarse sand, little clay, silt, gravel, cobbles		
10	RECOVERED DRUMS: TP-27-H-9-1 thru -3 4 TRASH DRUMS		
12	Trash; BOE = 12'		
14			
16			
18			
20			

T.P. DIMENSIONS

Width (ft):	6
Length (ft):	6
Depth (ft):	12
Vol (ft^3):	432

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Depth	Recovered	Trash
6-10'	3	4

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Based on observations trash drums were found at elevations ranging from 2 - 10'

CDM

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One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- H-10
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/12/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

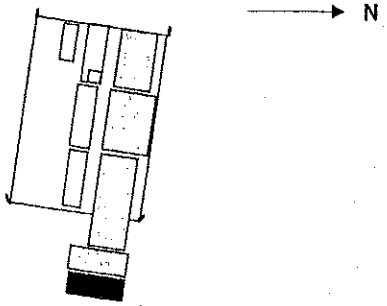
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Moist, brown, fine to coarse sand, little silt, gravel, clay, cobbles, wood, metal can boulders		
4			
6	Top 6", Moist brown/gray fine to coarse sand, some clay, little silt, cobbles, boulders Trash 30%: wood, plastic bags, fabric, metal pieces, glass bottles,		
8	+ blue leather, metal poles Trash 60%; BOE = 8'		
10			
12			
14			
16			
18			
20			

T.P. DIMENSIONS

Width (ft):	7
Length (ft):	8
Depth (ft):	8
Vol (ft^3):	448

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Depth	Recovered	Trash
--	0	0

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- I -1
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/12/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

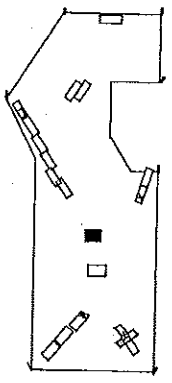
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2			
4			
6	OVM = 120		
8			
10			
12			
14			
16	TRASH DRUM		
18	RECOVERED DRUM: TP-27-I-1-1 Inaccessible drums observed		
20			

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	16
Vol (ft^3):	720

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Depth	Recovered	Trash
14'	0	1
16'	1	0

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

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One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

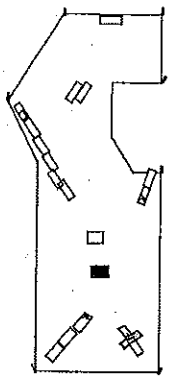
Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- I -2
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/13/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Gray fine - coarse sand, little silt, gravel, cobbles, clay		
4	Gray, cream and black fine to medium sand, some silt, little gravel, septic smell		
6	- rubber tire		
8	- metal can		
10	- boulders, concrete, blocks (1' to 3')		
12	TRASH DRUM		
14	- concrete pieces; RECOVERED DRUMS: TP-27-I-2-2; Label on lid		
16	RECOVERED DRUMS: TP-27-I-2-1 BOE = 16'		
18			
20			

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	16
Vol (ft^3):	720

TEST PIT PLAN



Drum Quantity

Depth	Recovered	Trash
10 - 12'	0	1
12 - 14'	2	0	

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

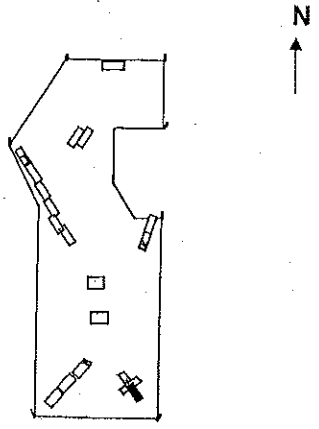
Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- I -3
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/15/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Brown and gray fine - coarse sand, little silt, gravel, cobbles, metal pieces		
4	Brown, gray, and black fine-coarse sand, little silt, rubber tire, metal screen, metal screen plastic cups and bags; Trash 30%; 2 TRASH DRUM		
6	Brown and gray fine- coarse sand, little silt, gravel, rubber tires , plastic bags, wood, metal tank		
8			
10	Black fine- coarse moist sand, plastic bags, shredded paper, plastic, metal wire, rubber tire Trash 75%		
12	Trash 80 - 90%		
14			
16			
18			
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	4
Length (ft):	20
Depth (ft):	20
Vol (ft^3):	1600

TEST PIT PLAN



Drum Quantity

Depth	Recovered	Trash
2 - 4'	0	2

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

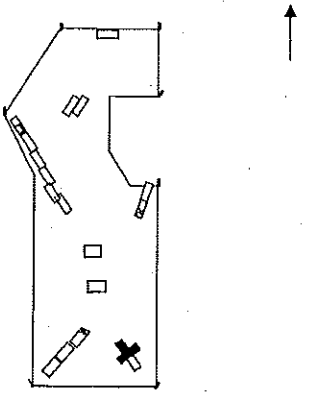
Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- I -4
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/15 and 8/18/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Brown and gray fine moist soil, little gravel		E
4	Tan and Brown fine-coarse moist soil, cobble; Drum Cover, rusted, no labels, no readings 2 TRASH DRUMS; RECOVERED DRUM: TP-27-I-4-1, TP-27-I-2, & TP-27-I-4-4		
6	Brown and black fine - coarse moist soil, boulders, wood, tires, cobble, asphalt (30%) LEL = 6 ppm, FID = 151 ppm; 2 TRASH DRUMS; RECOVERED DRUM: TP-27-I-4-3		M - D
8	Dark brown soil and Gray & tan fine - coarse moist soil, cobble, gravel, tires, Drum cover Trash 40 - 80%: tires, plastic bags, newspapers		
10	Brown fine - coarse moist soil Trash 80%		
12	Brown and gray fine soil Trash 80%		
14	Brown and black fine-coarse soil, Trash 80 - 90%		
16			
18	Black and brown fine- coarse moist soil Trash 90% : wood, cardboard, plastic bags, blue leather material, tires		
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	3 -10
Length (ft):	3 - 15
Depth (ft):	8 - 20
Vol (ft^3):	1100

TEST PIT PLAN



Drum Quantity

Depth	Recovered	Trash
2 - 4'	3	2
4 - 6'	1	2

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks: Test pit identified as southeast edge of drum pit area

Test pit 4 was excavated over two days and extended approx 3- 4 feet (east and west of the test pit) to a depth of 8 feet to investigate whether drums were in the side wall of the original test pit (approximately 3' wide and 15' long in a North- South dir'n)

CDM

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Test Pit Log

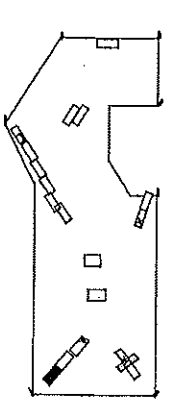
Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- I -5
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/19/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan and gray fine moist soil, cobble		E
4	black and brown fine-coarse moist soil, cobble		
6	Brown and tan fine - coarse moist soil, cobble		
8			
10			
12			
14	Brown and tan fine-coarse moist, soil , cobble Trash - 80%		
16	- tires, wood		
18			
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	20
Vol (ft^3):	900

TEST PIT PLAN



Drum Quantity

Depth	Recovered	Trash
--	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

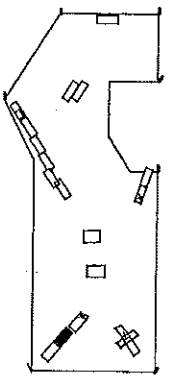
Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- I -6
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/19/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Gray fine moist soil, cobble, little silt		E
4	gray and brown fine-coarse moist soil, little silt, gravel		
6	Brown and tan fine - coarse moist soil, cobble, boulders		M - D
8			
10	- wood		
12			
14	Trash - 90%		
16	- white role of paper or insulation		
18			
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	20
Vol (ft^3):	900

TEST PIT PLAN



Drum Quantity

Depth	Recovered	Trash
--	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- I -7
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/19/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

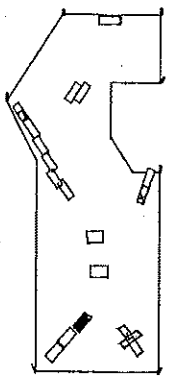
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Gray fine moist soil, cobble		E
4	gray and tan fine-coarse moist soil, gravel, cobble		
6	Brown and gray fine - coarse moist soil, boulders		M - D
8	Gray and tan fine - coarse moist soil, cobble gravel		
10			
12	1 TRASH DRUM DRUM RECOVERED: TP-27-I-7-1		
14	DRUM RECOVERED: TP-27-I-7-2		
16	DRUM RECOVERED: TP-27-I-7-3 55-gal drum in TP not recovered; no readings at surface; leather material, wood logs		
18	Brown and tan fine - coarse moist soil; Trash 40 -70% (PID = 20; LEL >10)		
20	Brown and black fine- coarse moist soil; Trash 70 - 80% BOE = 20'		M; D

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	20
Vol (ft^3):	900

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Depth	Recovered	Trash
10 - 12'	1	1
12 - 14'	1	0
14 - 16'	1	0

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Test pit identified as edge of drum pit area

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

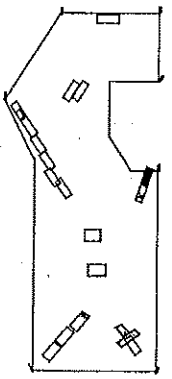
Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- I -8
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/20/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Light brown and tan fine - coarse moist soil, cobbles, gravel, clay		E
4	Brown and tan fine- coarse moist soil, cobble		
6	Brown and gray fine - coarse moist soil, boulders		
8	Gray and brown fine - coarse moist soil, clay, gravel		
10	Brown, black, and gray fine-coarse moist soil, cobble		
12			
14	- boulders, Trash 20%		
16	Brown soil some black; Trash 40% - blue-ish leather material ; drum cover; 3 TRASH DRUMS		
18	Brown and Black fine - coarse moist soil, boulders Trash 40%: leather material tires		
20	Brown and gray fine-coarse soil, moist, boulders BOE = 20'		M; D

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	20
Vol (ft^3):	900

TEST PIT PLAN



Drum Quantity

Depth	Recovered	Trash
14-16'	0	3

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- I -9
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/20/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

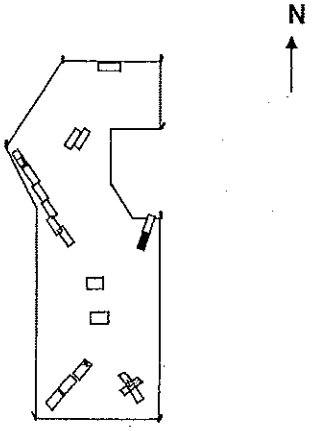
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Light brown fine- coarse, moist soil, cobble, boulder		E
4	Brown and gray, some tan fine -coarse moist soil, some gravel		
6	Brown fine -coarse moist soil		
8	Brown and tan fine - coarse soil, silty little cobble		
10	Gray, brown, and black fine- coarse moist soil		
12			
14			
16	Gray, brown, and black fine- coarse moist soil; Trash 40%: asphalt DRUM RECOVERED: TP-27-I-9-1; 3 TRASH DRUMS		D
18	55-gal drum, containing black liquid, observed in test pits (not removed) BOE = 15'		
20			

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	15
Vol (ft^3):	675

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Depth	Recovered	Trash
14-16'	1	3

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Oil absorbent booms were placed in the excavation before backfilling to prevent drum contents from migrating in excavation

CDM

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(617) 452-6000

Test Pit Log

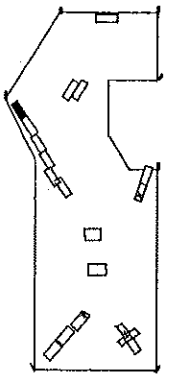
Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- I -10
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/21/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Light brown fine- coarse, moist soil, cobble, boulder		E
4	Gray and black fine -medium moist soil, some gravel		
6	Gray and light brown fine -coarse moist soil		
8	Gray and Brown fine - coarse soil boulders		
10	Gray, brown, and black fine- coarse moist soil		
12			
14	Gray, brown, and black fine- coarse moist soil (septic odor LE >12)		
16			
18			
20	DRUM RECOVERED: TP-27-I-10-1 Brown and black moist soil, cobble; trash 20% BOE = 20'		M; D

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	20
Vol (ft^3):	900

TEST PIT PLAN



Drum Quantity

Depth	Recovered	Trash
18- 19'	1	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- I -11
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/21/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

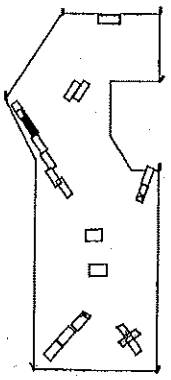
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Light brown and tan, fine- coarse, moist soil, cobble, boulder		
4	Gray and tan fine -coarse moist soil, clay, some cobble		
6	Gray and tan fine -coarse moist soil, cobble, sludge		
8			
10	Gray and black fine- coarse moist soil, cobble		
12			
14			
16			
18			
20	- brick BOE = 20'		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	20
Vol (ft^3):	900

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Depth	Recovered	Trash
--	0	0

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

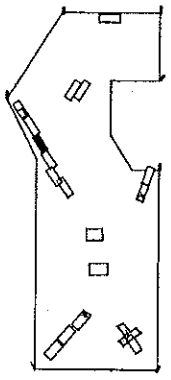
Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- i -12
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/21/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Light brown and tan, fine- coarse, moist soil, cobble, boulder		
4	Gray and tan fine -coarse moist soil, clay, some cobble		
6	Gray and brown fine -coarse moist soil, cobble, sludge		
8			
10			
12			
14			
16			
18			
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	20
Vol (ft^3):	900

TEST PIT PLAN



Drum Quantity

Depth	Recovered	Trash
--	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- I -13
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/21/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

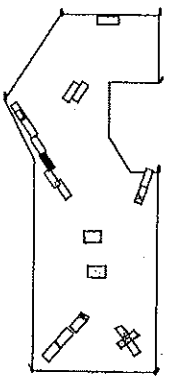
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan and brown, fine- coarse, moist soil, little silt, some clay, cobble		
4	Brown and black fine -coarse soil, little silty, some cobble		
6	Brown and gray fine -coarse soil, silty		
8			
10			
12			
14	Gray and brown fine- coarse soil, little silty 1 TRASH DRUM		
16	Trash 20%		
18			
20	Liquid encountered; possible drum rims observed on side wall; liquid, yellow, glue-like; BOE ≈ 20'		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	20
Vol (ft^3):	900

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Depth	Recovered	Trash
12 - 14'	0	1

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No:	TP-27- I -14
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/22/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

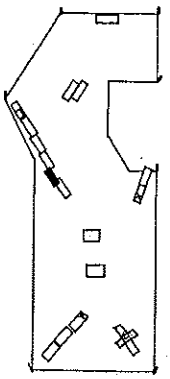
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan and brown, fine- coarse, moist soil, little silt, some clay, cobble		
4	Brown and tan fine -coarse soil, silty, some cobble		
6	Brown and tan with some gray fine -coarse soil, silty, some cobble		
8	Brown and gray, silty soil, boulders		
10			
12			
14	wood, boulders		
16	Trash 20%		
18			
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	20
Vol (ft^3):	900

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Depth	Recovered	Trash
--	0	0

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- I -15
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/22/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

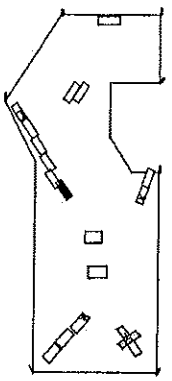
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan and brown, fine- coarse, moist soil, little silt, some clay, cobble		
4	Brown and tan fine -coarse soil, silty, some cobble		
6			
8	Brown, black, and gray, some tan silty soil, boulders		
10			
12	- metal bumper		
14	Brown and tan fine -coarse soil, silty, concrete blocks		
16			
18			
20	Trash 40%; RECOVERED DRUM; TP-27-I-15-1 BOE = 20'		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	20
Vol (ft^3):	900

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Depth	Recovered	Trash
18 - 20'	1	0

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- I -16
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/25/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

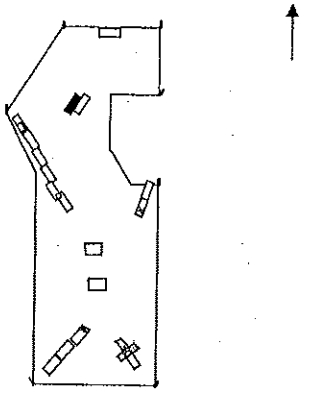
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan and brown, fine- coarse, moist soil, some clay, cobble, brick, roots		
4	Gray and tan fine -coarse dry soil and large boulders		
6			
8	- stream of water BOE = 8'		
10			
12			
14			
16			
18			
20			

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	8
Vol (ft^3):	360

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Depth	Recovered	Trash
--	0	0

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

Excavation stopped because water was entering the excavation

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- I-17
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/25/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

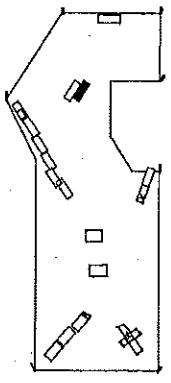
DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan and brown, fine- coarse, moist soil, some clay, cobble, brick, roots		
4	Gray and tan fine -coarse dry soil, cobble, brick, boulders		
6	Gray, black, and tan fine-coarse, moist soil, cobble, glass, brick 1 TRASH DRUM		
8	Gray, black, and tan fine-coarse, moist soil, some clay, cobble, glass, brick 1 TRASH DRUM		
10	Gray, black, and tan fine-coarse, moist soil, some clay, cobble, glass, brick 1 TRASH DRUM; Trash 10%: metal bumper, metal frame		
12	Gray, black, and tan fine-coarse, moist soil, some clay, cobble, glass, brick Trash 10%: metal post		
14	1 TRASH DRUM Trash 20 - 40%		
16	Trash 30 - 40%: tires, trash black in color (possible oil residue)		
18	Trash 40 - 70%		
20	BOE = 20'; Trash 70 - 90%: leather material; trash, black in color, tires, metal post		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	20
Vol (ft^3):	900

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT PLAN



Drum Quantity

Depth	Recovered	Trash
4 - 6'	0	1
6 - 8'	0	1
8 - 10'	0	1
12 - 14'	0	1

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

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One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

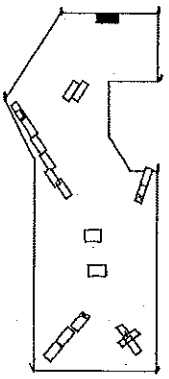
Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- I-18
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Kimberly White
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	8/25/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Tan and brown, fine, dry soil, gravel		
4	Gray and Tan fine -coarse dry soil, cobble, brick, boulders		
6	1 TRASH DRUM Trash - tires, leather material		
8	4 TRASH DRUMS		
10	Gray and Tan fine -coarse saturated soil, cobble, brick, boulders Trash 10%: smashed metal cans; OVM = 7-10, LEL =4		
12	Trash 20 - 40%: blue, leather material		
14	Trash 20 - 40%: metal post, blue, leather material		
16	Trash 40 - 60%		
18	Trash 60 - 70%		
20	BOE = 20'; Trash 70 - 80%		

T.P. DIMENSIONS

Width (ft):	3
Length (ft):	15
Depth (ft):	20
Vol (ft^3):	900

TEST PIT PLAN



Drum Quantity

Depth	Recovered	Trash
4 - 6'	0	1
6 - 8'	0	4

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- J-1
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	7/23/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Top 6" Wet, dark brown, fine to coarse sand, little silt, gravel, cobbles, roots Bottom 18" Moist brown , fine to coarse sand, little silt, clay, gravel, rubber cable		
4	Moist brown, fine to coarse sand, silt, gravel, clay, trace cobbles Moist., black, fine to coarse sand, little silt, clay, gravel, wood, rubber cable		
6	Moist., black, fine to coarse sand, little silt, gravel, 1.5' boulder plastic pieces, plastic bags, rubber tire		
8	Moist, black to gray, fine to coarse sand, little silt, wood, plastic bags, glass bottles, Trash 50 %: plastic botties, paper, fabric metal cans, metal rods, (1' - 2'), timber		
10	+ 2 plastic pipes (5' to 7'length; 1"- 2" diam.)		
12	Trash 80%: + 2 rubber tires brick, metal sheets (2'), cork boards		
14	+ 3 rubber tires, white metal box, metal sheets (possible washing machine), metal cylindrical tank, 3' stump		
16	2 white cylindrical metal tanks, metal sheets, metal plates, 2 rubber tires		
18	+ leather , metal rods,		
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	5
Length (ft):	22
Depth (ft):	20
Vol (ft^3):	2200

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
--	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- J-2
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	7/23/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
	Top 6"Topsoil		
2	Bottom 18" Moist brown , fine to coarse sand, little silt, clay, gravel		
	Moist brown, fine to coarse sand, silt, gravel, clay		
4	Moist, gray/ black/ brown, fine to coarse sand, little silt, clay, gravel, wood, rubber cable		
	Moist., black to gray fine to coarse sand, little silt, gravel, wood		
6	glass bottles, black plastic cables, plastic bags, rubber tire, cloth, metal cans & rods		
	Trash 50%; metal mesh (3' x 2')		
8			
	Trash 80%: + 5' timber		
10			
	+ boulder, metal rods, metal sheets, LEL readings		
12			
	+ newspaper (dated 1909)		
14			
	+ metal rods & sheets, bucket full of leather (blue to dark blue)		
16			
	+ metal ; two 6' water hear		
18			
20	BOE = 20'		

TEST PIT PLAN

T.P. DIMENSIONS

Width (ft):	5
Length (ft):	21
Depth (ft):	20
Vol (ft^3):	2100

Drum Quantity

Elevation	Recovered	Trash
---	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- J-3
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	7/23/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
	Top 6"Topsoil		
2	Bottom 18" Moist brown/ light brown/ yellow, fine to coarse sand, little silt, clay, gravel		
	Moist brown, fine to coarse sand, silt, clay		
4	Moist, gray/ black, fine to coarse sand, little silt, clay		
	Moist., black to gray fine to coarse sand, little silt, gravel, wood		
6	Trash 10% wood, plastic pieces, small metal rods,		
	Moist, gray/ black fine to coarse sand, little silt, wood, rubber tire, brick, timber, plastic		
8	bags, white metal air tank (4' x 2' diam), few glass bottles		
	Moist, gray/ black, fine to coarse sand, little silt, gravel, wood, metal sheets, fabric, rubber		
10	tire, few glass bottles,1' boulder		
	+ hay, metal plate (2' x 4'), LEL readings, tar (3 sec), blue to dark blue leather,		
12	metal scrap, rubber tire		
	+ black metal cylindrical tank, crushed (2' x 2'); rubber tires, blue leather		
14			
	+ more plastic bags, paper, cardboard boxes		
16			
18			
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	5
Length (ft):	22
Depth (ft):	20
Vol (ft^3):	2200

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
--	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- J-4
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	7/23/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
	Top 6"Topsoil		
2	Moist brown/ light brown/ yellow, fine to coarse sand, little silt, clay, gravel		
	Moist, brown/ gray/ black, fine to coarse sand, little silt, gravel, clay		
4	Trash 3%: glass pieces, metal wire, 2 metal rods, metal cans		
	Moist., black/ brown/ gray fine to coarse sand, little silt, gravel, wood		
6	plastic bags, timber, metal cans, paper		
	Trash 30%: metal springs, timber, logs, metal plate 2', rubber wiring& tires		
8			
	+ blue leather (1 bucket full)		
10			
	Trash 60%: white, metal box - 5' x4' (possible washing machine)		
12			
	Trash 80%: metal plate		
14			
	+ blue leather		
16			
	+ rubber tires		
18			
	+ blue leather		
20	BOE = 20'		

T.P. DIMENSIONS

Width (ft):	5
Length (ft):	23
Depth (ft):	20
Vol (ft^3):	2300

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
--	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- J-5
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	N/A	Date:	7/23/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
	Top 6"Topsoil		
2	Moist brown/ light brown, fine to coarse sand, little silt, clay, gravel		
4	Moist, brown/ gray/ black, fine to coarse sand, little silt, gravel, clay		
6	Moist., black/ brown/ gray fine to coarse sand, little silt, gravel Trash: plastic bags, clothes, rubber tire, wood; 1 TRASH DRUM		
8	Moist, black/ gray/ dark brown, fine to coarse, sand, little silt, gravel, cobbles, two 1' boulder Trash 30%: wood, glass bottles, metal cans, cloth		
10	+ white and blue confetti		
12	Trash 80%: rubber tire, glass, plastic, wood metal plate (2' x 6'), gray metal sheets		
14	+ plastic 3' pale; metal tire rim, 2 rubber tires, metal box (4' x 4')		
16	+ white metal plates (3' x 4'), tire, metal springs, metal rim, metal cylindrical water heater 3 rubber tires, black timber, blue leather		
18	+ white cylindrical metal- 4' x 2' diam. (water heater), plywood, hay		
20	+ blue leather (2 buckets full) BOE = 20'		

T.P. DIMENSIONS

Width (ft):	5
Length (ft):	21
Depth (ft):	20
Vol (ft^3):	2100

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
4- 6'	0	1

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- L -1
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	14'	Date:	7/18/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Moist, brown, fine to coarse sand, little silt, clay, gravel Trash 2%: brown plastic bottle, wood, roots, glass bottle		
4	Moist, brown fine to coarse sand, little silt, gravel, clay Trash 2%: glass bottle, wood		
6	Moist, brown, fine to coarse, little silt, gravel Trash 40%: plastic bags, glass bottles, metal rod, metal sheet, broken glass bottles		
8	Trash 60%: rubber tire, metal rod (4')		
10	1 TRASH DRUM		
12	Moist, gray/ black fine sand and silt, little clay, newspaper Trash 80%: plastic bags, bottles, glass bottles, broken glass, metal & rods, clothes		
14	groundwater; BOE = 14'		
16			
18			
20			

T.P. DIMENSIONS

Width (ft):	6
Length (ft):	20
Depth (ft):	14
Vol (ft^3):	1680

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
8 - 10'	0	1

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- L -2
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	13'	Date:	7/18/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Moist, brown, fine to coarse sand, little silt, gravel Trash 25 - 30%: plastic bags, glass bottles & jars, roots, 1 TRASH DRUM		
4	Moist, brown fine to coarse sand, little silt, gravel, Trash 50%: plastic, clothes, glass bottles, wood, paper, broken glass, plastic lids		
6	+ metal rods, shoe leathers, gray sand		
8	+ rubber tire, timber		
10	Moist, black, fine to coarse sand, little silt, gravel, cobbles, wood bottles (glass & plastic), plastic bags, bricks, tar, stump, timber (5'), red rope, metal sheets		
12	+ clothing catalog (not dated)		
14	groundwater; BOE = 13'		
16			
18			
20			

T.P. DIMENSIONS

Width (ft):	6
Length (ft):	20
Depth (ft):	13
Vol (ft^3):	1560

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
0 -2'	0	1

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM

50 Hampshire Street
One Cambridge Place
Cambridge, MA 02135
(617) 452-6000

Test Pit Log

Client:	City of Haverhill	Contractor:	TFORD	Test Pit No.	TP-27- L -3
Project Name:	Hot Spot Investigation	Equipment:	Excavator	Logged By:	Murat Yavuz
Project Location:	Haverhill, MA	Depth to Water:	12'	Date:	7/18/2003
Project Number:	0522-37609	Ground Surface EL:		Page:	1 of 1

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
2	Moist, brown, fine to coarse sand, little silt, gravel, roots Trash 25 - 30%: plastic bags, glass bottles		
4	Trash 50% Metal box, metal rods, roll of black leather (5'); shoe leather (cream), bricks		
6	Trash 50%		
8	Moist, black, fine to coarse, sand, little silt, gravel, cobbles, plastic bags, plastic bottles timber, glass bottles & jars, leather, bricks, metal rods, metal sheets, clothes metal plate		
10	drum / barrel (possible oil tank) - filled with water		
12	groundwater; BOE = 12'		
14			
16			
18			
20			

T.P. DIMENSIONS

Width (ft):	6
Length (ft):	20
Depth (ft):	12
Vol (ft^3):	1440

TEST PIT PLAN

Drum Quantity

Elevation	Recovered	Trash
---	0	0

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

EXCAVATION EFFORT

E : Easy
M : Moderate
D : Difficult

Remarks:

CDM Camp Dresser & McKee Inc.

consulting engineering construction operations

One Cambridge Place
50 Hampshire Street
Cambridge, Massachusetts 02139
Tel: 617 452-6000 Fax: 617 452-8000

November 1, 2000

Mr. Edward MacDonald
Regional Engineer for Waste Prevention
Northeast Regional Office
Department of Environmental Protection
205A Lowell Street
Wilmington, Massachusetts 01887

Subject: Summary of Test Pitting Activities
Haverhill Landfill, Old Groveland Road
Haverhill, Massachusetts
Transmittal # W007058, FMF # 39347

Dear Mr. MacDonald:

Camp Dresser & McKee Inc. (CDM) conducted test pits on June 12-14, 2000 at the Haverhill Landfill. The test pitting was performed to determine if waste exists on the adjacent private properties to the east and west of the landfill. The attached Figure 1 illustrates the property lines adjacent to the landfill (figure taken from the July 1999 Initial Site Assessment (ISA)). The parcel to the east of the landfill is currently owned by Aggregate Industries (formerly Bardon Trimount Products Company). There are two parcels to the west of the landfill currently owned by: 1) Sons of Divine Providence, and 2) National Grid, formerly known as Massachusetts Electric Co. Test pits to the south of the landfill were not necessary since they were performed as part of the Assessment and Interim Remediation of Migrating Landfill Gas program conducted in 1992 and 1993. Based on visual observations during site visits in 1999, it is assumed waste extends to the Merrimack River to the north.

Test pitting was performed by Geo Logic, Inc. as witnessed by Jennifer Rogers (CDM) on June 12 and 14, 2000, and by Vincent Recchia (CDM) on June 13, 2000. As illustrated on the attached Site Plan, thirteen (13) test pits (TP-00-1 through TP-00-11, TP-00-27, and TP-00-28) were excavated on the western side of the landfill, and eighteen (18) test pits (TP-00-12 through TP-00-26, including TP-00-21A, and TP-00-29 and TP-00-30) were excavated on the eastern side of the landfill. On the attached site plan, each test pit location is illustrated. The test pits are identified by different symbols to indicate the contents of each test pit. Test pit symbols designate areas of no waste, edge of waste or waste. An approximate waste limit is shown.

Test pit logs describing the contents of each test pit are attached. CDM recorded the contents of the test pits through photographs.

The general materials are classified as follows:

- Native Soils – All natural soils with no debris or refuse.

- Construction Debris – Fill containing one or more of the following: brick, concrete, pipe, metal, logs, boards, vinyl, etc.

- Solid Waste – Fill containing cloth, plastic, glass, or other municipal waste materials.

The results of the test pitting indicate that the solid waste is generally limited to the assumed landfill area, including Lots 20, 21, 24, and 27. Some construction debris was found in the northwestern corner of Lot 26. Based on the topography of the portion of the National Grid property adjacent to Lot 20, it is assumed that solid waste exists on a portion of the National Grid property. Due to difficulties associated with thick vegetation, soft ground, and variable topography, test pits were not performed along the western edge of Lot 27, adjacent to Lot 14A. However, based on visual observation during site visits conducted in 1999, and on June 14, 2000, it is assumed that waste exists in this area and likely extends onto the southeastern portion of Lot 14A.

Two power lines are buried side-by-side from the very northwestern corner of Lot 20, across Lot 1AA, along the southeastern edge of Lot 14A toward the National Grid substation, and finally, north from the substation toward the Merrimack River where the lines cross beneath the river. The buried power lines are approximated on the attached Site Plan. National Grid is currently checking their files for any reports of waste found during the installation of the buried lines.

Please note that additional test pitting may be conducted as part of the Comprehensive Site Assessment (CSA) to further delineate the waste areas. The work is scheduled for the end of 2000 through 2001.

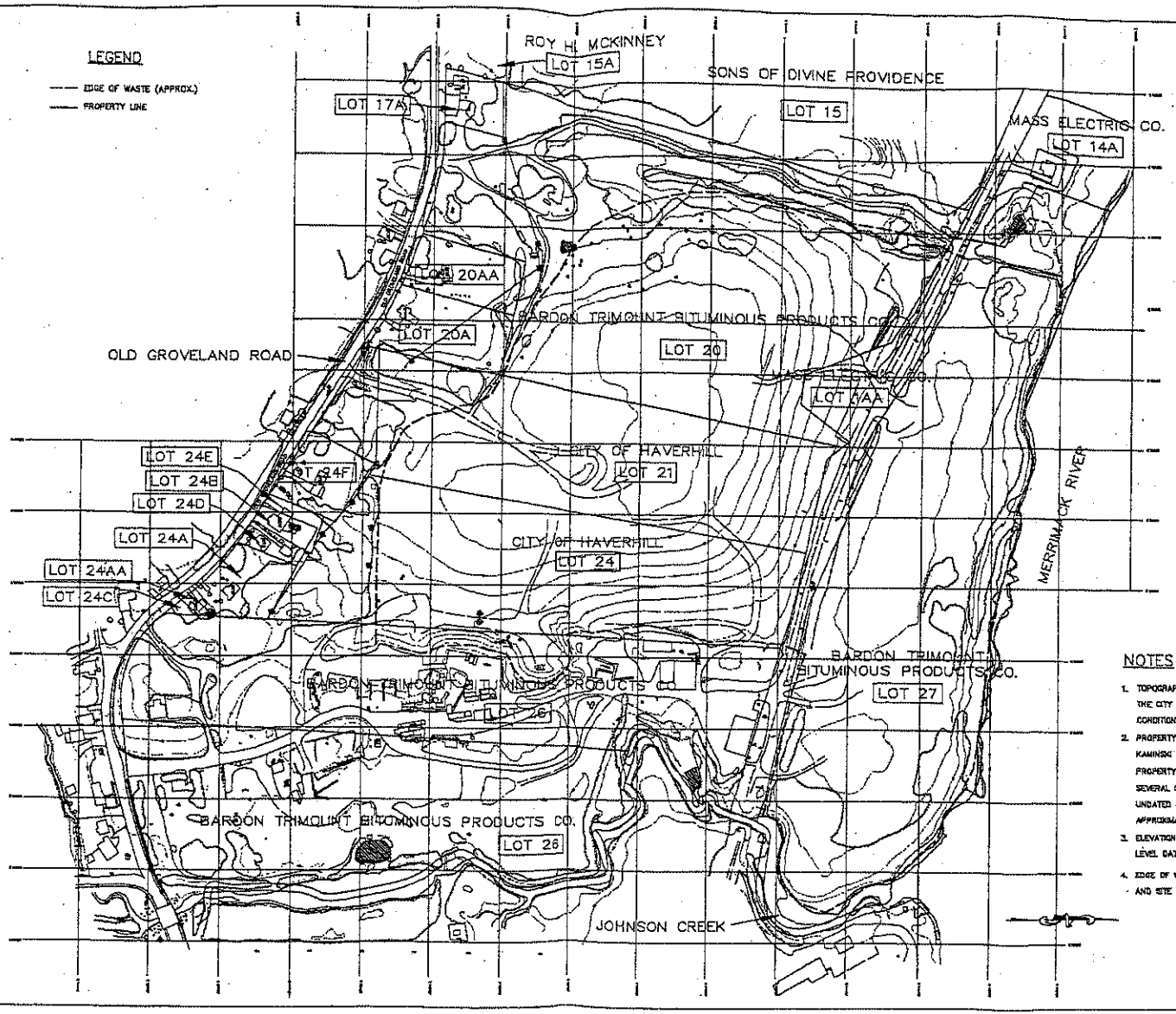
Please contact me at (617) 452-6000 if you have any questions.

Very truly yours,

CAMP DRESSER & McKEE INC.

Todd M. Heino, P.E.

cc: Michael Rostkowski, DEP
Robert Brown, DEP
William Pauk, Haverhill
Michael Leon, Esq.
David Peter, Aggregate Industries
Craig Campbell, Esq.
B. Haskell, J. Rogers, CDM



NOTES

1. TOPOGRAPHIC PLAN PREPARED BY EASTERN TOPOGRAPHICS FOR THE CITY OF HAVERHILL AND REFLECTS EXISTING GROUND CONDITIONS ON APRIL 13, 1992.
2. PROPERTY SURVEY FIELD SURVEY CONDUCTED BY RICHARD F. KAMINSKI & ASSOCIATES, INC., LAWRENCE, MASSACHUSETTS. PROPERTY LINE PLAN PREPARED ON NOVEMBER 16, 1992. SEVERAL OF THE PROPERTY LINES WERE DEVELOPED FROM AN UNDATED CITY ASSESSOR'S MAP AND THE PROPERTY LINES ARE APPROXIMATE.
3. ELEVATION DATUM IS BASED ON THE MEAN SEA LEVEL DATUM (MSL).
4. EDGE OF WASTE BASED ON PREVIOUS INVESTIGATIONS AND SITE VISITS.

1" = 300'

150 0 300

CDM
environmental engineers, scientists, planners, & management consultants

HAVERHILL LANDFILL
HAVERHILL MASSACHUSETTS

PROPERTY LINES

Figure No. 1

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-1
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Delineation
PROJECT # : 0522-23691
DEPTH TO WATER :
LOG PREPARED BY : J. Rogers

APPROXIMATE G.S. : N/A
DATE : 6/12/2000
CONTRACTOR : Geo Logic, Inc.
EQUIPMENT: Caterpiller 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Topsoil/vegetation		
2	Uniform in color brown, moist, fine to medium sand and silt, trace organics clean	Natural Soil	
3			
4			
5			
6	B.O.E. @ 5 ft		
7			
8			
9			
10			
11			
12			
13			

REMARKS

No waste.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-2
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Delineation
PROJECT # : 0522-23691
DEPTH TO WATER :
LOG PREPARED BY : J. Rogers

APPROXIMATE G.S. : N/A
DATE : 6/12/2000
CONTRACTOR : Geo Logic, Inc.
EQUIPMENT: Caterpiller 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Topsoil/vegetation		
2	Medium brown fine to coarse sand and little gravel, little silt, roots	Natural Soil	
3			
4			
5			
6	B.O.E. @ 5 ft		
7			
8			
9			
10			
11			
12			
13			

REMARKS

Test pit located between two large approx. 8 foot diameter steel pieces of conduit, above ground.
No waste.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-3
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Delineation
PROJECT # : 0522-23691
DEPTH TO WATER :
LOG PREPARED BY : J. Rogers

APPROXIMATE G.S. : N/A
DATE : 6/12/2000
CONTRACTOR : Geo Logic, Inc.
EQUIPMENT: Caterpiller 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1–5	Fine to coarse sand and gravel (1" to 2" fairly uniform) No evidence of any waste	Clean Soil	
6–13	B.O.E. @ 5 ft		

REMARKS

Test pit dug into elevated area with a gravel pile appearance although very overgrown.
No waste.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-4
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Delineation
PROJECT # : 0522-23691
DEPTH TO WATER :
LOG PREPARED BY : J. Rogers

APPROXIMATE G.S. : N/A
DATE : 6/12/2000
CONTRACTOR : Geo Logic, Inc.
EQUIPMENT: Caterpiller 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Topsoil/dark brown/organics/vegetation		
2	Dark to medium brown, wet, fine to medium sand and silt, trace organics clean	Natural Soil	
3			
4			
5			
6	B.O.E. @ 5 ft		
7			
8			
9			
10			
11			
12			
13			

REMARKS

Adjacent to stream/wetland area.
No waste.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-5
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Delineation
PROJECT # : 0522-23691
DEPTH TO WATER :
LOG PREPARED BY : J. Rogers

APPROXIMATE G.S. : N/A
DATE : 6/12/2000
CONTRACTOR : Geo Logic, Inc.
EQUIPMENT: Caterpiller 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Topsoil/organics/no low vegetation/trees		
2	trace broken glass, large pieces of plastic - possibly wind blown from landfill	Trace Waste	
3	Dark brown fine to coarse sand	Clean Soil	
4			
5			
6	B.O.E. @ 5 ft		
7			
8			
9			
10			
11			
12			
13			

REMARKS

Test pit dug into side of elevated ground - steep sloping berm appearance.
Very overgrown.
See test pit #28 for adjacent test pit dug at base of elevated ground.
Moved next test pit approx. 20 feet to verify composition of berm.
No waste.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-6
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Delineation
PROJECT # : 0522-23691
DEPTH TO WATER :
LOG PREPARED BY : J. Rogers

APPROXIMATE G.S. : N/A
DATE : 6/12/2000
CONTRACTOR : Geo Logic, Inc.
EQUIPMENT: Caterpiller 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Topsoil/organics/no low vegetation/trees		
2	trace broken glass, large pieces of plastic - possibly wind blown from landfill	Trace Waste	
3	Dark brown fine to coarse sand	Clean Soil	
4			
5			
6	B.O.E. @ 5 ft		
7			
8			
9			
10			
11			
12			
13			

REMARKS

Test pit dug into side of elevated ground - steep sloping berm appearance.
Very overgrown.
Test pit similar to previous test pit #5.
No waste.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-7
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Delineation
PROJECT # : 0522-23691
DEPTH TO WATER :
LOG PREPARED BY : J. Rogers

APPROXIMATE G.S. : N/A
DATE : 6/12/2000
CONTRACTOR : Geo Logic, Inc.
EQUIPMENT: Caterpiller 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Topsoil/vegetation		
2	Medium brown fine to coarse sand and little gravel, little silt	Natural Soil	
3			
4			
5			
6	B.O.E. @ 5 ft		
7			
8			
9			
10			
11			
12			
13			

REMARKS

No waste.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-8
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Delineation
PROJECT # : 0522-23691
DEPTH TO WATER :
LOG PREPARED BY : J. Rogers

APPROXIMATE G.S. : N/A
DATE : 6/12/2000
CONTRACTOR : Geo Logic, Inc.
EQUIPMENT: Caterpiller 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Topsoil/vegetation		
2	Medium brown fine to coarse sand and little gravel (1" to 4"), little silt Trace boulders (1')	Natural Soil	
3			
4			
5			
6	B.O.E. @ 5 ft		
7			
8			
9			
10			
11			
12			
13			

REMARKS

No waste.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-9
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Delineation
PROJECT # : 0522-23691
DEPTH TO WATER :
LOG PREPARED BY : J. Rogers

APPROXIMATE G.S. : N/A
DATE : 6/12/2000
CONTRACTOR : Geo Logic, Inc.
EQUIPMENT: Caterpiller 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Topsoil/Vegetation	Clean Soil	
2–7	Brown sand mixed with plastics and glass	Waste	
8–13	B.O.E. @ 7 ft		

REMARKS

Moved next test pit further down slope.
Waste.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-10
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Delineation
PROJECT # : 0522-23691
DEPTH TO WATER :
LOG PREPARED BY : J. Rogers

APPROXIMATE G.S. : N/A
DATE : 6/12/2000
CONTRACTOR : Geo Logic, Inc.
EQUIPMENT: Caterpiller 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Topsoil/Vegetation	Clean Soil	
2	Dark brown to dark gray sand mixed mainly with plastics	Waste	
3			
4			
5	There does not appear to be much waste below 5 feet		
6			
7	B.O.E. @ 6 ft		
8			
9			
10			
11			
12			
13			

REMARKS

Abandoned test pit as water was entering pit quickly.
Approximately 2 to 3 feet west of test pit, slope drops quickly toward wetland and stream.
Waste.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-11
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Delineation
PROJECT # : 0522-23691
DEPTH TO WATER :
LOG PREPARED BY : J. Rogers

APPROXIMATE G.S. : N/A
DATE : 6/12/2000
CONTRACTOR : Geo Logic, Inc.
EQUIPMENT: Caterpiller 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Topsoil/vegetation		
2	Medium brown fine to coarse sand, trace gravel (1" to 4"), little silt	Natural Soil	
3			
4			
5			
6			
7			
8			
9	B.O.E. @ 8 ft		
10			
11			
12			
13			

REMARKS

Test pit adjacent to wetland/stream/near culvert.
No waste.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-12
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Determination
PROJECT # : 0522-26391
DEPTH TO WATER : N/A
LOG PREPARED BY : Vin Recchia

APPROXIMATE G.S. : N/A
DATE : 6/13/2000
CONTRACTOR : Geologic Exploration
EQUIPMENT: Caterpillar 311Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Vegetated Topsoil		
	Topsoil		
2	Compacted topsoil and gravel	Clean Soil	
3			
4			
5			
6			
7			
8			
9			
10	Topsoil/gravel and waste (40%-50%)	Waste	
11			
12	Bottom of excavation		
13			

REMARKS

Bottom of excavation does not necessarily represent the bottom of waste.
Waste.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-13
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Determination
PROJECT # : 0522-26391
DEPTH TO WATER : N/A
LOG PREPARED BY : Vin Recchia

APPROXIMATE G.S. : N/A
DATE : 6/13/2000
CONTRACTOR : Geologic Exploration
EQUIPMENT: Caterpillar 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Gravel		
2	Fine, clean sand	Clean Soil	
3			
4			
5			
6			
7			
8			
9			
10			
11			
12	Bottom of excavation		
13			

REMARKS

No waste.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-14
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Determination
PROJECT # : 0522-26391
DEPTH TO WATER : N/A
LOG PREPARED BY : Vin Recchia

APPROXIMATE G.S. : N/A
DATE : 6/13/2000
CONTRACTOR : Geologic Exploration
EQUIPMENT: Caterpillar 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Gravel		
2	Fine sands, some staining	Clean Soil	
3			
4			
5			
6			
7			
8			
9			
10	Bottom of excavation		
11			
12			
13			

REMARKS

No waste.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-15
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Determination
PROJECT # : 0522-26391
DEPTH TO WATER : N/A
LOG PREPARED BY : Vin Recchia

APPROXIMATE G.S. : N/A
DATE : 6/13/2000
CONTRACTOR : Geologic Exploration
EQUIPMENT: Caterpillar 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Strong gravel/asphalt		
2	Fine sands, some staining	Clean Soil	
3			
4			
5			
6			
7			
8			
9	Fine silts		
10	Bottom of excavation		
11			
12			
13			

REMARKS

No waste.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-16
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Determination
PROJECT # : 0522-26391
DEPTH TO WATER : 11'
LOG PREPARED BY : Vin Recchia

APPROXIMATE G.S. : N/A
DATE : 6/13/00
CONTRACTOR : Geologic Exploration
EQUIPMENT: Caterpillar 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Vegetated topsoil		
2	Fine gravel with dark organics		
3			
4			
5			
6			
7			
8			
9			
10			
11	▽ Bottom of excavation		
12			
13			

REMARKS

A couple of stray pieces, no waste.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-17
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Determination
PROJECT # : 0522-26391
DEPTH TO WATER : 2'
LOG PREPARED BY : Vin Recchia

APPROXIMATE G.S. : N/A
DATE : 6/13/2000
CONTRACTOR : Geologic Exploration
EQUIPMENT: Caterpillar 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Vegetated topsoil	Clean Soil	
2	▽ Bottom of excavation		
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			

REMARKS

Groundwater encountered 2' below grade. Test pit was quickly filling up with water.
No waste.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-18
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Determination
PROJECT # : 0522-26391
DEPTH TO WATER : N/A
LOG PREPARED BY : Vin Recchia

APPROXIMATE G.S. : N/A
DATE : 6/13/2000
CONTRACTOR : Geologic Exploration
EQUIPMENT: Caterpillar 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Vegetated topsoil		
2	Brown clean gravel	Clean Soil	
3			
4			
5			
6			
7			
8			
9			
10			
11	Natural soils		
12			
13	Bottom of excavation		

REMARKS

No waste.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-19
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Determination
PROJECT # : 0522-26391
DEPTH TO WATER : N/A
LOG PREPARED BY : Vin Recchia

APPROXIMATE G.S. : N/A
DATE : 6/13/2000
CONTRACTOR : Geologic Exploration
EQUIPMENT: Caterpillar 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Gravel		
2	Fine, dry sands, slight staining	Clean Soil	
3			
4			
5			
6			
7			
8			
9			
10			
11	Bottom of excavation		
12			
13			

REMARKS

No waste.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-20
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Determination
PROJECT # : 0522-26391
DEPTH TO WATER : N/A
LOG PREPARED BY : Vin Recchia

APPROXIMATE G.S. : N/A
DATE : 6/13/2000
CONTRACTOR : Geologic Exploration
EQUIPMENT: Caterpillar 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Dark, black gravel		
2	Brown gravel		
3	Fine, dry, light sand, slight staining	Clean Soil	
4			
5			
6			
7			
8			
9			
10			
11			
12	Bottom of excavation		
13			

REMARKS

No waste.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-21
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Delineation
PROJECT # : 0522-23691
DEPTH TO WATER :
LOG PREPARED BY : J. Rogers

APPROXIMATE G.S. : N/A
DATE : 6/14/2000
CONTRACTOR : Geo Logic, Inc.
EQUIPMENT: Caterpiller 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Topsoil/Vegetation		
2–5	Brown fine to coarse sand	Clean Soil	
6–10	Dark stained fine to coarse sand, little brick residue, little broken glass, two (2) large (approx. 2 ft by 4 ft) pieces of metal (canister-like) small amount of water entering test pit	Construction Debris	
11–13	B.O.E. @ 10 ft		

REMARKS

Moved next test pit further down landfill slope.
Waste(construction debris).

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-21A
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Delineation
PROJECT # : 0522-23691
DEPTH TO WATER :
LOG PREPARED BY : J. Rogers

APPROXIMATE G.S. : N/A
DATE : 6/14/2000
CONTRACTOR : Geo Logic, Inc.
EQUIPMENT: Caterpiller 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Topsoil/Vegetation		
2–4	Brown fine to coarse sand	Clean Soil	
5–6	Brown sand mixed with plastics and glass	Waste	
7–13	B.O.E. @ 6 ft		

REMARKS

Moved next test pit further down landfill slope.
Waste.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-22
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Delineation
PROJECT # : 0522-23691
DEPTH TO WATER :
LOG PREPARED BY : J. Rogers

APPROXIMATE G.S. : N/A
DATE : 6/14/2000
CONTRACTOR : Geo Logic, Inc.
EQUIPMENT: Caterpiller 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Topsoil/Vegetation	Clean Soil	
2	Light brown fine to coarse sand		
3	At approximately 2 to 3 feet below ground surface, to one side of the test pit, was a pocket of uniformly graded gray 1- to 2-inch gravel, appeared to be a buried swale coming down from the landfill slope	Construction Debris	
4			
5	From 4 to 8 feet, large pieces of metal, little amount of broken bottles, and some wood, mixed with stained sand		
6			
7			
8			
9	Light brown fine to coarse sand	Clean Soil	
10			
11	B.O.E. @ 10 ft		
12			
13			

REMARKS

Waste(construction debris).

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-23
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Delineation
PROJECT # : 0522-23691
DEPTH TO WATER :
LOG PREPARED BY : J. Rogers

APPROXIMATE G.S. : N/A
DATE : 6/14/00
CONTRACTOR : Geo Logic, Inc.
EQUIPMENT: Caterpiller 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Topsoil/Vegetation		
2	at 1.5 to 2 ft. there were two thin layers of dark asphalt		
3	Light to medium brown fine to coarse sand a couple stray pieces of metal, but no evidence of other wastes or staining	Clean Soil (Trace Waste)	
4			
5			
6			
7			
8			
9			
10			
11	B.O.E. @ 10 ft		
12			
13			

REMARKS

No waste.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-24
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Delineation
PROJECT # : 0522-23691
DEPTH TO WATER :
LOG PREPARED BY : J. Rogers

APPROXIMATE G.S. : N/A
DATE : 6/14/2000
CONTRACTOR : Geo Logic, Inc.
EQUIPMENT: Caterpiller 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Topsoil/Vegetation	Clean Fill	
2	Light to medium brown fine to coarse sand Very thick asphalt. Difficult to break through.		
3	B.O.E. @ 2 ft		
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			

REMARKS

Due to difficulty during attempt to break through asphalt, test pit was abandoned.
Unknown - test pit was abandoned.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-25
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Delineation
PROJECT # : 0522-23691
DEPTH TO WATER :
LOG PREPARED BY : J. Rogers

APPROXIMATE G.S. : N/A
DATE : 6/14/2000
CONTRACTOR : Geo Logic, Inc.
EQUIPMENT: Caterpiller 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Light brown fairly uniform medium sand	Clean Soil	
2			
3	Thin layers of dark gravel		
4	Light brown fairly uniform medium sand	Natural Soil	
5			
6			
7			
8			
9			
10			
11			
12			
13	B.O.E. @ 12 ft		

REMARKS

Operator stated that he believed the area of the test pit to be remains of a hill previously mined for the sand.
Adjacent steep slope appears to be same natural material found in test pit.
No waste.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-26
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Delineation
PROJECT # : 0522-23691
DEPTH TO WATER :
LOG PREPARED BY : J. Rogers

APPROXIMATE G.S. : N/A
DATE : 6/14/2000
CONTRACTOR : Geo Logic, Inc.
EQUIPMENT: Caterpiller 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Topsoil/Vegetation		
2	Dark stained fine to coarse sand with little broken glass, and waste	Waste	
3	Light brown to gray fine to medium sand with some silt	Natural Soils	
4			
5			
6			
7			
8			
9			
10			
11			
12			
14	B.O.E. @ 14 ft		

REMARKS

Edge of waste.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-27
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Delineation
PROJECT # : 0522-23691
DEPTH TO WATER :
LOG PREPARED BY : J. Rogers

APPROXIMATE G.S. : N/A
DATE : 6/14/2000
CONTRACTOR : Geo Logic, Inc.
EQUIPMENT: Caterpiller 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Topsoil/Vegetation	Clean Soil	
2–5	mostly plastics and wood, little glass, little sand, odor	Waste	
6–13	B.O.E. @ 5 ft		

REMARKS

Abandoned test pit as water started entering test pit quickly.
Waste.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-28
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Delineation
PROJECT # : 0522-23691
DEPTH TO WATER :
LOG PREPARED BY : J. Rogers

APPROXIMATE G.S. : N/A
DATE : 6/14/2000
CONTRACTOR : Geo Logic, Inc.
EQUIPMENT: Caterpiller 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Dark brown topsoil/organics/roots		
2–8	Medium brown fine to coarse sand	Natural Soil	
9–13	B.O.E. @ 8 ft		

REMARKS

Water entering test pit at approximately 7 feet.
No waste.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-29
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Delineation
PROJECT # : 0522-23691
DEPTH TO WATER :
LOG PREPARED BY : J. Rogers

APPROXIMATE G.S. : N/A
DATE : 6/14/2000
CONTRACTOR : Geo Logic, Inc.
EQUIPMENT: Caterpiller 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Topsoil/vegetation		
2	Brown fine to coarse sand and gravel with some boulders (1-2 feet)	Natural Deposit	
3			
4			
5			
6	B.O.E. @ 5 ft		
7			
8			
9			
10			
11			
12			
13			

REMARKS

Test pit adjacent to large tree and a few smaller trees/shrubs.
No waste.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

TEST PIT FIELD LOG

CAMP DRESSER & MCKEE INC.

TP-30
Sheet 1 of 1

PROJECT : Haverhill Landfill
SITE : Edge of Waste Delineation
PROJECT # : 0522-23691
DEPTH TO WATER :
LOG PREPARED BY : J. Rogers

APPROXIMATE G.S. : N/A
DATE : 6/14/2000
CONTRACTOR : Geo Logic, Inc.
EQUIPMENT: Caterpiller 311 Excavator

DEPTH (feet)	SOIL DESCRIPTION	STRATA CHANGE	EXCAV. EFFORT
1	Topsoil/vegetation	Clean Soil	
2	Light to medium brown fine to coarse sand		
3			
4	Dark stained fine to coarse sand, little wood, a couple of tires, trace to little amount of waste, not much odor	Stained Soil	
5			
6			
7			
8			
9			
10			
11			
12			
13	B.O.E. @ 12 ft		

REMARKS

No waste.

DESCRIPTION
and : 35 to 50 %
some : 20 to 35 %
little : 10 to 20 %
trace : 1 to 10 %

Memorandum

To: *William Pauk, City of Haverhill*

From: *Bruce Haskell, Camp Dresser & McKee Inc.* BH

Date: *October 8, 1993*

Subject: *Test Pit Excavation in Location of Proposed Gas Migration Venting and Barrier Trenches at Old City Landfill, October 4, 1993*

On October 4, 1993, Camp Dresser and McKee Inc. (CDM) witnessed the excavation of ten test pits in the southeastern corner of the Old City Landfill in Haverhill along the approximate location of the proposed landfill gas venting/barrier trench. The purpose of this work was to (1) delineate the edge of waste in the vicinity of the proposed trench and (2) determine if any landfilled waste will have to be relocated to allow for installation of the trench.

The approximate location (determined by tape measurement from previously surveyed landmarks such as gas monitoring wells) are shown on the attached site plan. Photographs were take at all of the test pits except for TP-1.

Below is a brief description of our observations at each test pit:

1. TP-1. The first test pit is immediately to the west of gas monitoring well CDM-4 and was entirely in natural undisturbed soils. The encountered soils were fine sands (brown in color).

2. TP-2 was immediately to the north of TP-1 along the apparent edge of landfilled waste and the wooded treeline. The northern edge of the excavation (e.g. adjoining the landfill) had landfilled waste while the southern side appeared to be natural soils (sand). There was a layer of silts/clay in TP-2 which was relatively thick at the northern side of the pit and thinner at the southern edge. (It almost appeared to be a liner of some type).

3. TP-3 was located approximately 20 feet to the east of TP-2 along the woods line and encountered clean sand except in its northern side which was refuse. No sign of the silty layer at TP-2 was observed in TP-3.

4. TP-4 was located 90 feet to the east of TP-3 along the woods line and apparent edge of waste. Refuse was observed along the northern side (e.g. along the landfill) of this test pit. There is an area immediately to the south of TP-4 which appears to be disturbed and/or filled. CDM was unable to access this area because of steep side slopes.

5. TP-5 was approximately 90 feet to the east of TP-4 along the woods line and encountered similar subsurface conditions. Landfilled trash was observed in the northern portion of the excavation while the remainder appeared to be the sandy soils encountered at the previous excavations.

6. TP-6 was located approximately 25 feet into the woods between TP-4 and TP-5. This excavation encountered the apparently natural soils found at several of the other locations.

7. Test pits TP-7, TP-8, TP-9 and TP-10 were excavated in the woods immediately behind the house at 200 Groveland Road. TP-7, was in the western side of this area and only encountered undisturbed soils. Test pits TP-8 and TP-9 were immediately to the east of this area and encountered between one and three feet of fill material including what appeared to be burned solid waste. TP-10, located to the south of the previous two test pits and approximately thirty feet from the staked property line, encountered only clean undisturbed soils. This finding confirms previous reports by John Connor about the historic burning of waste in this vicinity.

In general, the following conclusions can be drawn from the results:

1. The apparent edge of the landfill is adjacent to the wooded area in the southeast corner of the site. The only exception to this is a small burn dump area in the vicinity of the area indicated on the attached site plan.

2. The two test pits excavated within the burn dump found that the burned layer was up to three feet thick and covered by fill soils which included numerous large stones.

3. The edge of the burned landfill appears to stop at least thirty feet from the property line of the adjacent property at 200 Groveland Road. This will provide adequate space for the installation of the cap. Location of the trench in this area will also lower the excavation required as the elevation drops off. However, because burn dumps tended to be uncontrolled, the design specifications and documents should incorporate provisions for the excavation and removal of these materials if they are encountered.

CDM will be revising our previous proposal with respect to the design of the venting/barrier trench this week. Please do not hesitate to call me at (617) 252-8371 with any questions or concerns.

BH/hb

APPENDIX D

Bid Form (2 Copies)

CITY OF HAVERHILL, MASSACHUSETTS
& AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.

SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
CORRECTIVE ACTION DESIGN

CITY MAYOR

JAMES J. FIORENTINI

CITY COUNCIL

MICHAEL J. HART

ROBERT H. SCATAMACCHIA

WILLIAM H. RYAN

MICHAEL YOUNG

DAVID E. HALL

COLLIN F. LePAGE

MARY ELLEN DALY O'BRIEN

SVEN A. AMIRIAN

WILLIAM J. MACEK

AGGREGATE INDUSTRIES - NORTHEAST REGION - PRESIDENT

GRAHAM HARDWICK

SUPERINTENDENT/ENGINEER OF THE WATER/WASTEWATER DIVISION

ROBERT E. WARD

CONTRACT NO. 1

PROJECT NO. CWSRF - 3403

SCALE IN FEET
2000 1000 0 2000 4000

LOCATION PLAN

HAVERHILL LANDFILL SITE
OLD GROVELAND ROAD
HAVERHILL, MASSACHUSETTS

MASS DEP RELEASE TRACKING NUMBER : 3-0000324

LIST OF DRAWINGS

OCTOBER 2010
REVISED FEBRUARY 2011

CDM
consulting · engineering · construction · operations

CAMP DRESSER & McKEE INC. **CONSULTING ENGINEERS** **CAMBRIDGE, MASSACHUSETTS**

0522-75128

GENERAL NOTES:

1. BASE SURVEY PLAN BY EASTERN TOPOGRAPHICS OF WOLFBORO, NH. (SCALE 1"=40', 2-FOOT CONTOUR INTERVAL). PHOTO DATES APRIL 13, 1992 AND AUGUST 31, 1999; COMPILATION DATES OF NOVEMBER 23, 1992 AND SEPTEMBER 9, 1999. GROUND CONTROL BY RICHARD F. KAMINSKI, & ASSOCIATES, INC. LAWRENCE MA. (NGVD 1929; NAD 1927)
2. TOPOGRAPHIC SURVEY OF NATIONAL GRID PROPERTY AND NORTHERN SLOPE OF SOUTHERN MOUND BY RICHARD F. KAMINSKI, & ASSOCIATES, INC. LAWRENCE MA. (FEBRUARY 13, 2006).
3. PROPERTY BOUNDARY SURVEY BY RICHARD F. KAMINSKI, & ASSOCIATES, INC. LAWRENCE MA. (FEBRUARY 13, 2006) LANDFILL LOTS INCLUDE CITY OF HAVERHILL LOTS 21 AND 24 AND AGGREGATE INDUSTRIES LOTS 20, 26, AND 27.
4. WETLAND BOUNDARIES ALONG WESTERN EDGE OF LANDFILL, MERRIMACK RIVER, AND JOHNSON CREEK ALONG NORTHERN MOUND WERE DELINEATED BY AMY GREEN CONSULTING LLC IN NOVEMBER 2009. WETLAND FLAGS SURVEYED BY RICHARD F. KAMINSKI & ASSOCIATES INC., LAWRENCE, MA. WETLAND BOUNDARIES ACCEPTED BY THE HAVERHILL CONSERVATION COMMISSION ON MAY 24, 2010.
5. WETLAND BOUNDARIES SOUTH OF LANDFILL AND ALONG JOHNSON CREEK ALONG AGGREGATE PROPERTY EAST OF LANDFILL WERE DELINEATED BY AMY GREEN CONSULTING LLC IN SEPTEMBER 2010. WETLAND FLAGS SURVEYED BY RICHARD F. KAMINSKI & ASSOCIATES INC., LAWRENCE, MA.
6. EDGE OF WASTE REVISED FROM 2002 CSA BASED ON WASTE RELOCATION CONDUCTED DURING PHASE I SOILS PROJECT IN AREA OF STORMWATER BASIN NO. 1, TEST PITS CONDUCTED IN 2005 TO LOCATE SEWER FORCE MAIN, AND TEST PITS CONDUCTED IN NOV/DEC 2008. TEST PIT LOGS INCLUDED IN SPECIFICATIONS.
7. LOCATIONS OF TEST PITS CONDUCTED IN 1993 AND 2000 ARE APPROXIMATE. LOCATIONS OF TEST PITS CONDUCTED IN 2008 WERE SURVEYED WITH GPS.
8. PLANS SHOW FINAL PHASE IA GRADING AND SHAPING CONTOURS AS APPROVED BY THE MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION (MASSDEP) AS BASE ELEVATIONS. REVISIONS TO FINAL CONTOURS SHALL BE SUBMITTED TO MASSDEP AS A MINOR MODIFICATION PERMIT APPLICATION. MASSDEP APPROVAL OF MINOR MODIFICATION REQUIRED PRIOR TO INSTALLATION OF FINAL CAP.
9. NATIONAL GRID REPLACED UTILITY POLES ON NORTHERN SIDE OF CORRIDOR IN DECEMBER 2008. SURVEY NOT UPDATED TO REFLECT NEW UTILITY POLES.
10. TP-21 & TP-22 INDICATE WASTE PRESENT, HOWEVER, WASTE WAS RELOCATED FROM THIS AREA IN 2006 DURING CONSTRUCTION OF STORMWATER BASIN NO. 1.
11. EDGE OF WASTE TO BE CONFIRMED DURING CONSTRUCTION.
12. LOCATIONS OF PILES OF ASPHALT, BRICK, AND CONCRETE ON LOT 26 LOCATED BY GPS IN OCTOBER 2010.

CONSTRUCTION NOTES:

1. CONTACT DIGSAFE A MINIMUM OF 72 HOURS PRIOR TO CONSTRUCTION.
2. CLEAR VEGETATION ONLY AS REQUIRED TO COMPLETE WORK. MINIMIZE TREE CUTTING AND REMOVAL. ALL TREES TO BE CLEARED SHALL BE IDENTIFIED FOR REVIEW BY ENGINEER PRIOR TO CLEARING. REMOVE TREES AND VEGETATION NECESSARY TO COMPLETE THE WORK AS SHOWN.
3. GRADE SUBGRADE FOR LLDPE CAP TO MAXIMUM SLOPE OF 3 HORIZONTAL TO 1 VERTICAL AND MINIMUM SLOPE OF 20 HORIZONTAL TO 1 VERTICAL.
4. TO ESTABLISH PROPER GRADES, INSTALL AND MAINTAIN GRADE STAKES. THE NUMBER AND LOCATION SHALL BE DETERMINED IN THE FIELD AND APPROVED BY THE ENGINEER. CONTRACTOR SHALL BE RESPONSIBLE FOR A FINAL FIELD CHECK OF FINISHED GRADES ACCEPTABLE TO THE ENGINEER PRIOR TO LOAMING AND SEEDING.
5. ALL DISTURBED AREAS NOT COVERED BY RIPRAP SHALL RECEIVE LOAM AND SEED.
6. STORMWATER BASIN NO. 1 TO BE MAINTAINED THROUGHOUT CONSTRUCTION AND POST CONSTRUCTION. MAINTENANCE INCLUDES SEDIMENT REMOVAL, CHECK DAM RE-WORK, AND TURBIDITY CURTAIN REPLACEMENT.
7. PRESERVE AND PROTECT ALL EXISTING GROUNDWATER AND LANDFILL GAS MONITORING WELLS ON-SITE, INCLUDING EXISTING LANDFILL GAS VENTS AS IDENTIFIED ON SHEET C-11. ANY DAMAGE CAUSED BY THE CONTRACTOR SHALL BE REPAIRED OR REPLACED AT THE CONTRACTOR'S EXPENSE.
8. ALL CONSTRUCTION ACCESS SHALL BE VIA YEMMA ROAD AND THE EXISTING ACCESS ROADS ON AGGREGATE PROPERTY. OTHER ACCESS LOCATIONS CAN ONLY BE UTILIZED WITH APPROVAL OF ENGINEER.
9. RETAIN A LICENSED LAND SURVEYOR TO CONFIRM AND STAKE ALL PROPERTY LINES AND UTILITY EASEMENTS PRIOR TO START OF CONSTRUCTION ACTIVITIES.
10. MAINTAIN ACCESS AT ALL TIMES TO YEMMA ROAD, THE INACTIVE AGGREGATE BATCH PLANT, AND THE NATIONAL GRID PROPERTY DURING CONSTRUCTION.
11. ALL AREAS OUTSIDE THE LIMIT OF DISTURBANCE SHALL BE PROTECTED AT ALL TIMES UNLESS OTHERWISE DIRECTED BY THE ENGINEER. ALL AREAS DISTURBED OUTSIDE THE LIMIT OF WORK SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE IN A MANNER APPROVED BY THE ENGINEER AND ANY AFFECTED PARTY.
12. NO WORK SHALL TAKE PLACE IN GROVELAND. MUNICIPAL BOUNDARY SHALL BE DELINEATED BY LICENSED SURVEYOR AND BOUNDARY SHALL BE CLEARLY DEMARCATED WITH TEMPORARY FENCING, PRIOR TO START OF WORK.

EROSION CONTROL NOTES:

1. ALL WORK SHALL CONFORM TO MASSDEP GUIDELINES FOR EROSION AND SEDIMENTATION CONTROL LATEST VERSION.
2. PRIOR TO UNDERTAKING ANY WORK AT THE SITE, PREPARE AN EROSION CONTROL PLAN IN ACCORDANCE WITH NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PHASE II FOR APPROVAL BY THE ENGINEER TO PROTECT THE SITE FROM EROSION AND PREVENT THE MOVEMENT OF SEDIMENT AND DEBRIS INTO DRAINAGE SYSTEMS AND WETLAND AREAS.
3. PREPARE A STORMWATER POLLUTION PREVENTION PLAN (SWPPP) FOR APPROVAL BY THE ENGINEER TO PROTECT THE SITE FROM EROSION AND PREVENT THE MOVEMENT OF SEDIMENT AND DEBRIS INTO DRAINAGE SYSTEMS, WETLAND AREAS, AND OFF-SITE AREAS PRIOR TO BEGINNING CONSTRUCTION ACTIVITIES. MAINTAIN A COPY OF THE SWPPP ON SITE AT ALL TIMES.
4. MAINTAIN THE SEDIMENTATION AND EROSION CONTROL SYSTEMS FOR THE DURATION OF THE CONTRACT. MAINTENANCE SHALL INCLUDE CLEANING AND/OR REPLACING SYSTEMS THAT ARE NO LONGER FUNCTIONAL AS DETERMINED BY THE ENGINEER.
5. NPDES PERMIT AND MASSDEP FILE NUMBERS SHALL BE POSTED IN A POSITION TO BE PUBLICLY VISIBLE AT ALL TIMES.
6. INSTALL HAY BALES AND SEDIMENT FENCE AT THE LIMITS OF WORK AS SHOWN ON THE PROJECT PLANS PRIOR TO COMMENCEMENT OF WORK TO PREVENT EROSION OR SEDIMENTATION INTO RESOURCE AREAS.
7. EROSION CONTROLS SHOWN ON PLANS ARE THE MINIMUM REQUIRED. CONTRACTOR MAY BE REQUIRED TO ADJUST LOCATIONS AND ELEVATIONS OF SEDIMENTATION BARRIERS AS APPROVED BY ENGINEER.
8. INSPECT HAY BALES/SEDIMENT FENCE BARRIER WEEKLY AND AFTER ALL STORM EVENTS OF ½-INCH OR GREATER. REPAIR AS NEEDED AND AS DIRECTED BY THE ENGINEER OR OWNER WITHIN 48 HOURS OF ANY STORM EVENT.
9. BARRIERS SHALL BE LEFT IN PLACE UNTIL THE AREA IS PERMANENTLY STABILIZED. HAY BALES AND SEDIMENT FENCE SHALL BE REPLACED AS NECESSARY DUE TO SEDIMENT BUILD-UP AND DEGRADATION.
10. INSTALL EROSION CONTROL BLANKET ON ALL EXPOSED SLOPES OF 4:1 (HORIZONTAL:VERTICAL) OR STEEPER DURING CONSTRUCTION TO MINIMIZE SOIL EROSION.
11. CONSTRUCT NEW BASINS PRIOR TO COMMENCING OTHER WORK. DIRECT RUNOFF INTO TEMPORARY OR PERMANENT DETENTION/SEDIMENTATION BASINS, WHERE PRACTICAL, VIA SWALES OR BERMS. SEED AND COVER SWALES AND BERMS WITH EROSION CONTROL BLANKETS TO STABILIZE THE SOILS UNTIL THE GRASS ROOTS HAVE DEVELOPED SUFFICIENTLY TO STABILIZE THE SOIL. TEMPORARY FOREBAYS AND BASINS SHALL REMAIN IN PLACE AS LONG AS POSSIBLE.
12. PROVIDE PROTECTION FOR DRAIN INLETS AND STRUCTURES UPON INSTALLATION AND LEAVE IN PLACE UNTIL ADJACENT SURFACES ARE STABILIZED.
13. WHERE CONSTRUCTION OCCURS WITHIN THE 100-FOOT BUFFER ZONE, SEED AND MULCH DISTURBED AREAS TO STABILIZE SOILS AND PREVENT EROSION AS SOON AS POSSIBLE AFTER CONSTRUCTION IS COMPLETE, WHEN NO FURTHER ALTERATION IS ANTICIPATED FOR 30 OR MORE DAYS. IN THE EVENT THAT THIS WORK IS TO TAKE PLACE OUTSIDE OF THE GROWING SEASON, PLACE EROSION CONTROL BLANKETS OR MULCH AND TACKIFIER OVER THESE AREAS TO MINIMIZE EROSION.
14. FOR WORK IN THE BUFFER ZONE THAT WILL DISTURB SOILS, AND ADDITIONAL DISTURBANCES THAT ARE ANTICIPATED WITHIN 7 TO 30 DAYS, TEMPORARILY STABILIZE THE AREA WITH MULCH AND TACKIFIER OR EROSION CONTROL BLANKETS, OR OTHER EQUIVALENT MEASURES.
15. INSTALL ROCK OR HAY BALE CHECK DAMS IN SWALES TO REDUCE FLOW VELOCITIES AND MINIMIZE EROSION.
16. PLACE HAY BALES ON THE DOWNGRADIENT SIDE OF THE WORK AREA WITHIN THE 100-FOOT BUFFER ZONE AND LEAVE IN PLACE UNTIL CONSTRUCTION IS COMPLETE.
17. WORK FROM ADJACENT UPLANDS.
18. WORK SHALL PROCEED AS RAPIDLY AS POSSIBLE TO LIMIT THE EXPOSURE TIME OF DISTURBED SOILS TO WIND AND PRECIPITATION.
19. PROVIDE STREET SWEEPING AS REQUIRED TO MINIMIZE TRACKING OF SOILS ONTO PUBLIC STREETS.
20. APPLY WATER AS NECESSARY TO PREVENT THE PRODUCTION OF DUST.
21. UPON COMPLETION OF CONSTRUCTION ACTIVITIES INSPECT AND CLEAN OUT NEW DRAINAGE SYSTEM COMPONENTS TO THE SATISFACTION OF THE ENGINEER AND OWNER.
22. REMOVE AND SATISFACTORILY DISPOSE ALL EROSION CONTROL STRUCTURES UPON COMPLETION OF ALL WORK AND SOIL STABILIZATION AS DIRECTED BY THE ENGINEER AND OWNER.

STORAGE AND STOCKPILE NOTES

1. ALL EQUIPMENT REFUELING AND ANY REQUIRED MINOR MAINTENANCE SHALL OCCUR OUTSIDE OF THE 100-FOOT BUFFER ZONE TO WETLANDS. LIMIT OF AREA SHALL BE DEFINED BY A TEMPORARY CONSTRUCTION FENCE.
2. SPILL CONTAINMENT EQUIPMENT SHALL BE STORED IN THE EQUIPMENT STORAGE AND REFUELING AREA.
3. MAINTAIN A SUPPLY OF SPEEDY DRY OR OTHER SUITABLE OIL ABSORBENT MATERIAL WITH THE EQUIPMENT FOR THE CLEAN-UP OF ANY ACCIDENTAL SPILLS DURING REFUELING OR MAINTENANCE OPERATIONS. NOTIFY THE PROPER AUTHORITIES IN THE EVENT OF AN ACCIDENTAL RELEASE.
4. INSPECT ALL HYDRAULIC LINES ON ALL CONSTRUCTION EQUIPMENT AND VEHICLES AT THE BEGINNING AND END OF EACH WORKDAY.
5. STORE ALL OIL, HYDRAULIC FLUID, OR OTHER HAZARDOUS MATERIAL IN ORIGINAL CONTAINERS. FUEL SHALL BE STORED IN CLEARLY MARKED, TIGHTLY SEALED CONTAINERS. ALL SUCH MATERIAL SHALL BE STORED UNDER A ROOF OR IN A COVERED ENCLOSURE.
6. ALL TRUCKS ENTERING OR LEAVING THE SITE SHALL BE COVERED.

LEGEND

EXISTING CONDITIONS

- EDGE OF WASTE (APPROX.)
- PROPERTY LINE
- BORDERING VEGETATED WETLAND LINE
- INLAND BANK LINE
- NON-JURISDICTIONAL/ISOLATED WETLAND LINE
- LIMIT OF 100-FOOT BUFFER ZONE
- LIMIT OF 200-FOOT RIVERFRONT AREA
- LIMIT OF 100 YEAR FLOODPLAIN
- LIMIT OF TOWN OF GROVELAND 100-FOOT BUFFER ZONE TO LAND SUBJECT TO FLOODING
- 40 — 10' CONTOUR - PRIOR TO GRADING AND SHAPING PROJECTS
- 2' CONTOUR - PRIOR TO GRADING AND SHAPING PROJECTS
- 428.4 — SPOT ELEVATION - PRIOR TO GRADING AND SHAPING PROJECT
- TREE LINE
- W — W — WATER SERVICE
- CITY OF HAVERHILL/ TOWN OF GROVELAND BOUNDARY
- LOT LINE
- x — x — x — x — FENCE
- EASEMENT
- D — D — DRAINAGE PIPE
- P BK41 — WETLAND FLAG
- STONE BOUND
- UTILITY POLE
- RIP RAP
- VENT 22 — LANDFILL GAS VENT
- CDM-1 — LANDFILL GAS MONITORING WELL
- TP-1 — TEST PIT (1993) - NO WASTE FOUND
- TP-2 — TEST PIT (1993) - EDGE OF WASTE
- TP-9 — TEST PIT (1993) - WASTE PRESENT
- TP-1 — TEST PIT (2000) - NO WASTE FOUND
- TP-26 — TEST PIT (2000) - EDGE OF WASTE
- TP-12 — TEST PIT (2000) - WASTE PRESENT
- TP-117 — TEST PIT (2008) - NO WASTE FOUND
- TP-100 — TEST PIT (2008) - EDGE OF WASTE
- TP-106 — TEST PIT (2008) - WASTE PRESENT
- TP-1 — TEST PIT (2007)
- FM — FM — SEWER FORCE MAIN TEST PIT (2005)
- MW-10M — GROUNDWATER MONITORING WELL LOCATION
- LOW SPOT
- STRUCTURE
- B — B' — PROFILE CROSS-SECTION LOCATION

PROPOSED CONDITIONS

- PROPOSED EDGE OF LLDPE CAP
- 120 — 10' CONTOUR - APPROVED PHASE IA GRADING AND SHAPING PROJECT
- 122 — 2' CONTOUR - APPROVED PHASE IA GRADING AND SHAPING PROJECT
- 130 — 10' CONTOUR - CAP SUBGRADE
- 132 — 2' CONTOUR - CAP SUBGRADE
- 143.9 — SPOT ELEVATION - CAP SUBGRADE
- 140 — 10' CONTOUR - FINAL CAP
- 142 — 2' CONTOUR - FINAL CAP
- 146.0 — SPOT ELEVATION - FINAL CAP
- DRAINAGE SWALE
- PERFORATED FLAT HDPE PANEL PIPE
- HAYBALES AND SILT FENCE
- LIMIT OF WORK
- AREA OF WASTE RELOCATION
- AREA OF WASTE RELOCATION REQUIRING FURTHER DELINEATION BY CONTRACTOR
- SETTLEMENT MONITORING PLATFORM
- LANDFILL GAS VENT
- PERMANENT GAS MONITORING WELL
- EXISTING ASPHALT, BRICK, AND CONCRETE PILES

COMMONWEALTH OF MASSACHUSETTS — BRUCE WILSON HOWE — No. 24167 — REGISTERED PROFESSIONAL ENGINEER — 2/9/11

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	2/11	MJW	NEJ	REVISED FOR BIDDING AND TO INCORPORATE MASS DEP AND EPA COMMENTS

DESIGNED BY: N. JONES
DRAWN BY: N. JONES
SHEET CHK'D BY: D. CHRISTIAN
CROSS CHK'D BY: N. JONES
APPROVED BY: B. HASKELL
DATE: OCTOBER 2010

CDM
Camp Dresser & McKee
One Cambridge Place, 50 Hampshire Street
Cambridge, MA 02139
Tel: (617) 452-6000
consulting • engineering • construction • operations

CITY OF HAVERHILL / AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
HAVERHILL, MASSACHUSETTS
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
CORRECTIVE ACTION DESIGN

GENERAL NOTES AND LEGEND

PROJECT NO. 0522-78856
FILE NAME: GEN0001
SHEET NO. G-1
ACCESSION #0522-75129

LIMIT OF 100-FOOT BUFFER ZONE

LIMIT OF 50-FOOT NO-BUILD ZONE

LIMIT OF 25-FOOT NO-BUILD-NO-DISTURBANCE ZONE

INLAND BANK LINE

BORDERING VEGETATED WETLAND LINE

NON-JURISDICTIONAL WETLANDS

LIMIT OF 100-FOOT BUFFER ZONE

LIMIT OF 50-FOOT NO-BUILD ZONE

LIMIT OF 25-FOOT NO-BUILD-NO-DISTURBANCE ZONE

NON-JURISDICTIONAL WETLANDS

LIMIT OF WORK

NON-JURISDICTIONAL WETLANDS

LIMIT OF 100 YEAR FLOODPLAIN (EL. 20-22)

LIMIT OF 25-FOOT NO-BUILD-NO-DISTURBANCE ZONE

LIMIT OF 50-FOOT NO-BUILD ZONE

LIMIT OF 100-FOOT BUFFER ZONE

LIMIT OF 200-FOOT RIVERFRONT AREA

PILE OF DEMOLITION DEBRIS
TO BE REMOVED OFF-SITE (BY OTHERS)

BUILDING TO BE DEMOLISHED AND REMOVED OFF-SITE (BY OTHERS)

MIXED RUBBLE AND SOIL PILE

EDGE OF WASTE TO BE CONFIRMED DURING CONSTRUCTION

ASPHALT PILE

FORMER RUBBLE PILE

GROUND ASPHALT PILE

ASPHALT PILE

EXISTING INACTIVE AGGREGATE BATCH PLANT BUILDINGS
TO BE DEMOLISHED AND REMOVED (BY OTHERS)

UTILITY POLES
TO BE REMOVED (BY OTHERS)

PUMP HOUSE
TO BE DEMOLISHED AND REMOVED (BY OTHERS)

LIMIT OF TOWN OF GROVELAND 100-FOOT BUFFER ZONE
TO LAND SUBJECT TO FLOODING

LIMIT OF WORK

EXISTING SOILS GRADING AND SHAPING PROJECT SCALEHOUSE,
TRUCK WEIGHING SCALE, AND TRUCK WASH TO BE REMOVED
AT THE END OF THE GRADING AND SHAPING PROJECT (BY OTHERS)

EXISTING SITE FENCE GATE TO BE
MAINTAINED THROUGHOUT CONSTRUCTION

NOTES:

1. PLAN SHOWS SITE CONDITIONS PRIOR TO START OF SOILS GRADING AND SHAPING PROJECT.
2. REFER TO SHEET G-1 FOR LEGEND AND GENERAL NOTES.

1" = 100'

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	2/11	MJW	NEJ	REVISED FOR BIDDING AND TO INCORPORATE MASS DEP AND EPA COMMENTS

DESIGNED BY: N. JONES
DRAWN BY: N. JONES
SHEET CHK'D BY: B. HASKELL
CROSS CHK'D BY: N. JONES
APPROVED BY: B. HASKELL
DATE: OCTOBER 2010

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Camp Dresser & McKee
One Cambridge Place, 50 Hampshire Street
Cambridge, MA 02139
Tel: (617) 452-6000
consulting • engineering • construction • operations

CITY OF HAVERHILL / AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
HAVERHILL, MASSACHUSETTS

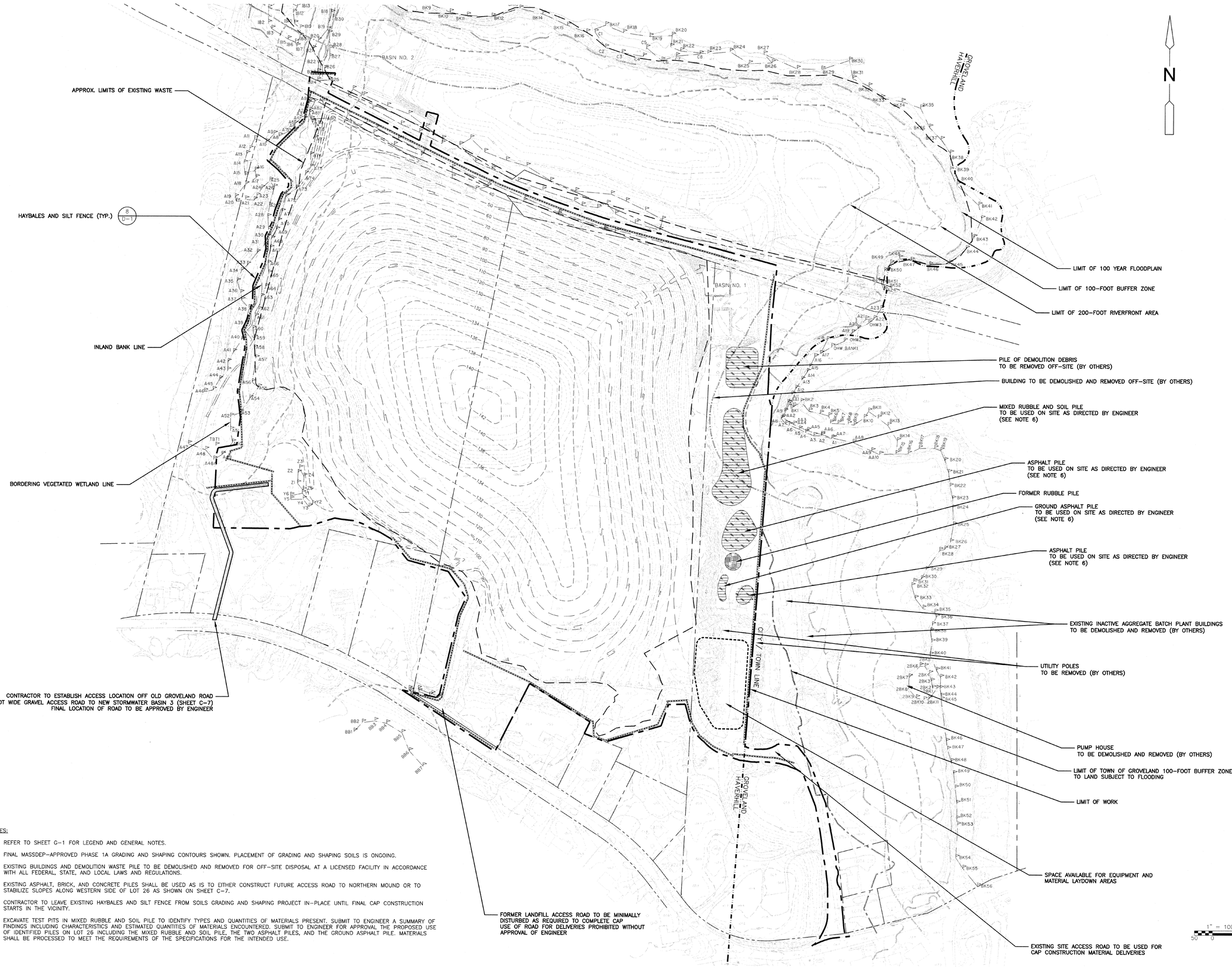
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
CORRECTIVE ACTION DESIGN

EXISTING CONDITIONS PLAN

PROJECT NO. 0522-78856
FILE NAME: CSTPL001.DWG

SHEET NO.
C-1

ACCESSION #0522-75130



NOTES:

1. REFER TO SHEET G-1 FOR LEGEND AND GENERAL NOTES.
2. FINAL MASSDEP-APPROVED PHASE 1A GRADING AND SHAPING CONTOURS SHOWN. PLACEMENT OF GRADING AND SHAPING SOILS IS ONGOING.
3. EXISTING BUILDINGS AND DEMOLITION WASTE PILE TO BE DEMOLISHED AND REMOVED FOR OFF-SITE DISPOSAL AT A LICENSED FACILITY IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS.
4. EXISTING ASPHALT, BRICK, AND CONCRETE PILES SHALL BE USED AS IS TO EITHER CONSTRUCT FUTURE ACCESS ROAD TO NORTHERN MOUND OR TO STABILIZE SLOPES ALONG WESTERN SIDE OF LOT 26 AS SHOWN ON SHEET C-7.
5. CONTRACTOR TO LEAVE EXISTING HAYBALES AND SILT FENCE FROM SOILS GRADING AND SHAPING PROJECT IN-PLACE UNTIL FINAL CAP CONSTRUCTION STARTS IN THE VICINITY.
6. EXCAVATE TEST PITS IN MIXED RUBBLE AND SOIL PILE TO IDENTIFY TYPES AND QUANTITIES OF MATERIALS PRESENT. SUBMIT TO ENGINEER A SUMMARY OF FINDINGS INCLUDING CHARACTERISTICS AND ESTIMATED QUANTITIES OF MATERIALS ENCOUNTERED. SUBMIT TO ENGINEER FOR APPROVAL THE PROPOSED USE OF IDENTIFIED PILES ON LOT 26 INCLUDING THE MIXED RUBBLE AND SOIL PILE, THE TWO ASPHALT PILES, AND THE GROUND ASPHALT PILE. MATERIALS SHALL BE PROCESSED TO MEET THE REQUIREMENTS OF THE SPECIFICATIONS FOR THE INTENDED USE.

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	2/11	MJW	NEJ	REVISED FOR BIDDING AND TO INCORPORATE MASS DEP AND EPA COMMENTS

DESIGNED BY: N. JONES
DRAWN BY: D. VAN SCHALKWYK
SHEET CHK'D BY: B. HASKELL
CROSS CHK'D BY: N. JONES
APPROVED BY: B. HASKELL
DATE: OCTOBER 2010

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Camp Dresser & McKee
One Cambridge Place, 50 Hampshire Street
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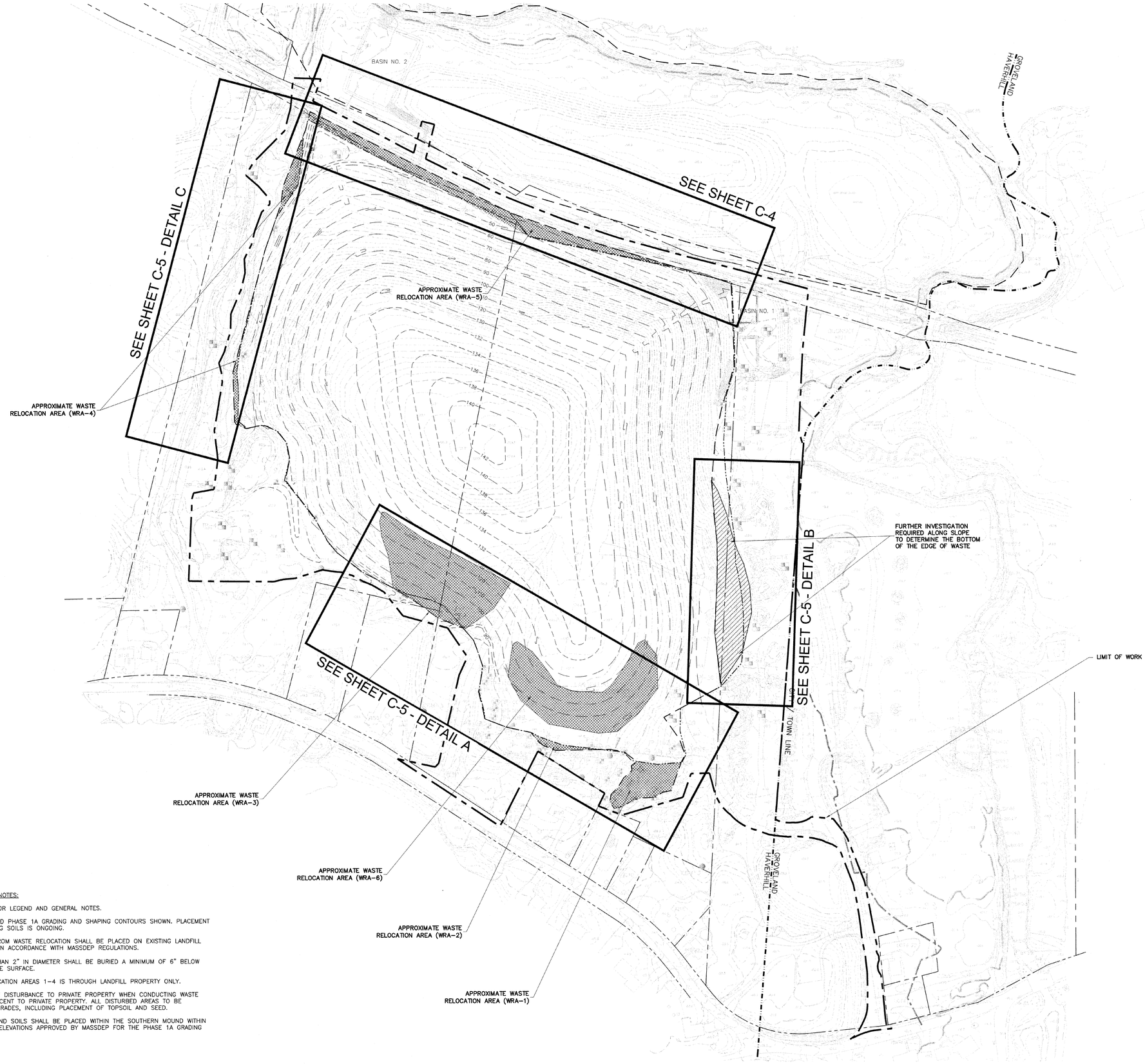
CITY OF HAVERHILL / AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
HAVERHILL, MASSACHUSETTS

SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
CORRECTIVE ACTION DESIGN

SITE PREPARATION AND EROSION CONTROL

PROJECT NO. 0522-78856
FILE NAME: CSTPL002.DWG
SHEET NO. C-2
ACCESSION #0522-75131



GENERAL WASTE RELOCATION NOTES:

1. REFER TO SHEET G-1 FOR LEGEND AND GENERAL NOTES.
2. FINAL MASSDEP-APPROVED PHASE 1A GRADING AND SHAPING CONTOURS SHOWN. PLACEMENT OF GRADING AND SHAPING SOILS IS ONGOING.
3. MATERIALS GENERATED FROM WASTE RELOCATION SHALL BE PLACED ON EXISTING LANDFILL SURFACE AND COVERED IN ACCORDANCE WITH MASSDEP REGULATIONS.
4. ANY MATERIAL LARGER THAN 2" IN DIAMETER SHALL BE BURIED A MINIMUM OF 6" BELOW THE FINAL CAP SUBGRADE SURFACE.
5. ACCESS TO WASTE RELOCATION AREAS 1-4 IS THROUGH LANDFILL PROPERTY ONLY.
6. CONTRACTOR TO MINIMIZE DISTURBANCE TO PRIVATE PROPERTY WHEN CONDUCTING WASTE RELOCATION ON OR ADJACENT TO PRIVATE PROPERTY. ALL DISTURBED AREAS TO BE RESTORED TO EXISTING GRADES, INCLUDING PLACEMENT OF TOPSOIL AND SEED.
7. ALL RELOCATED WASTE AND SOILS SHALL BE PLACED WITHIN THE SOUTHERN MOUND WITHIN THE FINAL GRADES AND ELEVATIONS APPROVED BY MASSDEP FOR THE PHASE 1A GRADING AND SHAPING PROJECT.

1" = 100'
50 0 100

COMMONWEALTH OF MASSACHUSETTS
BRUCE WILLIAM HASKELL
No. 49487
REGISTERED PROFESSIONAL ENGINEER
3/11/11

REV. NO.	DATE	DRWN	CHK'D	REMARKS
1	2/11	MJW	NEJ	REVISED FOR BIDDING AND TO INCORPORATE MASS DEP AND EPA COMMENTS

DESIGNED BY: J. GOVE
DRAWN BY: J. GOVE
SHEET CHK'D BY: B. HASKELL
CROSS CHK'D BY: N. JONES
APPROVED BY: B. HASKELL
DATE: OCTOBER 2010

CDM
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One Cambridge Place, 50 Hampshire Street
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Tel: (617) 452-6000
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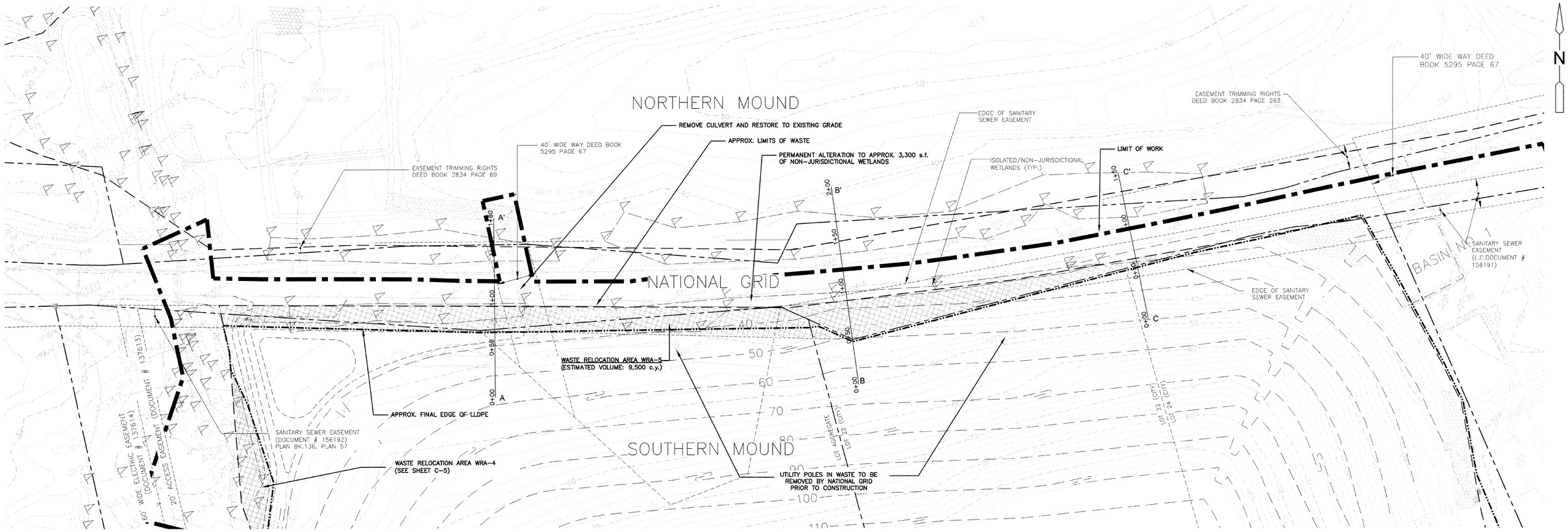
CITY OF HAVERHILL / AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
HAVERHILL, MASSACHUSETTS

SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
CORRECTIVE ACTION DESIGN

WASTE RELOCATION AREAS

PROJECT NO. 0522-78856
FILE NAME: CSTPL003
SHEET NO. C-3
ACCESSION #0522-75132



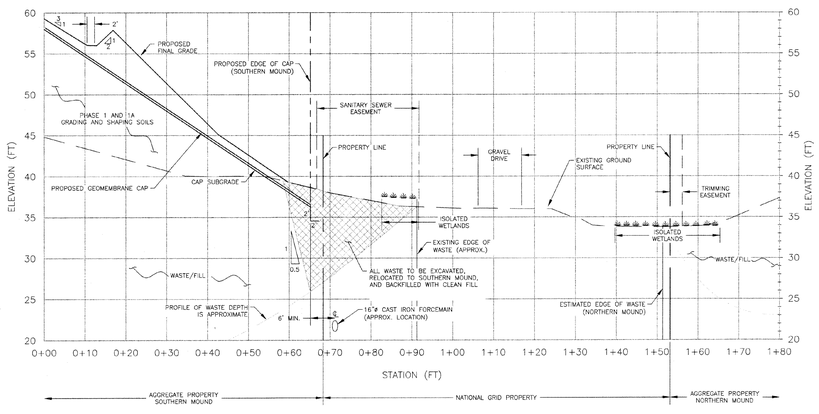
PLAN

1" = 40'

20 0 40

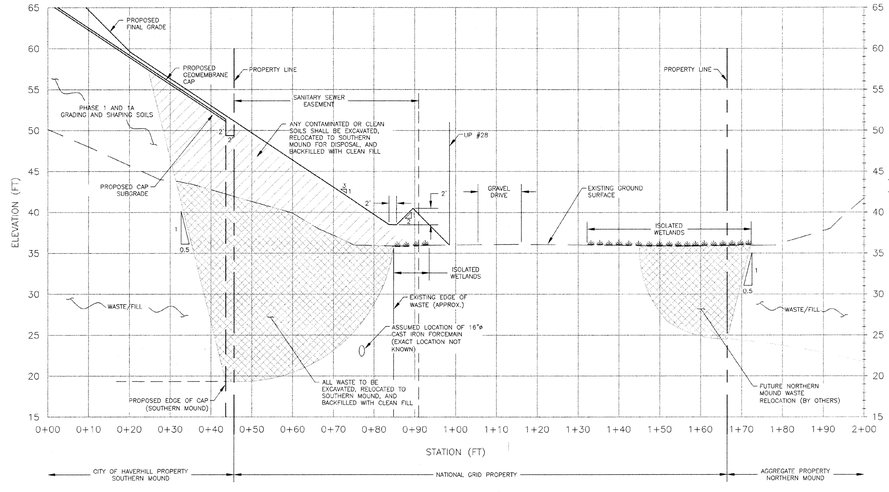
NOTES:

1. REFER TO SHEET G-1 FOR LEGEND AND GENERAL NOTES. SEE SHEET C-3 FOR WASTE RELOCATION GENERAL NOTES AND GENERAL SHEET VIEW DISTRIBUTION.
2. PROPOSED FINAL GRADES AS DEPICTED ON PROFILE VIEWS ARE SHOWN ON SHEET C-7.
3. CONTRACTOR TO RETAIN A LICENSED LAND SURVEYOR TO CONFIRM AND STAKE LOCATION OF ALL PROPERTY LINES AND EASEMENTS PRIOR TO CONDUCTING ANY CONSTRUCTION ACTIVITIES ON-SITE.
4. CONTRACTOR TO PERFORM TEST PITS TO CONFIRM EDGE OF WASTE AND LOCATION OF SEWER FORCE MAIN PRIOR TO EXCAVATION.
5. ALL WASTE, SLUDGE, AND CONTAMINATED SOILS LOCATED EITHER ON NATIONAL GRID PROPERTY OR WITHIN SIX HORIZONTAL FEET OF SEWER FORCE MAIN TO BE EXCAVATED AND BACKFILLED WITH CLEAN FILL.
6. CONTRACTOR SHALL PROVIDE PLAN PREPARED AND STAMPED BY A LICENSED LAND SURVEYOR SHOWING LOCATION OF ALL PROPERTY LINES AND EASEMENTS, LOCATION OF SEWER FORCE MAIN, VERTICAL AND HORIZONTAL LIMITS OF EXCAVATION, LOCATION OF ANY CONFIRMATORY TESTING, FINAL EDGE OF LANDFILLED WASTE, AND FINAL ELEVATIONS PRIOR TO PLACEMENT OF LLDPE FML.
7. SAND DRAINAGE LAYER SHALL EXTEND TO WITHIN APPROX. 10 FEET OF TOE OF SLOPE REGARDLESS OF FINAL EDGE OF LLDPE. REFER TO DETAIL 3 ON SHEET D-1 FOR RIPRAP AT TOE OF SLOPE AND SAND DRAINAGE LAYER OUTLET TO CRUSHED STONE LAYER.



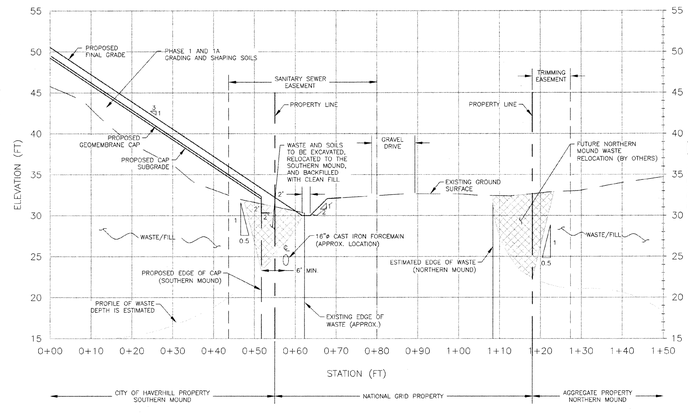
SCALE: HORIZONTAL 1"= 15' VERTICAL 1"=7.5'

PROFILE VIEW OF ALIGNMENT - A-A'



SCALE: HORIZONTAL 1"= 15' VERTICAL 1"=7.5'

PROFILE VIEW OF ALIGNMENT - B-B'



SCALE: HORIZONTAL 1"= 15' VERTICAL 1"=7.5'

PROFILE VIEW OF ALIGNMENT - C-C'

COMMONWEALTH OF MASSACHUSETTS BRUCE WILLIAM HASKELL No. 34020 REGISTERED PROFESSIONAL ENGINEER

VERTICAL SCALE: 1"= 7.5' 3.75 0 7.5

HORIZONTAL SCALE: 1"= 15' 7.5 0 15

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	2/11	MJW	NEJ	REVISED FOR BIDDING AND TO INCORPORATE MASS DEP AND EPA COMMENTS

DESIGNED BY: N. JONES
DRAWN BY: N. JONES
SHEET CHK'D BY: B. HASKELL
CROSS CHK'D BY: N. JONES
APPROVED BY: B. HASKELL
DATE: OCTOBER 2010

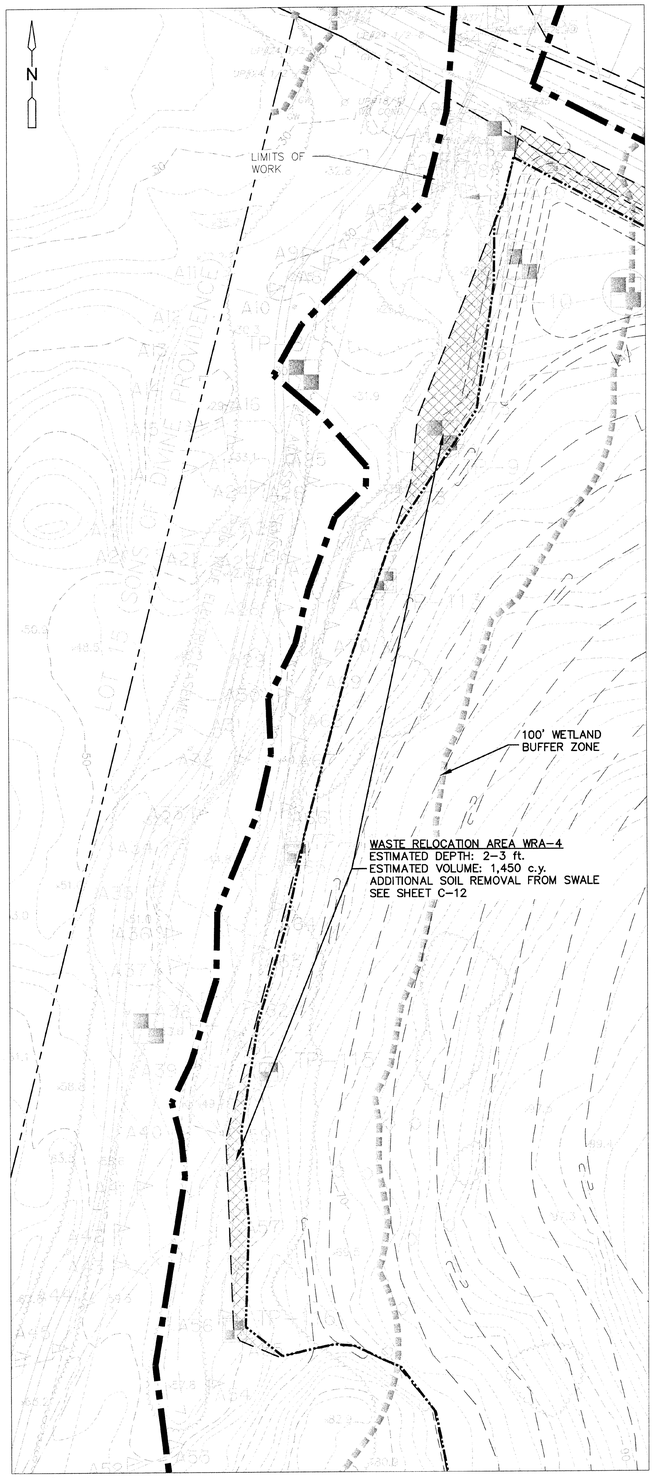
CDM
Camp Dresser & McKee
One Cambridge Place, 50 Hampshire Street
Cambridge, MA 02139
Tel: (617) 452-6000
consulting • engineering • construction • operations

CITY OF HAVERHILL / AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
HAVERHILL, MASSACHUSETTS

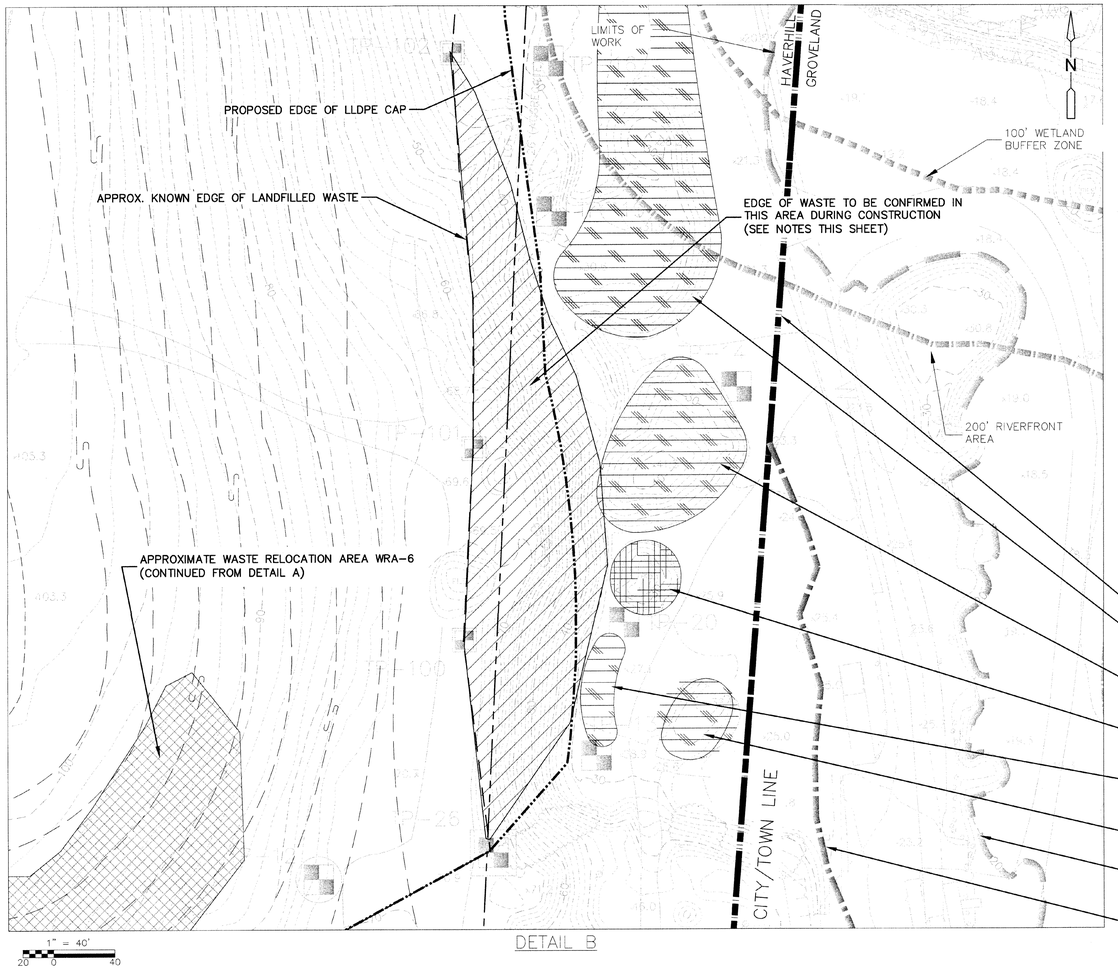
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
CORRECTIVE ACTION DESIGN

NATIONAL GRID FOCUS PLAN

PROJECT NO. 0522-78856
FILE NAME: CSTPL004
SHEET NO.
C-4
ACCESSION #0522-75133



DETAIL C

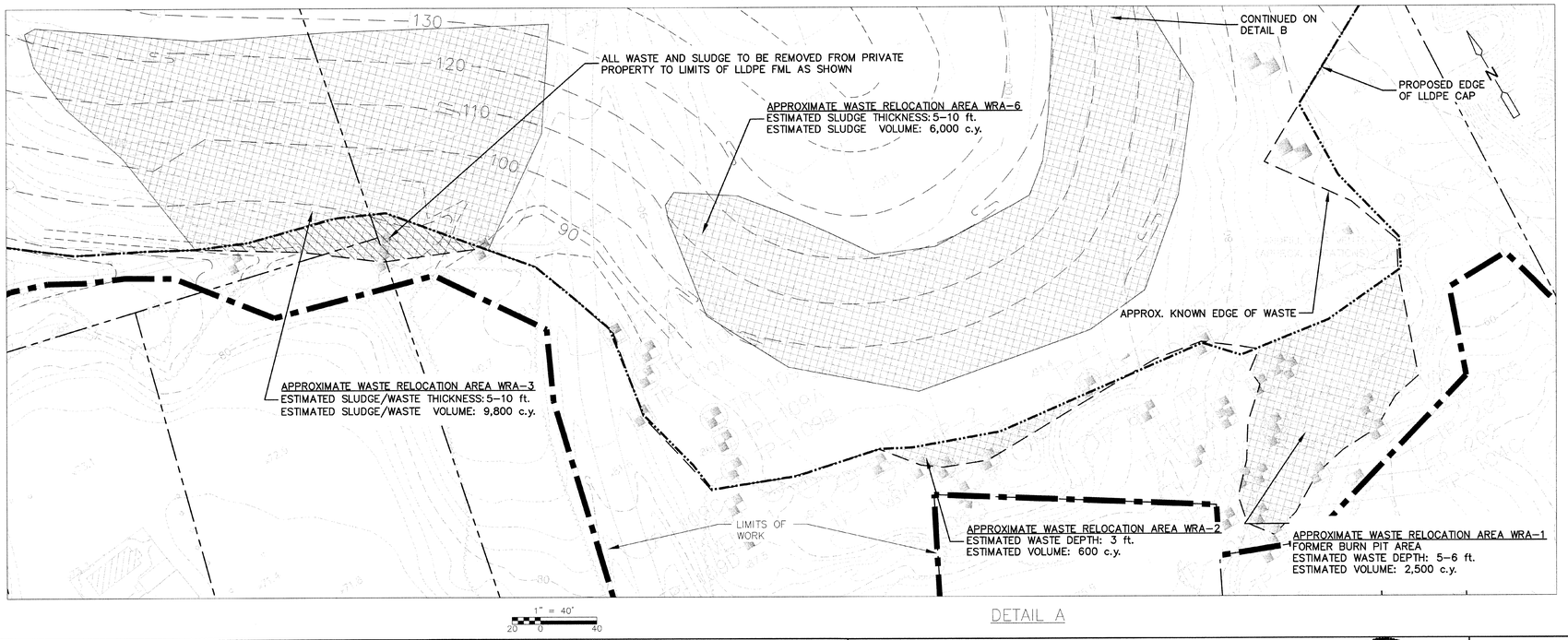


DETAIL B

GENERAL WASTE RELOCATION NOTES:

1. REFER TO SHEET C-3 FOR NOTES AND GENERAL SHEET VIEW DISTRIBUTION. REFER TO SHEET G-1 FOR GENERAL NOTES AND LEGEND.
2. PROPOSED FINAL CONTOURS AND GRADES SHOWN ON SHEET C-7.
3. CONTRACTOR MAY BE REQUIRED BY THE ENGINEER TO PERFORM FURTHER TEST PITS WITHIN THE PROPOSED WASTE RELOCATION AREAS TO CONFIRM EDGE OF WASTE AND DEPTHS. ADDITIONAL TEST PITS WILL BE REQUIRED TO CONFIRM THE EASTERN AND SOUTHERN EXTENTS OF WRA-1.
4. AT ALL WASTE RELOCATION AREAS, CONTRACTOR SHALL RETAIN A LICENSED LAND SURVEYOR TO CONFIRM AND STAKE THE LOCATION OF ALL PROPERTY LINES AND EASEMENTS PRIOR TO CONDUCTING ANY CONSTRUCTION ACTIVITIES ON-SITE.
5. CONTRACTOR SHALL PROVIDE PLAN PREPARED AND STAMPED BY A LICENSED LAND SURVEYOR SHOWING THE LOCATION OF ALL PROPERTY LINES AND EASEMENTS, LOCATION OF ANY UTILITIES, VERTICAL AND HORIZONTAL LIMITS OF EXCAVATION, LOCATION OF ANY CONFIRMATORY TESTING, FINAL EDGE OF LANDFILLED WASTE AND THE FINAL ELEVATIONS WITHIN ANY WASTE RELOCATION AREA PRIOR TO THE PLACEMENT OF THE LLDPE FML.
6. FOR WASTE RELOCATION AREAS WHERE SLUDGE AND PAPER BEATER WASTE ARE PROPOSED TO BE RELOCATED (WRA- 3 AND WRA-6), THE CONTRACTOR SHALL FOLLOW THE FOLLOWING GENERAL PROCEDURES:
   a. THE CONTRACTOR SHALL NOTIFY THE ENGINEER 72-HOURS IN ADVANCE OF CONDUCTING ANY WASTE RELOCATION IN THESE AREAS TO ALLOW FOR NOTIFICATION OF ABUTTERS.
   b. STRIP OFF ALL SOIL INCLUDING ANY PHASE I AND IA GRADING AND SHAPING SOILS. STOCKPILE SOILS IMMEDIATELY ADJACENT TO PROPOSED EXCAVATION AREA.
   c. CONDUCT TEST PITS AT LOCATIONS DIRECTED BY THE ENGINEER WITHIN THE PROPOSED WASTE RELOCATION AREA TO CONFIRM THE DEPTH AND EXTENT OF THE LANDFILLED SLUDGE AND BEATER WASTE
   d. REMOVE THE SLUDGE AND BEATER WASTE TO THE EXTENTS APPROVED BY THE ENGINEER. SPREAD THE EXCAVATED SLUDGE IN A LAYER OF NO THICKER THAN 2-FEET WITHIN THE SOUTHERN MOUND CAP. PLACE DAILY COVER OVER THE RELOCATED SLUDGE AND AT THE BOTTOM OF THE EXCAVATION AT THE END OF EACH DAY IN ACCORDANCE WITH MASSDEP REGULATIONS.
   e. BACKFILL THE EXCAVATED AREAS WITH COMMON FILL OR PHASE IA APPROVED GRADING AND SHAPING SOILS.
   f. CARE SHALL BE TAKEN IN CONTROLLING ODORS DURING THE EXCAVATION AND RELOCATION OF SLUDGE AND BEATER WASTES.
7. ALL WASTE RELOCATION CONDUCTED FROM AREAS WRA-1, WRA-2 AND WRA-4 WILL BE RELOCATED TO WITHIN THE LIMITS OF THE SOUTHERN MOUND AND COVERED IN ACCORDANCE WITH MASSDEP REGULATIONS.
8. AT AREA SHOWN ON DETAIL B REQUIRING FURTHER INVESTIGATIONS TO CONFIRM THE LIMIT OF WASTE, THE CONTRACTOR SHALL PROVIDE CONSTRUCTION EQUIPMENT SUITABLE TO EXCAVATE TO A DEPTH OF APPROXIAMTELY ELEVATION 30. CONTRACTOR MAY RELOCATE EXISTING MATERIALS IN THIS AREA TO ACCESS THIS AREA AND CONFIRM LOCATION OF ANY LANDFILLED WASTE. ALL RELOCATED MATERIALS FROM THIS AREA WILL BE PLACED UNDER THE LLDPE FML IN THE SOUTHERN MOUND.
9. IN THE AREA SHOWN ON DETAIL B, CONTRACTOR SHALL EXCAVATE TEST PITS AT LOCATIONS REQUESTED BY THE ENGINEER. LOCATION OF TEST PITS EXCAVATED SHALL BE LOCATED ON A PLAN PREPARED BY A LICENSED SITE SURVEYOR AND SUBMITTED TO THE ENGINEER.

LIMIT OF WORK
MIXED RUBBLE AND SOIL PILE
ASPHALT PILE
FORMER RUBBLE PILE
GROUND ASPHALT PILE
ASPHALT PILE
LIMIT OF 100 YEAR FLOODPLAIN
LIMIT OF TOWN OF GROVELAND 100-FOOT BUFFER ZONE TO LAND SUBJECT TO FLOODING



DETAIL A

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	2/11	MJW	NEJ	REVISED FOR BIDDING AND TO INCORPORATE MASS DEP AND EPA COMMENTS

DESIGNED BY: J. GOVE
DRAWN BY: J. GOVE
SHEET CHK'D BY: B. HASKELL
CROSS CHK'D BY: N. JONES
APPROVED BY: B. HASKELL
DATE: OCTOBER 2010

CDM
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consulting • engineering • construction • operations

CITY OF HAVERHILL / AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
HAVERHILL, MASSACHUSETTS

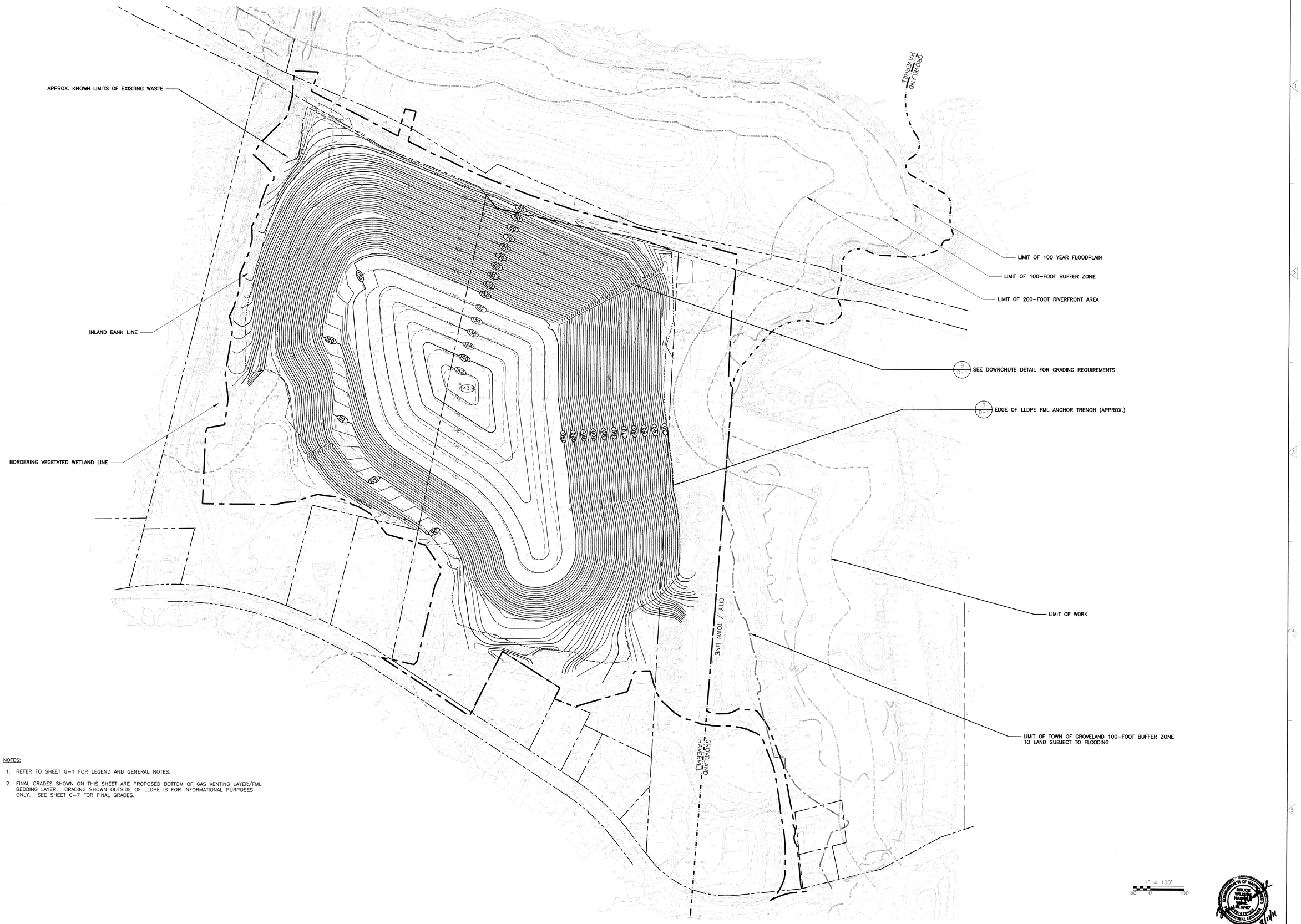
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
CORRECTIVE ACTION DESIGN

WASTE RELOCATION FOCUS PLAN

PROJECT NO. 0522-78856
FILE NAME: CSTPL005

SHEET NO.
C-5

ACCESSION #0522-75134



NOTES:

1. REFER TO SHEET G-1 FOR LEGEND AND GENERAL NOTES.
2. FINAL GRADES SHOWN ON THIS SHEET ARE PROPOSED BOTTOM OF GAS VENTING LAYER/FML BEDDING LAYER. GRADING SHOWN OUTSIDE OF LLDPE IS FOR INFORMATIONAL PURPOSES ONLY. SEE SHEET C-7 FOR FINAL GRADES.

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	2/11	MJW	NEJ	REVISED FOR BIDDING AND TO INCORPORATE MASS DEP AND EPA COMMENTS

DESIGNED BY: N. JONES
DRAWN BY: N. JONES
SHEET CHK'D BY: D. CHRISTIAN
CROSS CHK'D BY: N. JONES
APPROVED BY: B. HASKELL
DATE: OCTOBER 2010

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CITY OF HAVERHILL / AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
HAVERHILL, MASSACHUSETTS
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
CORRECTIVE ACTION DESIGN

INTERIM GRADING PLAN - CAP SUBGRADE

PROJECT NO. 0522-78856
FILE NAME: CSTPL006
SHEET NO. C-6
ACCESSION #0522-75135

EXISTING BASIN NO. 2 TO BE DECOMMISSIONED DURING NORTHERN MOUND CAP CONSTRUCTION (BY OTHERS)

AREA OF EXISTING UNDERGROUND POWER LINES

EXISTING CULVERT TO BE MAINTAINED AND PROTECTED

WETLAND REMEDIATION AND REPLICATION AREA SEE SHEETS C-12 AND C-13

SETTLEMENT MONITORING PLATFORM (TYP.) (20 / D-3) GRADING AROUND PLATFORM NOT SHOWN

LIMIT OF WORK

RIPRAP APRON (D50 12-IN) (11 / D-2)

NEW STORMWATER BASIN NO. 3

FLARED END SECTION AND RIPRAP APRON (11 / D-2)

FOREBAY (12 / D-2)

RIPRAP APRON (D50 24-IN) (11 / D-2)

RIPRAP APRON (D50 12-IN) (11 / D-2)

MORTARED RIPRAP DOWNCHUTE (D50 18-IN) (9 / D-1)

VEGETATED DRAINAGE SWALE OFF-CAP (15 / D-2)

RIPRAP DRAINAGE SWALE ON CAP (TYP.) (1 / D-1)

FUTURE GRAVEL ACCESS ROAD CAP CROSS-SECTION SEE NOTE 4 (7 / D-1)

RIPRAP DRAINAGE SWALE OFF-CAP (15 / D-2)

1 / D-1 VEGETATED DRAINAGE SWALE ON CAP (TYP.)

EXISTING DRAINAGE PIPES TO BE REMOVED AND BACKFILLED WITH COMMON FILL DURING WASTE RELOCATION ACTIVITIES

PERFORMED FLAT HDPE PANEL PIPE ON TOP OF LLDPE (TYP. MIDWAY BETWEEN EACH SWALE, DAYLIGHT TO MORTARED RIPRAP DOWNCHUTE)

1 / D-1 RIPRAP DRAINAGE SWALE (D50 9-IN)

9 / D-1 MORTARED RIPRAP DOWNCHUTE (D50 18-IN)

EXISTING RIPRAP APRON TO BE REMOVED AND RE-INSTALLED

11 / D-2 RIPRAP APRON (D50 24-IN)

GROVELAND HAVERHILL

BASIN NO. 1

EXISTING STORMWATER BASIN 1 TO REMAIN

EXISTING RIPRAP APRON TO BE REMOVED AND RE-INSTALLED

3 / D-1 RIPRAP TOE OF SLOPE (TYP.)

PERFORMED FLAT HDPE PANEL PIPE ON TOP OF LLDPE (TYP. MIDWAY BETWEEN EACH SWALE, DAYLIGHT TO MORTARED RIPRAP DOWNCHUTE)

1 / D-1 RIPRAP DRAINAGE SWALE (TYP.) (D50 9-IN)

SLOPE IN THIS AREA SHALL BE STABILIZED USING UNPROCESSED ASPHALT, BRICK, AND CONCRETE MATERIALS FROM ON-SITE STOCKPILES AS DIRECTED BY ENGINEER

DESIGN AND CONSTRUCT 20-FOOT WIDE PERMANENT GRAVEL ACCESS ROAD AT LOCATION SHOWN. ACCESS ROAD SUBBASE MAY BE CONSTRUCTED USING STOCKPILED ASPHALT, BRICK, AND CONCRETE MATERIALS ON LOT 26. GRAVEL ROAD SHALL BE CONSTRUCTED OF 8" PROPOSED GRAVEL BASE AND 4" DENSE GRADED CRUSHED STONE SURFACE. CONTRACTOR SHALL SUBMIT PE STAMPED DESIGN, INCLUDING PROPOSED GRADING PLAN AND ROADWAY CROSS-SECTIONS, FOR ENGINEERS APPROVAL.

CONTRACTOR SHALL MAINTAIN EXISTING ACCESS ROAD TO AREA OF EXISTING SCALE AND SCALE HOUSE (SEE SHEET C-1) ROAD TO BE MAINTAINED AS ACCESS TO SOUTHERN MOUND

CITY / TOWN LINE

GROVELAND HAVERHILL

DAYLIGHT HDPE PANEL PIPE ON TOP RIPRAP APRON IN CENTER OF SWALE (D50 9-IN)

RIRRAP APRON (D50 12-IN) (11 / D-2)

FOREBAY (12 / D-2)

NEW STORMWATER BASIN NO. 4

LIMIT OF WORK

A A' B B' C C'

NOTES:

1. REFER TO SHEET C-1 FOR LEGEND AND GENERAL NOTES.
2. DETAILED FINAL GRADING SHOWN ON SHEETS C-8 AND C-9. FOR PROFILES, SEE SHEET C-10.
3. SEE SHEET C-2 FOR ACCESS TO CONSTRUCT AND MAINTAIN NEW STORMWATER BASIN NO. 3.
4. INACTIVE LANDFILL ACCESS ROAD ADJACENT TO 158 OLD GROVELAND ROAD SHALL NOT BE SIGNIFICANTLY ALTERED DURING CONSTRUCTION. FUTURE GRAVEL ACCESS ROAD ON CAP SHALL BE CONSTRUCTED AS SHOWN WITH LOAM AND SEED. ROAD MAY BE CONSTRUCTED BY OTHERS AS PART OF POST-CLOSURE USE OF SITE.
5. CLEAN AND CONDUCT PHYSICAL INSPECTION OF THE EXISTING 18-INCH RCP CULVERT BENEATH THE INACTIVE LANDFILL ACCESS ROAD. AT LEAST 45 DAYS PRIOR TO CONSTRUCTION OF BASIN NO. 4, SUBMIT TO ENGINEER THE RESULTS OF THE PHYSICAL INSPECTION AND PROPOSED MEANS OF TYING IN THE BASIN NO. 4 OUTLET PIPE TO THE EXISTING CULVERT, INCLUDING ANY NECESSARY REPAIRS TO THE EXISTING RCP.

1" = 100'
50 0 100

COMMONWEALTH OF MASSACHUSETTS BRUCE WILLIAM HASKELL No. 37462 REGISTERED PROFESSIONAL ENGINEER

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	2/11	MJW	NEJ	REVISED FOR BIDDING AND TO INCORPORATE MASS DEP AND EPA COMMENTS

DESIGNED BY: J. COROA/N. JONES
DRAWN BY: J. COROA
SHEET CHK'D BY: B. HASKELL
CROSS CHK'D BY: N. JONES
APPROVED BY: B. HASKELL
DATE: OCTOBER 2010

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CITY OF HAVERHILL / AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
HAVERHILL, MASSACHUSETTS

SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
CORRECTIVE ACTION DESIGN

FINAL GRADES I

PROJECT NO. 0522-78856
FILE NAME: CSTPL007.dwg
SHEET NO. C-7
ACCESSION #0522-75136

BASIN NO. 2

BASIN NO. 1

N

B'

A

LIMIT OF WORK

PERFORMED FLAT HDPE PANEL PIPE ON TOP OF LLDPE (TYP. MIDWAY BETWEEN EACH SWALE, DAYLIGHT TO MORTARED RIPRAP CHANNEL)

1 / D-1 VEGETATED DRAINAGE SWALE (TYP.)

20 / D-3 SETTLEMENT MONITORING PLATFORM (TYP.)

1 / D-1 RIPRAP DRAINAGE SWALE (D50 9-IN)

PERFORATED FLAT HDPE PANEL PIPE ON TOP OF LLDPE (TYP. MIDWAY BETWEEN EACH SWALE, DAYLIGHT TO MORTARED RIPRAP DOWNCHUTE)

1 / D-1 VEGETATED DRAINAGE SWALE (TYP.)

9 / D-1 MORTARED RIPRAP DOWNCHUTE (D50 18-IN)

LIMIT OF CHAIN LINK FENCE

EXISTING RIPRAP TO BE REMOVED AND RE-INSTALLED

13 / D-2 DOUBLE LEAF SWING GATE (TYP.)

11 / D-2 RIPRAP APRON (D50 24-IN)

14 / D-2 6-FT HIGH CHAIN LINK FENCE

12 / D-2 OUTLET RISER SECTION STANDPIPE INV. 22.5 OVERFLOW GRATE INV. 24.5 OUTLET PIPE INV. 20.83

EXISTING RIPRAP TO BE REMOVED AND RE-INSTALLED

LIMIT OF CHAIN LINK FENCE

1 / D-1 RIP RAP DRAINAGE SWALE (D50 9-IN)

1 / D-1 VEGETATED DRAINAGE SWALE

PERFORATED FLAT HDPE PANEL PIPE ON TOP OF LLDPE (TYP. MIDWAY BETWEEN EACH SWALE, DAYLIGHT TO MORTARED RIPRAP EDGE OF LLDPE CAP

1 / D-1 RIPRAP TOE OF SLOPE

PI
N: 639500.39
E: 721198.83
R: 92'

PI
N: 639372.91
E: 721158.93
R: 300'

PI
N: 639212.50
E: 721191.42
R: 500'

PC 12+61.10
PT 12+98.97
PC 13+00.00
R 300'
PC 13+97.75
PT 14+00.00
R 500'

MATCH LINE SHEET C-9

MATCH LINE SHEET C-9

1" = 40'
20 0 40

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	2/11	MJW	NEJ	REVISED FOR BIDDING AND TO INCORPORATE MASS DEP AND EPA COMMENTS

DESIGNED BY: J. COROA/N. JONES
DRAWN BY: J. COROA
SHEET CHK'D BY: B. HASKELL
CROSS CHK'D BY: N. JONES
APPROVED BY: B. HASKELL
DATE: OCTOBER 2010

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CITY OF HAVERHILL / AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
HAVERHILL, MASSACHUSETTS

SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
CORRECTIVE ACTION DESIGN

FINAL GRADES II

COMMONWEALTH OF MASSACHUSETTS — ERICK WILLIAM HASKELL — No. 37621 — REGISTERED PROFESSIONAL ENGINEER

PROJECT NO. 0522-78856
FILE NAME: CSTPL109.dwg
SHEET NO. C-8
ACCESSION #0522-75137

MATCH LINE SHEET C-8

MATCH LINE SHEET C-8

PI
N: 639022.56
E: 721174.20
R: 212'

RIPRAP APRON (D50 12-IN) 11 D-2

RIPRAP APRON (D50 24-IN) 11 D-2

PC: 0+39.36
PT: 3+31.79

9+00.00

8+00.00

7+00.00

6+00.00

5+00.00

4+00.00

3+00.00

2+00.00

1+00.00

0+27.08

MORTARED RIPRAP (MASSDOT M2.02.2 DUMPED RIPRAP D50 18-IN) DOWNCHUTE 9 D-1

FOREBAY 12 D-2

DOUBLE LEAF SWING GATE 13 D-2

OUTLET RISER SECTION 10 D-1
STANDPIPE INV. 69.35
OVERFLOW GRATE INV. 71.35
OUTLET PIPE INV. 68.00

6-FT HIGH CHAIN LINK FENCE 14 D-2

FLARED END SECTION AND RIPRAP APRON 11 D-2
INV. 66.70
(D50 12-IN)
25' MIN. FROM EDGE OF WETLANDS

SETTLEMENT MONITORING PLATFORM (TYP.) 20 D-3

PI
N: 638730.77
E: 721525.59
R: 132'

PC: 1+76.85
PT: 2+76.24

PI
N: 638590.75
E: 721475.66
R: 312'

PC: 2+76.69

R 312'

PT: 0+27.08

PI
N: 638396.03
E: 721432.95
R: 15'

PC: 0+30.00

R 150'

DOUBLE LEAF SWING GATE 13 D-2

LIMIT OF 6-FT HIGH CHAIN LINK FENCE

6-FT HIGH CHAIN LINK FENCE 14 D-2

REPLACE EXISTING DOUBLE LEAF SWING GATE 13 D-2

OUTLET PIPE TO CONNECT TO EXISTING 18-ICH RCP BENEATH EXISTING ACCESS ROAD

DOUBLE LEAF SWING GATE 13 D-2

OUTLET RISER SECTION 10 D-2
STANDPIPE INV. 66.00
OVERFLOW GRATE INV. 68.00
OUTLET PIPE INV. 65.60

FOREBAY 12 D-2

RIPRAP APRON (D50 12-IN) 11 D-2

6-FT HIGH CHAIN LINK FENCE 14 D-2

LIMIT OF WORK

PERFORATED FLAT HDPE PANEL PIPE ON TOP OF LLDPE (TYP. MIDWAY BETWEEN EACH SWALE, DAYLIGHT TO MORTARED RIPRAP DOWNCHUTE)

1 D-1 VEGETATED DRAINAGE SWALE (TYP.)

EDGE OF LLDPE CAP RIPRAP TOE OF SLOPE 3 D-1

1 D-1 RIPRAP DRAINAGE SWALE (TYP.) (D50 9-IN)

DAYLIGHT HDPE PANEL PIPE ON TOP RIPRAP APRON IN CENTER OF SWALE (D50 9-IN)

VEHICLE ACCESS GATE 21 D-3

CITY / TOWN LINE

GROVELAND / HAVERHILL

N

1" = 40'
20 0 40

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	2/11	MJW	NEJ	REVISED FOR BIDDING AND TO INCORPORATE MASS DEP AND EPA COMMENTS

DESIGNED BY: J. COROA/N. JONES
DRAWN BY: J. COROA
SHEET CHK'D BY: B. HASKELL
CROSS CHK'D BY: N. JONES
APPROVED BY: B. HASKELL
DATE: OCTOBER 2010

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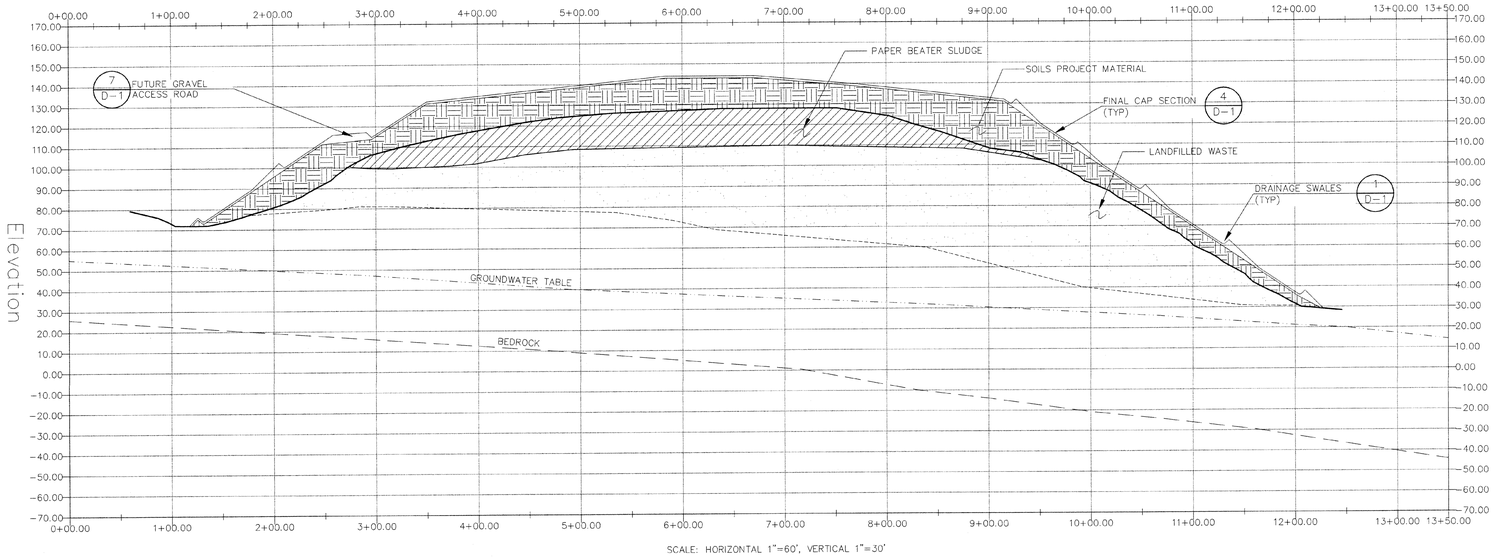
CITY OF HAVERHILL / AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
HAVERHILL, MASSACHUSETTS

SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
CORRECTIVE ACTION DESIGN

FINAL GRADES III

COMMONWEALTH OF MASSACHUSETTS
BRUCE WILLIAM HASKELL
No. 32,942
REGISTERED PROFESSIONAL ENGINEER

PROJECT NO. 0522-78856
FILE NAME: CSTPL109.dwg
SHEET NO. C-9
ACCESSION #0522-75138



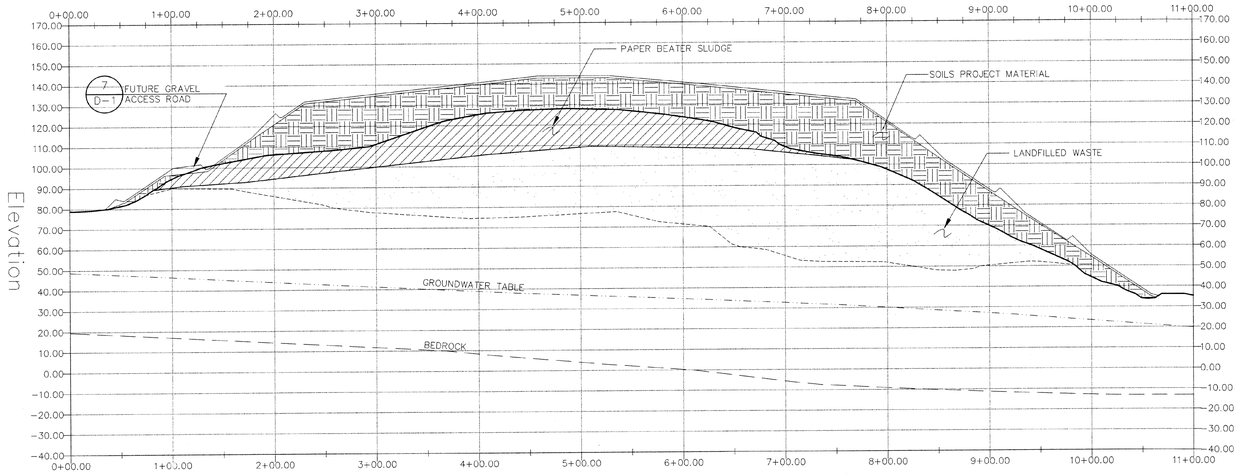
SCALE: HORIZONTAL 1"=60', VERTICAL 1"=30'

Profile View of Alignment – A–A'

NOTES:

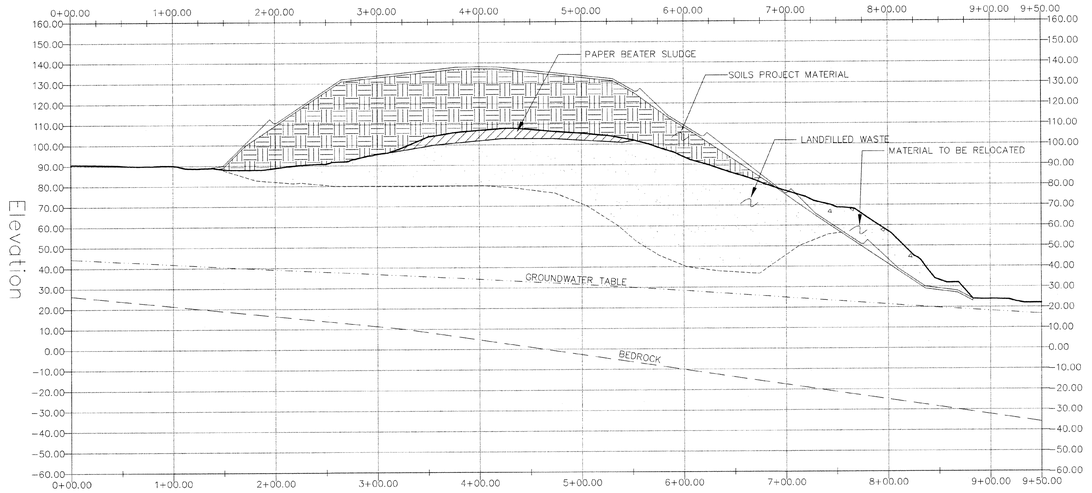
CROSS SECTION LAYERS WERE DEVELOPED BASED ON TOPOGRAPHIC INFORMATION FROM THE FOLLOWING:

1. TOP OF CAP: PROPOSED FINISHED GRADE SHOWN ON SHEET 7 OF THIS PLAN SET.
2. BOTTOM OF SOIL PROJECT: BASE SURVEY PLAN BY EASTERN TOPOGRAPHICS OF WOLFBORO, NH. (SCALE 1"=40', 2–FOOT CONTOUR INTERVAL). PHOTO DATES APRIL 13, 1992 AND AUGUST 31, 1999; COMPILATION DATES OF NOVEMBER 23, 1992 AND SEPTEMBER 9, 1999. GROUND CONTROL BY RICHARD F. KAMINSKI, & ASSOCIATES, INC. LAWRENCE MA. (NGVD 1929; NAD 1927). (EXISTING CONDITIONS PLAN SHEET C–1 OF THIS PLAN SET)
3. BOTTOM OF PAPER BEATER SLUDGE LAYER: TOPOGRAPHY FROM THE SITE PLAN INCLUDED IN THE LANDFILL EVALUATION AND GROUNDWATER STUDY (PERKINS JORDAN, INC., AUGUST 1981).
4. BOTTOM OF WASTE: USGS 1943 EDITION TOPOGRAPHIC MAP OF HAVERHILL, MASSACHUSETTS.
5. GROUNDWATER TABLE: GROUNDWATER CONTOUR PLAN FROM THE SEMI–ANNUAL WATER QUALITY MONITORING REPORT (CDM, NOVEMBER 2009).
6. BEDROCK: FIGURE 3–9 OF THE 1991 MANAGEMENT OF MIGRATION REMEDIAL INVESTIGATION REPORT (NUS, FEBRUARY 1991), WHICH IS INCLUDED AS APPENDIX J OF THE ISA (CDM, JULY 1999).



SCALE: HORIZONTAL 1"=60', VERTICAL 1"=30'

Profile View of Alignment – B–B'



SCALE: HORIZONTAL 1"=60', VERTICAL 1"=30'

Profile View of Alignment – C–C'

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	2/11	MJW	NEJ	REVISED FOR BIDDING AND TO INCORPORATE MASS DEP AND EPA COMMENTS

DESIGNED BY: J. GOVE
DRAWN BY: J. GOVE
SHEET CHK'D BY: D. CHRISTIAN
CROSS CHK'D BY: N. JONES
APPROVED BY: B. HASKELL
DATE: OCTOBER 2010

CDM
Camp Dresser & McKee
One Cambridge Place, 50 Hampshire Street
Cambridge, MA 02139
Tel: (617) 452-6000
consulting • engineering • construction • operations

CITY OF HAVERHILL / AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
HAVERHILL, MASSACHUSETTS

SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
CORRECTIVE ACTION DESIGN

LANDFILL CROSS SECTIONS

PROJECT NO. 0522-78856
FILE NAME: CSTPL010

SHEET NO.
C-10

ACCESSION #0522-75139

BASIN NO. 2

BASIN NO. 1

APPROX. KNOWN LIMITS OF EXISTING WASTE

INLAND BANK LINE

PASSIVE GAS VENT WITH SOLAR IGNITED FLARE (TYP.) (16 D-3)

BORDERING VEGETATED WETLAND LINE

REPLACEMENT GAS MONITORING WELL CDM-2 DEPTH = 50 FEET (18 D-3)

PRESERVE AND PROTECT EXISTING GAS MONITORING WELLS (TYP.)

EXISTING LANDFILL GAS VENTS TO BE PRESERVED, PROTECTED, AND BOOTED (5 D-1)

PERMANENT GAS MONITORING WELL DEPTH = 60 FEET (18 D-3)

PERMANENT GAS MONITORING WELL DEPTH = 30 FEET (18 D-3)

LIMIT OF 100 YEAR FLOODPLAIN

LIMIT OF 100-FOOT BUFFER ZONE

LIMIT OF 200-FOOT RIVERFRONT AREA

EDGE OF LLDPE

PERMANENT GAS MONITORING WELL DEPTH = 17 FEET (15 D-3)

PERMANENT GAS MONITORING WELL DEPTH = 17 FEET (18 D-3)

LIMIT OF WORK

HORIZONTAL GAS COLLECTION TRENCH (17 D-3)

PERMANENT GAS MONITORING WELL DEPTH = 15 FEET (18 D-3)

CDM-1
CDM-2
CDM-3
CDM-4+4A
CDM-5
CDM-6+6A
CDM-7
CDM-11+11A
CDM-10+10A
VENT-21
VENT-22
VENT-23
VENT-24

GROVELAND HAVERHILL

CITY / TOWN LINE

1" = 100'
50 0 100

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	2/11	MJW	NEJ	REVISED FOR BIDDING AND TO INCORPORATE MASS DEP AND EPA COMMENTS

DESIGNED BY: N. JONES
DRAWN BY: N. JONES
SHEET CHK'D BY: J. CURRO
CROSS CHK'D BY: D. CHRISTIAN
APPROVED BY: B. HASKELL
DATE: OCTOBER 2010

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HAVERHILL, MASSACHUSETTS

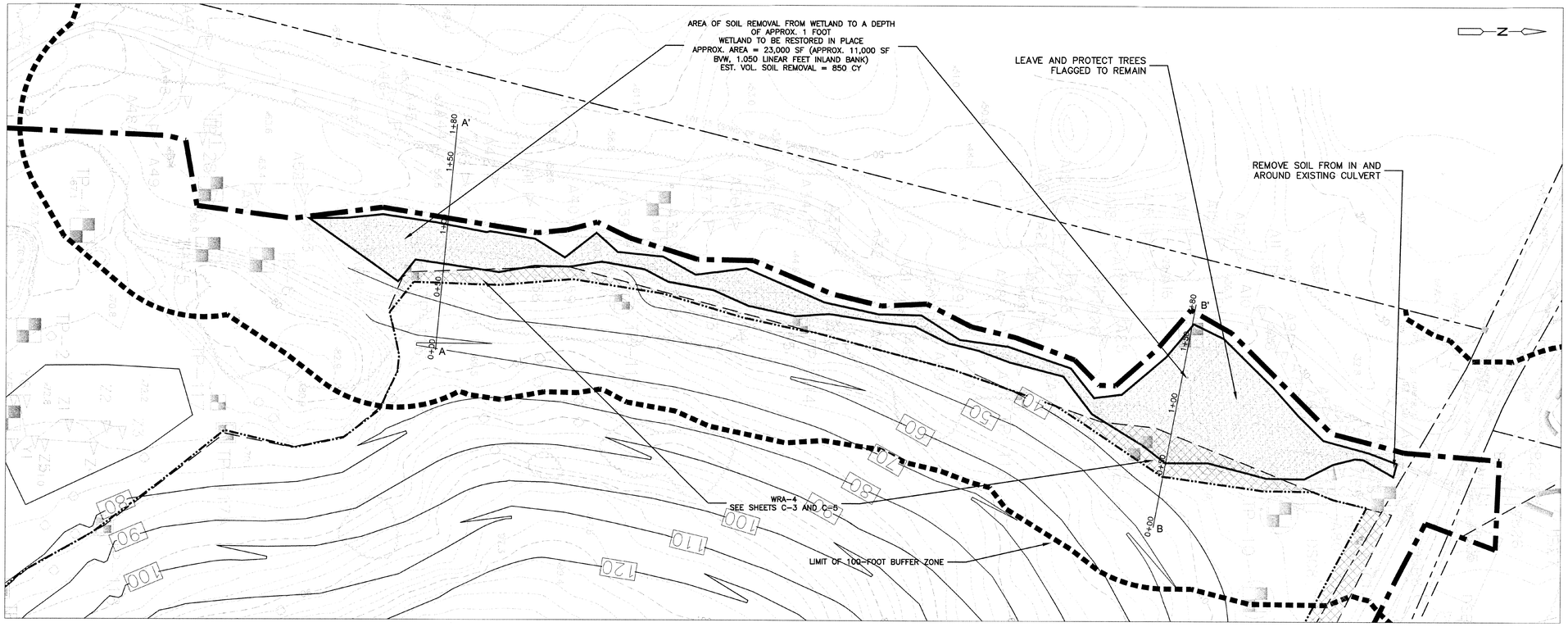
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
CORRECTIVE ACTION DESIGN

LANDFILL GAS MANAGEMENT SYSTEM LAYOUT

PROJECT NO. 0522-78856
FILE NAME: CSTPL011

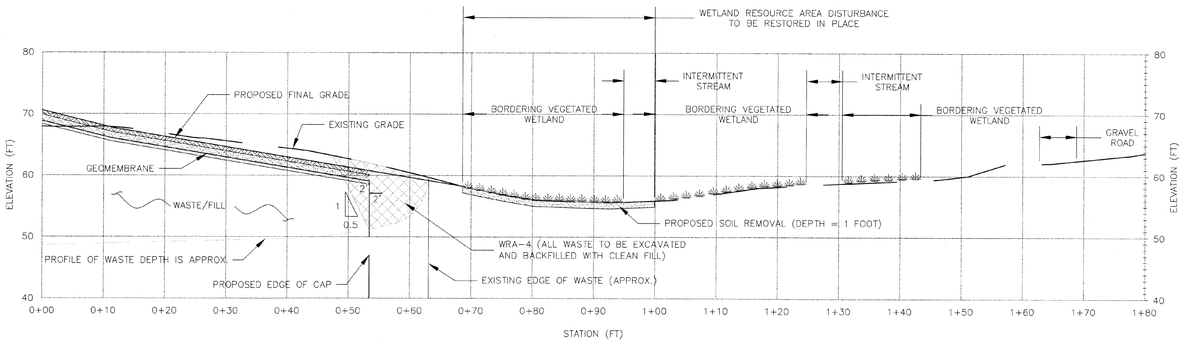
SHEET NO.
C-11

ACCESSION #0522-75140



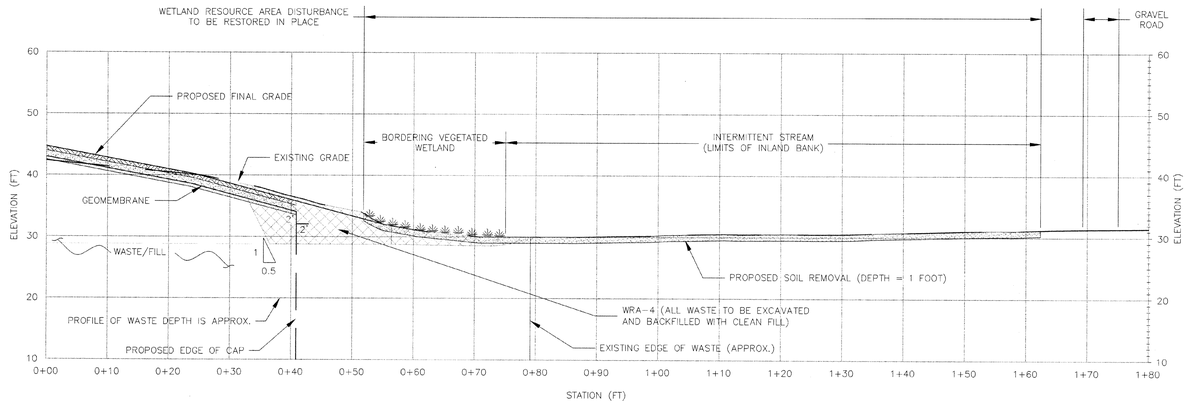
PLAN

1" = 40'



SCALE: HORIZONTAL 1"= 10' VERTICAL 1"=5'

PROFILE VIEW OF ALIGNMENT – A–A'



SCALE: HORIZONTAL 1"= 10' VERTICAL 1"=5'

PROFILE VIEW OF ALIGNMENT – A–A'

VERTICAL SCALE: 1"= 10'
HORIZONTAL SCALE: 1"= 10'

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	2/11	MJW	NEJ	REVISED FOR BIDDING AND TO INCORPORATE MASS DEP AND EPA COMMENTS

DESIGNED BY: N. JONES
DRAWN BY: N. JONES
SHEET CHK'D BY: D. CHRISTIAN
CROSS CHK'D BY: N. JONES
APPROVED BY: B. HASKELL
DATE: OCTOBER 2010

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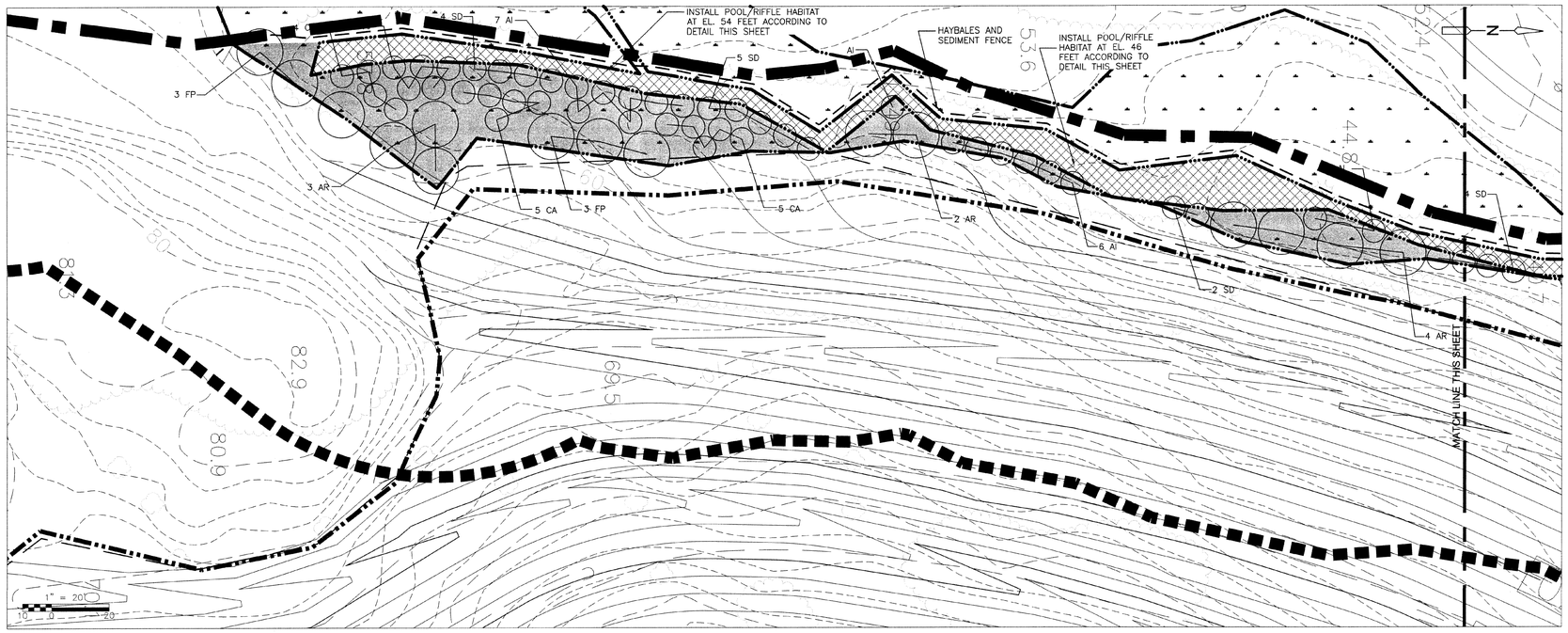
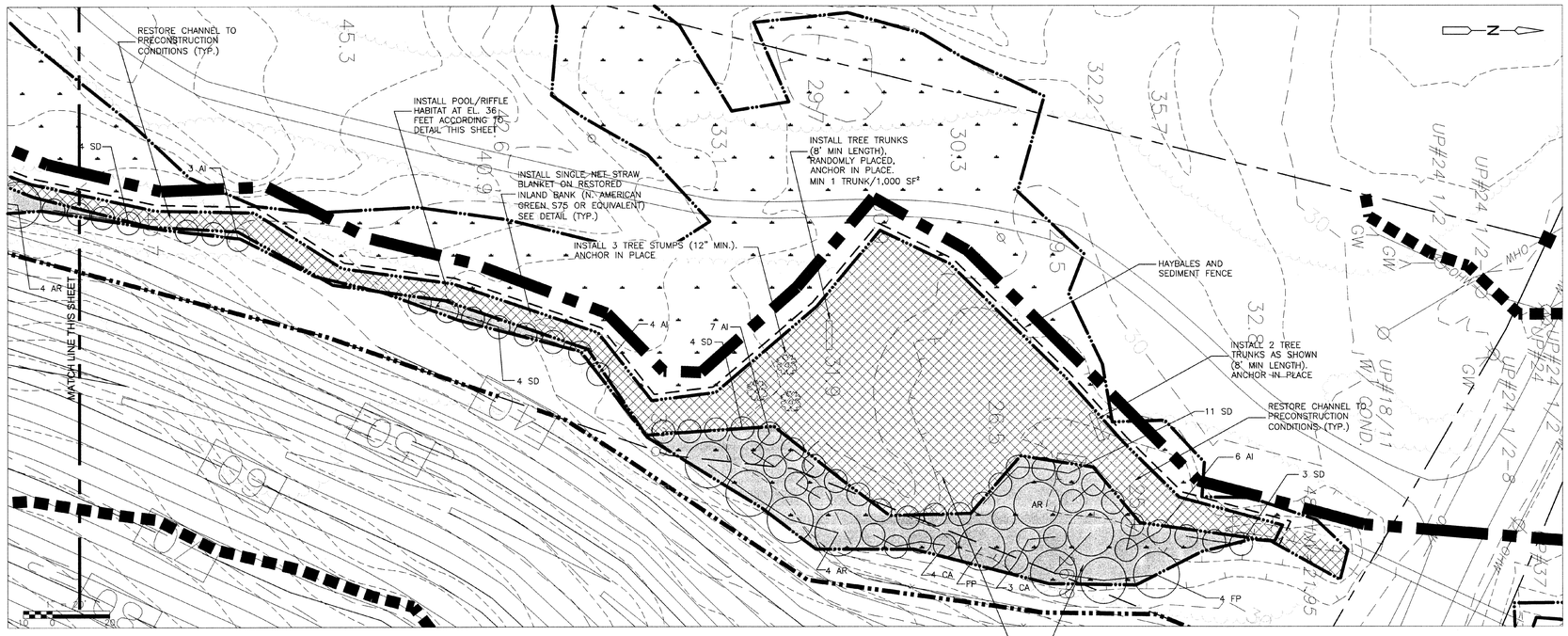
HAVERHILL, MASSACHUSETTS

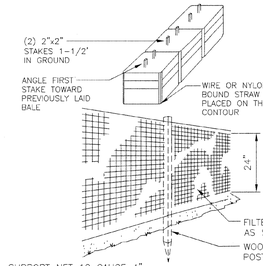
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
CORRECTIVE ACTION DESIGN

WETLAND REMEDIATION PLAN

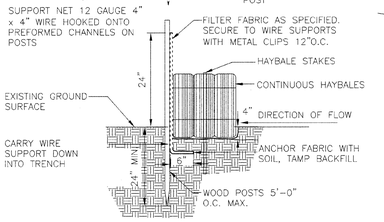
PROJECT NO. 0522-78856
FILE NAME: CSTPL012.DWG
SHEET NO.
C-12
ACCESSION #0522-75141

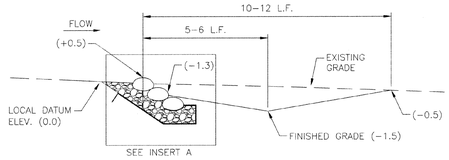


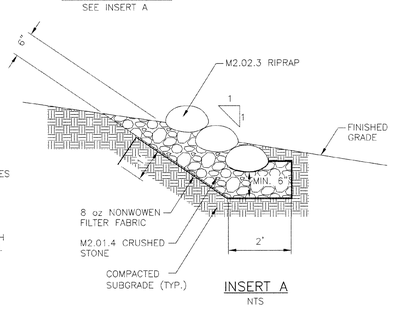




SEDIMENT FENCE WITH HAYBALES
NTS

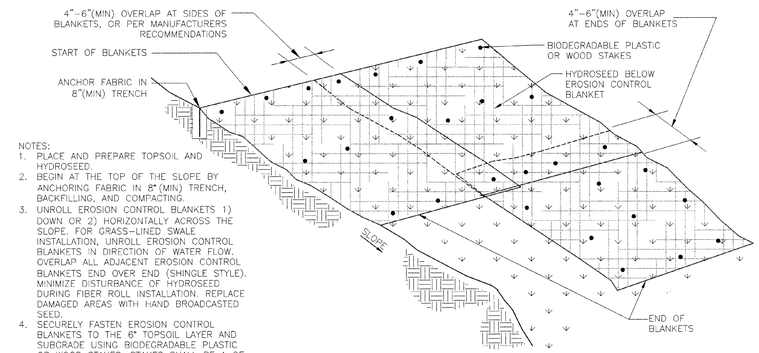






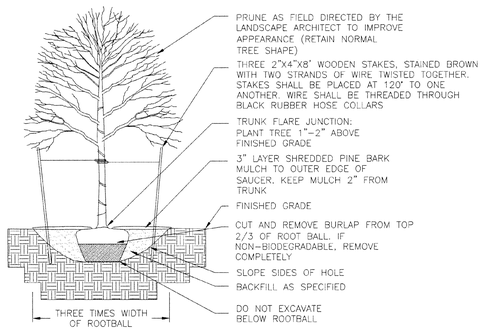
INSERT A
NTS

POOL/RIFFLE HABITAT
NTS

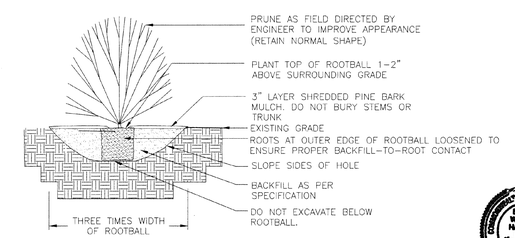


NOTES:
1. PLACE AND PREPARE TOPSOIL AND HYDROSEED.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING FABRIC IN 8"(MIN) TRENCH, BACKFILLING, AND COMPACTING.
3. UNROLL EROSION CONTROL BLANKETS 1) DOWN OR 2) HORIZONTALLY ACROSS THE SLOPE. FOR GRASS-LINED SWALE INSTALLATION, UNROLL EROSION CONTROL BLANKETS IN DIRECTION OF WATER FLOW. OVERLAP ALL ADJACENT EROSION CONTROL BLANKETS END OVER END (SHINGLE STYLE). MINIMIZE DISTURBANCE OF HYDROSEED DURING FIBER ROLL INSTALLATION. REPLACE DAMAGED AREAS WITH HAND BROADCASTED SEED.
4. SECURELY FASTEN EROSION CONTROL BLANKETS TO THE 6" TOPSOIL LAYER AND SUBGRADE USING BIODEGRADABLE PLASTIC OR WOOD STAKES. STAKES SHALL BE A OF SUFFICIENT LENGTH TO SECURE TO THE SUBGRADE. STAKE SPACING AND PATTERN SHALL BE AS RECOMMENDED BY THE MANUFACTURER. STAKE SPACING AND PATTERN SHOWN HEREIN IS FOR ILLUSTRATION PURPOSES ONLY.

EROSION CONTROL BLANKET
NTS



TREE PLANTING
NTS



SHRUB PLANTING
NTS

LEGEND

- PROPOSED EDGE OF HDPE CAP
- EDGE OF WASTE
- PROPERTY LINE
- LIMITS OF INLAND BANK
- LIMITS OF BORDERING VEGETATED WETLAND
- 10' EXISTING CONTOUR (DASHED WHERE INFERRED)
- 2' EXISTING CONTOUR (DASHED WHERE INFERRED)
- HAYBALES AND SEDIMENT FENCE
- TREE LINE
- 100' WETLAND BUFFER ZONE
- 60 — 10' PROPOSED FINAL CONTOUR
- 2' PROPOSED FINAL CONTOUR
- AREA OF INLAND BANK DISTURBANCE
- AREA OF BORDERING VEGETATED WETLAND DISTURBANCE
- AREA OF UNAFFECTED BORDERING VEGETATED WETLAND

PLANT SCHEDULE

		COMMON NAME	LATIN NAME	CONTAINER	APP. HEIGHT	COUNT	COMMENTS
TREES	AR	RED MAPLE	ACER RUBRUM	1.0-1.5" CALIPER		13	SPACE 15-FT
	FP	GREEN ASH	FRAXINUS PENNSYLVANICA	1.0-1.5" CALIPER		11	SPACE 15-FT
	AI	SPECKLED ALDER	ALNUS INCANA	#2	4-5'	41	SPACE 8-FT
	CA	SILKY DOGWOOD	CORNUS AMOMUM	#2	4-5'	21	SPACE 8-FT
	SD	PUSSY WILLOW	SALIX DISCOLOR	#2	4-5'	37	SPACE 8-FT

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	2/11	MJW	NEJ	REVISED FOR BIDDING AND TO INCORPORATE MASS DEP AND EPA COMMENTS

DESIGNED BY: M. LOFSTEDT
DRAWN BY: T. PETRUKHIN
SHEET CHK'D BY: D. CHRISTIAN
CROSS CHK'D BY: N. JONES
APPROVED BY: B. HASKELL
DATE: OCTOBER 2010

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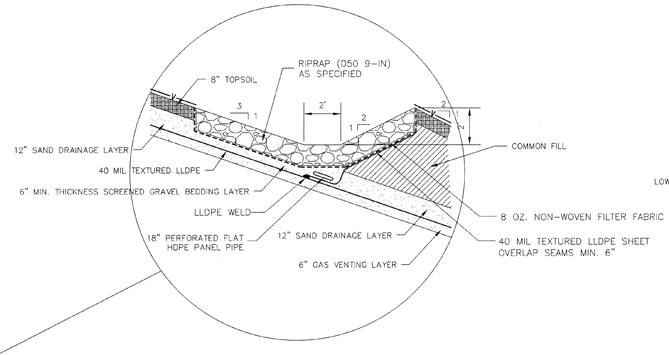
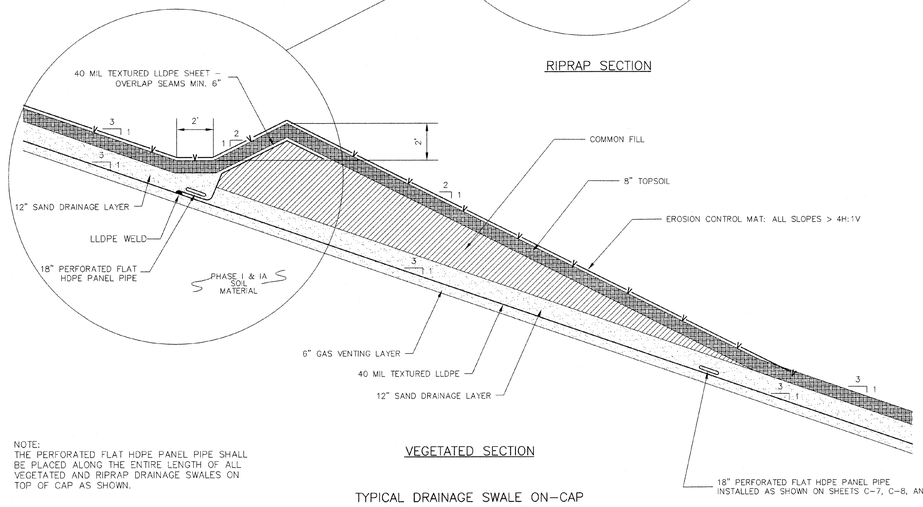
HAVERHILL, MASSACHUSETTS
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
CORRECTIVE ACTION DESIGN

WETLAND RESTORATION PLAN

PROJECT NO. 0522-78856
FILE NAME: CSTPL013.DWG
SHEET NO.
C-13
ACCESSION #0522-75142



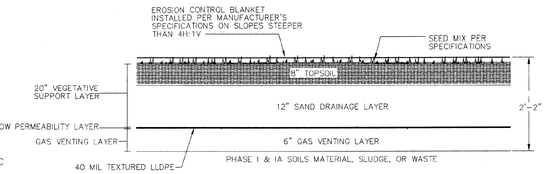
RIPRAP SECTION



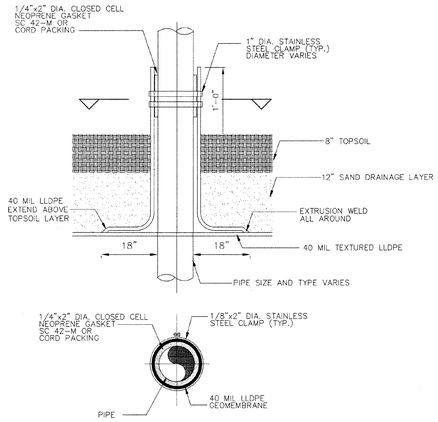
NOTE:
THE PERFORATED FLAT HDPE PANEL PIPE SHALL BE PLACED ALONG THE ENTIRE LENGTH OF ALL VEGETATED AND RIPRAP DRAINAGE SWALES ON TOP OF CAP AS SHOWN.

VEGETATED SECTION

TYPICAL DRAINAGE SWALE ON-CAP
DETAIL 1
N.T.S.

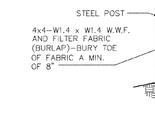


FINAL CAP SECTION
DETAIL 4
N.T.S.

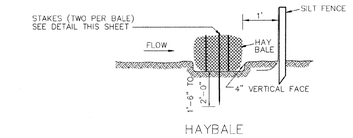


SECTION

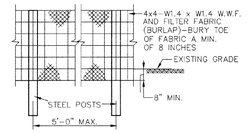
PIPE PENETRATION SEALING BOOT
DETAIL 5
N.T.S.



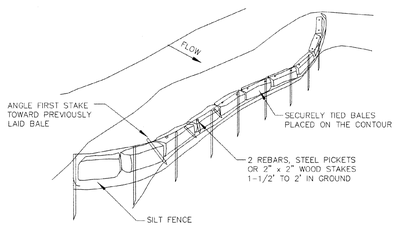
SILT FENCE EMBEDDING DETAIL



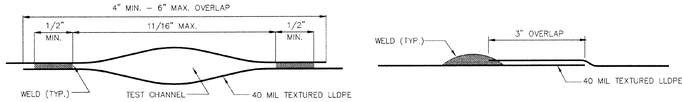
HAYBALE EMBEDDING DETAIL



SILT FENCE DETAIL



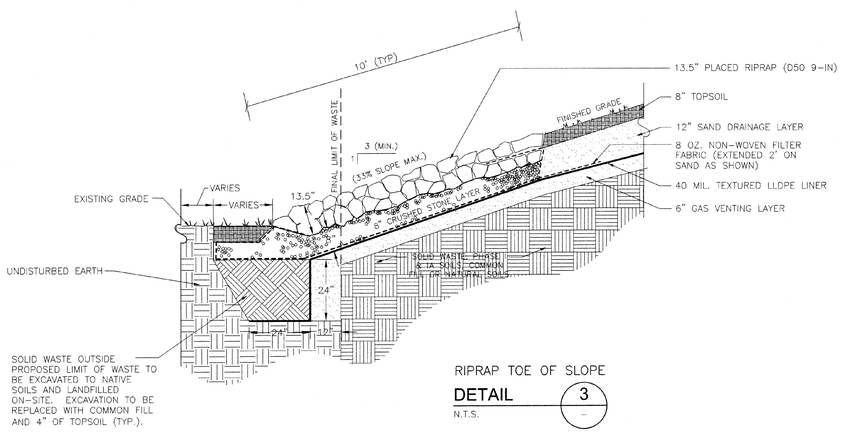
PLACEMENT AND ANCHORING DETAIL
HAYBALE SEDIMENT BARRIERS AND SILT FENCE



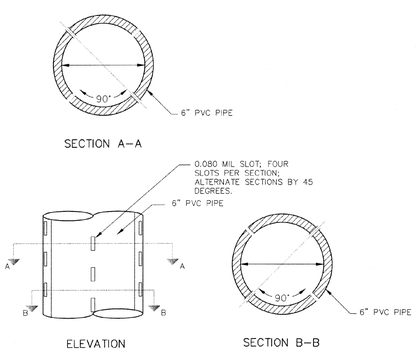
DOUBLE FUSION WELD (OPTION 1 – SEE SPECIFICATIONS)

EXTRUSION WELD (OPTION 2 – SEE SPECIFICATIONS)

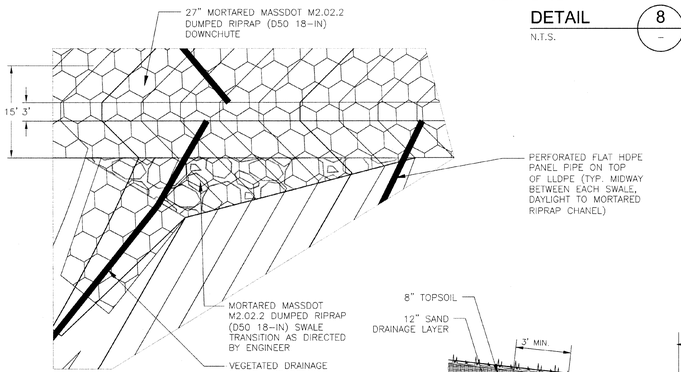
LLDPE WELD
DETAIL 2
N.T.S.



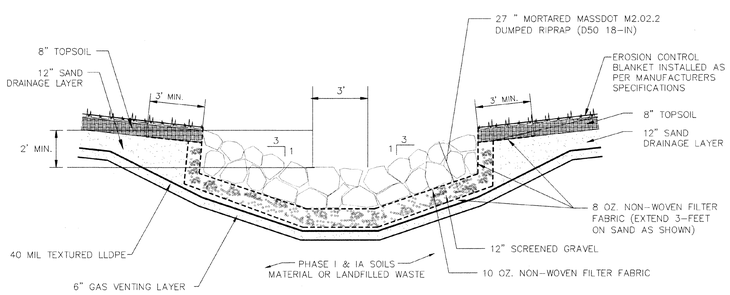
RIPRAP TOE OF SLOPE
DETAIL 3
N.T.S.



WELL SCREEN SLOTTING
DETAIL 6
N.T.S.



PLAN



SECTION

MORTARED RIPRAP DOWNCHUTE
DETAIL 9
N.T.S.

ANCHORING FOR HAYBALES AND SILT FENCE ON UN-CAPPED AREAS
DETAIL 8
N.T.S.

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	2/11	MJW	NEJ	REVISED FOR BIDDING AND TO INCORPORATE MASS DEP AND EPA COMMENTS

DESIGNED BY: N. JONES/J. CORCA
DRAWN BY: N. JONES
SHEET CHK'D BY: D. CHRISTIAN
CROSS CHK'D BY: N. JONES
APPROVED BY: B. HASKELL
DATE: OCTOBER 2010

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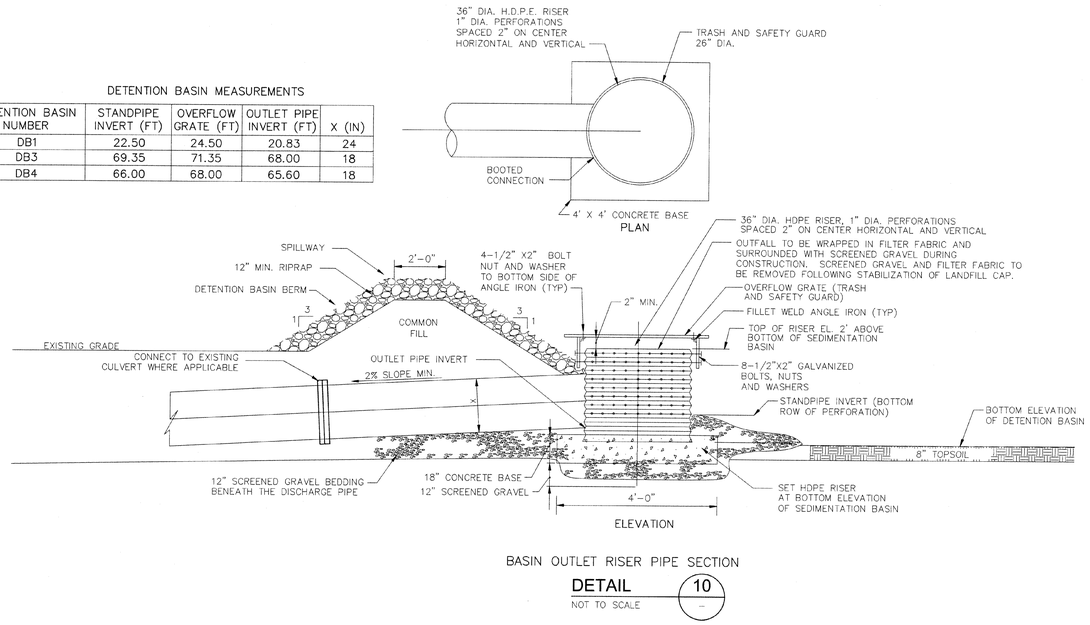
CITY OF HAVERHILL / AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
HAVERHILL, MASSACHUSETTS
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
CORRECTIVE ACTION DESIGN

CIVIL DETAILS I

PROJECT NO. 0522-78856
FILE NAME: CSTDT001
SHEET NO.
D-1
ACCESSION #0522-75143

DETENTION BASIN MEASUREMENTS

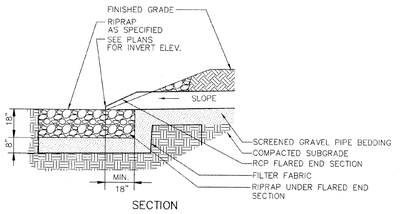
DETENTION BASIN NUMBER	STANDPIPE INVERT (FT)	OVERFLOW GRATE (FT)	OUTLET PIPE INVERT (FT)	X (IN)
DB1	22.50	24.50	20.83	24
DB3	69.35	71.35	68.00	18
DB4	66.00	68.00	65.60	18



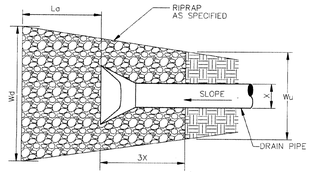
BASIN OUTLET RISER PIPE SECTION

DETAIL 10
NOT TO SCALE

	X	Wu	Wd	Lo	RIPRAP
FES1	2FT	6FT	12FT	10FT	D50 12-IN
BASIN 1 DOWNCHUTE	3FT	15FT	25FT	25FT	D50 24-IN
BASIN 1 NORTH	MATCH EXISTING,		SEE SHEET C-8		D50 24-IN
BASIN 1 SOUTH	MATCH EXISTING,		SEE SHEET C-8		D50 12-IN
BASIN 3 DOWNCHUTE	3FT	15FT	20FT	20FT	D50 24-IN
BASIN 3 NORTH	2FT	6FT	12FT	10FT	D50 12-IN
BASIN 3 SOUTH	2FT	6FT	7FT	5FT	D50 12-IN
BASIN 4	2FT	6FT	14FT	12FT	D50 12-IN

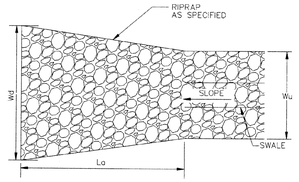


SECTION



PLAN

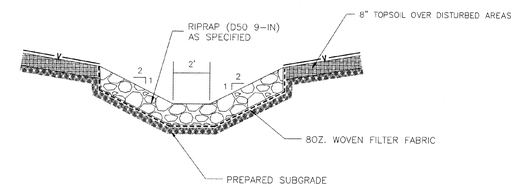
RIPRAP APRON – FLARED END



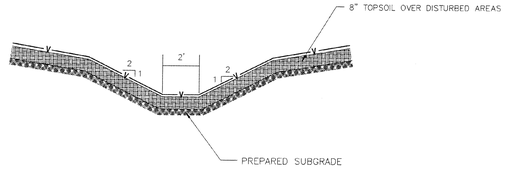
RIPRAP APRON – SWALE

RIPRAP APRON

DETAIL 11
SCALE: NTS



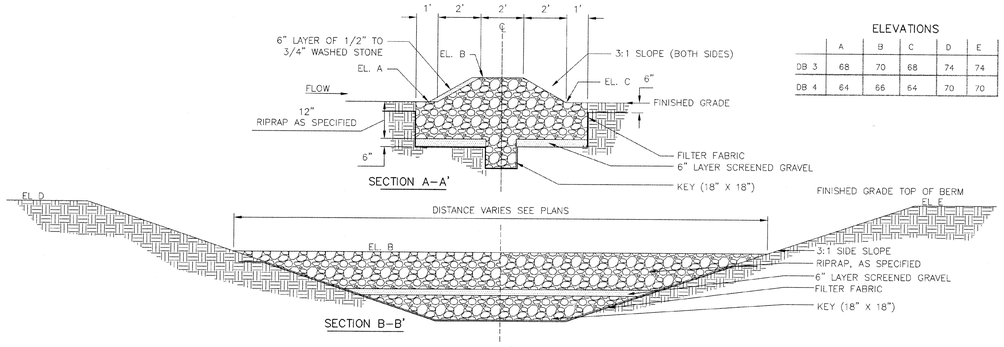
RIPRAP SECTION



VEGETATED SECTION

TYPICAL DRAINAGE SWALE OFF-CAP

DETAIL 15
NOT TO SCALE

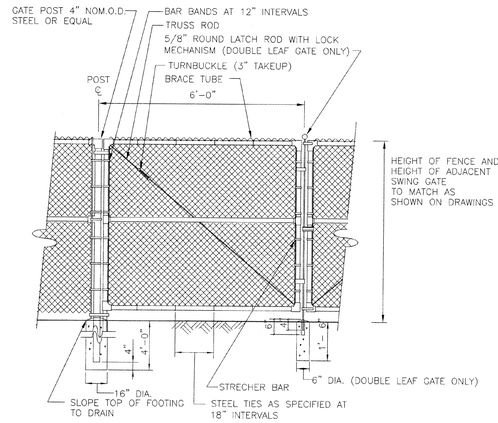


ELEVATIONS

	A	B	C	D	E
DB 3	68	70	68	74	74
DB 4	64	66	64	70	70

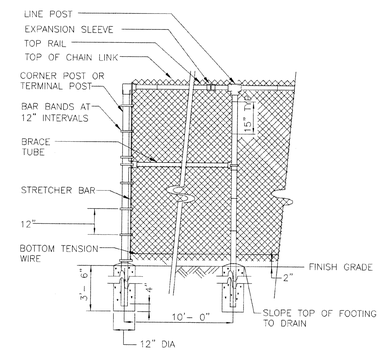
FOREBAY – NEW STORMWATER BASINS NO. 3 AND NO. 4

DETAIL 12
SCALE: NTS



CHAIN LINK FENCE-DBL LEAF SWING GATE

DETAIL 13
NOT TO SCALE



CHAIN LINK FENCE

DETAIL 14
NOT TO SCALE

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	2/11	MJW	NEJ	REVISED FOR BIDDING AND TO INCORPORATE MASS DEP AND EPA COMMENTS

DESIGNED BY: N. JONES
DRAWN BY: J. COROA
SHEET CHK'D BY: D. CHRISTIAN
CROSS CHK'D BY: N. JONES
APPROVED BY: B. HASKELL
DATE: OCTOBER 2010

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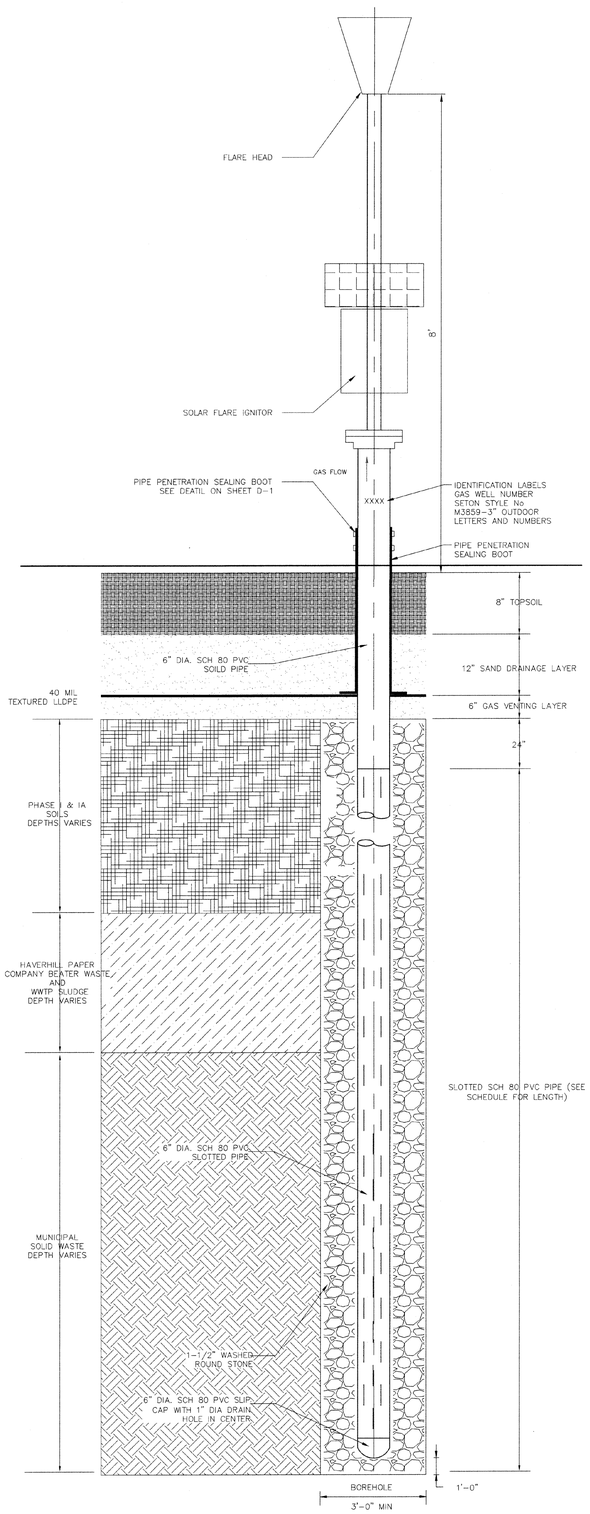
Camp Dresser & McKee
One Cambridge Place, 50 Hampshire Street
Cambridge, MA 02139
Tel: (617) 452-6000
consulting • engineering • construction • operations

CITY OF HAVERHILL / AGGREGATE INDUSTRIES - NORTHEAST REGION, INC.
HAVERHILL, MASSACHUSETTS
SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
CORRECTIVE ACTION DESIGN

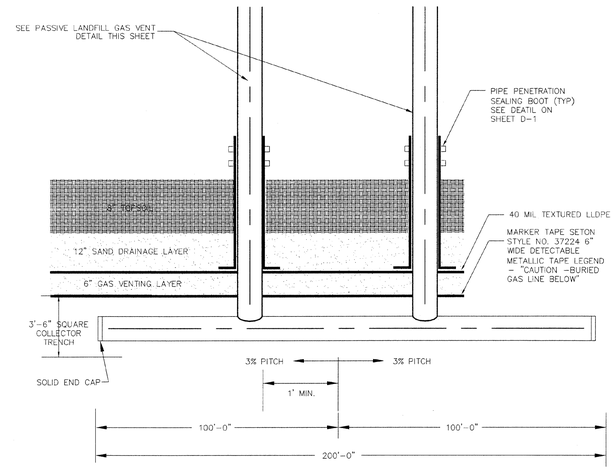
CIVIL DETAILS II

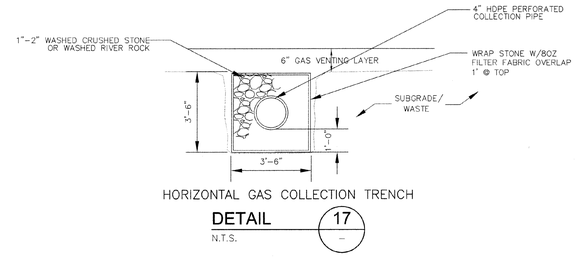
PROJECT NO. 0522-78856
FILE NAME: CSTDT002
SHEET NO. D-2
ACCESSION #0522-75144



TYPICAL PASSIVE LANDFILL GAS VENT WITH SOLAR IGNITED FLARE

DETAIL 16 — N.T.S.





HORIZONTAL GAS COLLECTION TRENCH

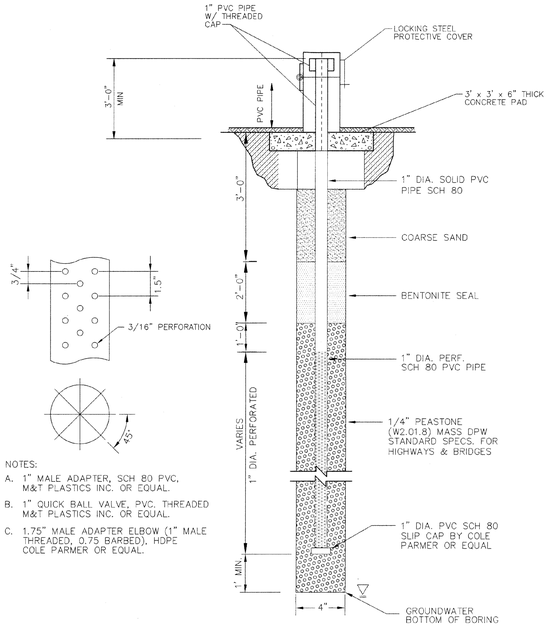
DETAIL 17 — N.T.S.

PASSIVE GAS VENT SCHEDULE

VENT NO.	GROUND EL. (FT)	BOTTOM EL. (FT)	SLOT. PIPE (FT)
G-1	59	23	32
G-2	69	24	41
G-3	78	25	49
G-4	89	25	60
G-5	98	27	67
G-6	102	30	68
G-7	109	34	71
G-8	114	35	75
G-9	132	37	91
G-10	114	41	69
G-11	116	44	68
G-12	111	46	61
G-13	93	45	44
G-14	76	36	36
G-15	44	37	13
G-16	74	28	42
G-17	76	26	46
G-18	76	25	47
G-19	74	24	46
G-20	62	21	37
G-21	117	26	87
G-22	133	27	102
G-23	132	30	98
G-24	133	33	96
G-25	135	39	92
G-26	142	35	103
G-27	142	33	105
G-28	124	28	92
G-29	135	31	100
G-30	140	36	100
G-31	138	38	96
G-32	136	32	100
G-33	95	31	64
G-34	95	31	64
G-35	85	27	58

NOTE: ALL ELEVATION ARE APPROXIMATE NGVD 1929.

GAS VENTS G-4, G-5, G-6, G-15, AND G-20 ARE LOCATED IN AREAS WITH LITTLE OR NO WASTE. SLOTTED PIPE SHALL BE INSTALLED ONE FOOT ABOVE THE LOWEST MUNICIPAL SOLID WASTE ELEVATION OF APPROXIMATELY 30 FEET.



NOTES:

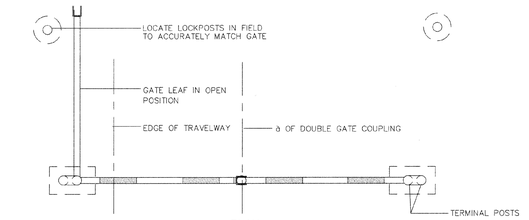
A. 1" MALE ADAPTER, SCH 80 PVC, M&T PLASTICS INC. OR EQUAL.

B. 1" QUICK BALL VALVE, PVC, THREADED M&T PLASTICS INC. OR EQUAL.

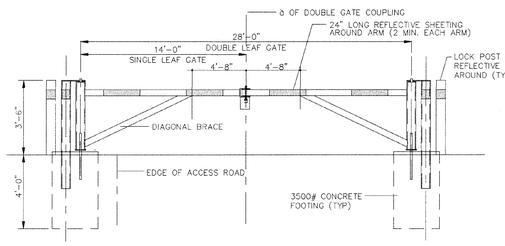
C. 1.75" MALE ADAPTER ELBOW (1" MALE THREADED, 0.75 BARBED), HDPE COLE PARMER OR EQUAL.

GAS MONITORING WELL (TYP.)

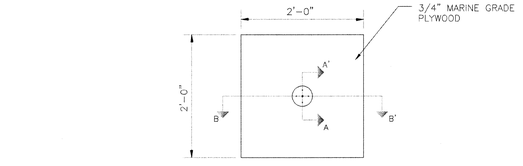
DETAIL 18 — N.T.S.



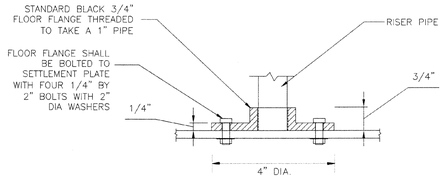
PLAN



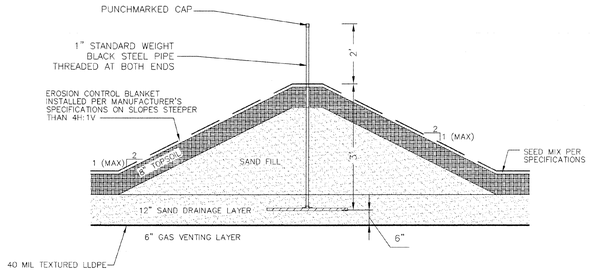
ELEVATION



PLAN VIEW



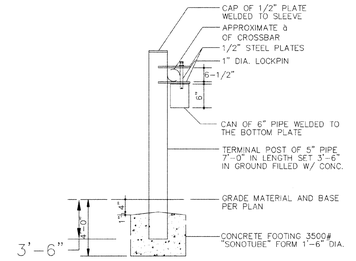
SECTION A-A'



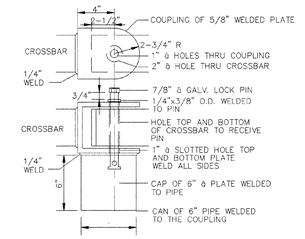
SECTION B-B'

SETTLEMENT MONITORING PLATFORM

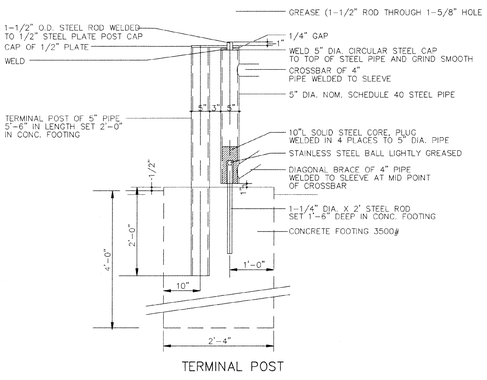
DETAIL 20 — N.T.S.



LOCK POST



COUPLING AND LOCK



TERMINAL POST

VEHICLE ACCESS GATE

DETAIL 21 — N.T.S.

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	2/11	MJW	NEJ	REVISED FOR BIDDING AND TO INCORPORATE MASS DEP AND EPA COMMENTS

DESIGNED BY: N. JONES
DRAWN BY: D. VAN SCHALKWYK
SHEET CHK'D BY: D. CHRISTIAN
CROSS CHK'D BY: N. JONES
APPROVED BY: B. HASKELL
DATE: OCTOBER 2010

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HAVERHILL, MASSACHUSETTS

SOUTHERN MOUND CLOSURE - HAVERHILL LANDFILL
CORRECTIVE ACTION DESIGN

CIVIL DETAILS III

PROJECT NO. 0522-78856
FILE NAME: CSTDT003

SHEET NO.
D-3

ACCESSION #0522-75145