

CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS FOR

PHASE II, III AND PARCEL C CAP
FORMER GORHAM MANUFACTURING SITE
333 ADELAIDE AVENUE
PROVIDENCE, RHODE ISLAND

Prepared for:

TEXTRON

Textron, Inc.
40 Westminster Street
Providence, Rhode Island 02908

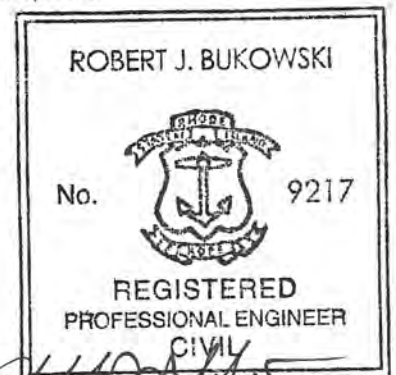
Prepared by:



Amec Foster Wheeler Environment and Infrastructure, Inc.

271 Mill Road
Chelmsford, Massachusetts 01824

June 2015



6/24/15

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SECTION 00200
INSTRUCTIONS TO BIDDERS

1. PART 1 - GENERAL

1.01 DESCRIPTION

A. BID OPENING of this project is scheduled for 2:00 p.m. Wednesday, June 3, 2015 at the Textron, Inc. office located at 40 Westminster Street, Providence, Rhode Island. Construction is intended to start on July 13, 2015, and must be substantially complete within 120 calendar days and finally complete by November 24, 2015.

a. A pre-bid meeting is scheduled for Tuesday, May 12, 2015, 10:00 a.m. at the Site located at 333 Adelaide Avenue, Providence, Rhode Island. Conference attendance is mandatory.

B. ESTIMATES OF QUANTITIES: The quantities listed herein for unit price items shall be considered as approximate. The bidders are encouraged to make their own quantity estimates in bid preparation. The lump sum bid items are based on the Plans and Specifications as presented herein and are irrespective of quantities of work. Bid prices for supplemental units shall reasonably reflect the costs included in the Lump Sum Items.

Unit and Lump Sum prices in the Bid Proposal shall not be unbalanced. Unbalanced bids may be cause for rejection.

C. CONTRACT DOCUMENTS AND SITE OF WORK: Before submitting a proposal, the bidder shall examine carefully the Contract Documents and the site of the proposed work. He shall satisfy himself as to the character, quality and quantities of work to be performed and materials to be furnished. The submission of a proposal by a bidder shall be conclusive evidence that the Bidder has complied with these requirements. Claims for additional compensation due to variation between conditions actually encountered in construction and as indicated by the plans, except for payment under the specific payment items included herein, will not be allowed, unless in full conformance with the General Conditions Section 4.2.

D. PREPARATION OF PROPOSAL: The bidder must submit his proposal on the Bid Proposal form included herein. The blank spaces for each item in the proposal forms shall be correctly filled in, by writing in words and numerals, in ink. The bidder must submit a price for each item in the proposal. In case of conflict between words and numerals, **the words shall govern**. The proposal shall be executed with ink in the complete and correct name of the individual, firm or corporation making the proposal and signed by the person or persons authorized to bind the individual, firm or corporation. Bids by corporations shall have the corporate seal affixed.

The bidder shall properly acknowledge all addenda in the spaces provided therefore on the proposal form and acknowledge submission of all required bid documents as shown on the proposal form.

E. ADDENDA: Bidders desiring further information or interpretation of the plans, specifications or other Contract Documents must make a request for such information in writing to the

Engineer, no later than seventy two (72) hours before the bid opening. Answers to such requests will be given in writing to all bidders, in addendum form, and all addenda will be bound with, and made a part of the Contract Documents. No other explanation or interpretation will be considered official or binding. The Engineer will not be responsible for any other interpretations of the plans, specifications or Contract Documents. Should a bidder find discrepancies in or omissions from the plans, specifications or other Contract Documents, or should he be in doubt as to their meaning, he should at once notify the Engineer in order that a written addendum may be sent to all bidders. Any addenda issued prior to forty eight (48) hours of the opening of bids will be mailed or delivered to each pre-qualified Contractor contemplating the submission of a proposal on this work. The proposal as submitted by the Contractor will be so constructed as to include any addenda, if such are issued by the Engineer prior to forty eight (48) hours of the opening of bids.

The Client reserves the right to postpone the bid opening date or time, without prior notice, as it deems to be in its best interests.

- F. REJECTION OF PROPOSALS: Proposals containing any omission, alteration of form, additions or conditions not called for, incomplete bids or proposals otherwise regular which are not accompanied by acceptable proposal guaranty will be considered irregular and may be rejected. In case of any ambiguity or lack of clarity in stating the prices in the proposal, the Client reserves the right to consider the most advantageous construction thereof, or to reject the proposal. Unreasonable or unbalanced bid prices may be cause to reject any proposal.
- G. PROPOSAL GUARANTY: Not Applicable
- H. DELIVERY OF PROPOSAL: Each completed proposal shall be placed in an envelope sealed or via electronic mail to gsimpson@textron.com and clearly identified on the outside as a proposal to the Client and including the project title and name and address of the bidder. When sent by mail, the sealed proposal, marked as indicated above, should be enclosed in an additional envelope. Proposals will not be considered unless received at the place and/or electronically on or before the time designated in this Instruction to Bid.
- I. WITHDRAWAL OF PROPOSALS: Any bidder, upon his written request, will be given permission to withdraw his proposal no later than the time set for the opening thereof.
- J. QUALIFICATION OF BIDDER: The qualifications, experience, and demonstrated ability to complete the work on time and as specified are of importance to the Client and will be given significant consideration in the selection of a bidder. Before being awarded the contract, the bidder may be required to submit such evidence as the Client may require to establish his financial responsibility, experience and possession of such equipment as may be needed to prosecute the work in an expeditious, safe and satisfactory manner.
- K. DISQUALIFICATION OF BIDDERS: The following are some of the causes which may be considered as sufficient for the disqualification of a bidder and the rejection of his proposal:
- (1) More than one proposal for the same work from an individual, firm, partnership or corporation.
 - (2) Evidence of collusion among bidders.
 - (3) Poor performance in the execution of work under previous contracts.

- (4) For being in arrears on existing contracts, or having defaulted on a previous contract.

The Client reserves the right to waive any informalities in any or all proposals, to reject any or all proposals, or accept any proposal submitted for the project, as deemed by the Client to be in its best interest based upon qualifications, experience, demonstrated ability to perform, cost, or other factors deemed by the Client to bear on the successful outcome of the Contract.

- L. **CONSIDERATION OF PROPOSALS:** For the purpose of award, after the proposals are opened and read, the summation of the products of the approximate quantities shown in the proposal by the lump sum or unit bid prices will be considered the amount of the bid.

The information provided by bidders shall be evaluated to determine compliance with the requirements of the project and other comparative favorability to the Client. The Client reserves the right to reject any and all proposals and waive technicalities as may be considered to be in the best interest of the Client.

- M. **SUBMISSION OF POST BID INFORMATION:** Upon request by the Engineer, selected bidders shall within two (2) calendar days thereafter submit the following:

- (1) A designation of the work to be performed by the bidder with his own forces.
- (2) A list of the names of the subcontractors or other persons or organizations (including those who are to furnish materials or equipment fabricated to a special design) proposed for such portions of the work. The bidder will be required to establish to the satisfaction of the Client the reliability and responsibility of the proposed subcontractors to furnish and perform such portions of the work.
- (3) Prior to the award of Contract, the Client will notify the bidder in writing if the Client, after due investigation, has reasonable and substantial objection to any person or organization on such list. If the Client has a reasonable and substantial objection to any person or organization on such list, and refuses in writing to accept such person or organization, the bidder may, at his option, withdraw his bid without forfeiture of bid security, notwithstanding anything to the contrary contained herein. If the bidder submits an acceptable substitute with an increase in his bid price to cover the difference in cost occasioned by such substitution, the Client may, at its discretion, accept the increased bid price or may disqualify the bidder. Subcontractors and other persons and organizations proposed by the bidder and accepted by the Client must be used on the work for which they were proposed and accepted and shall not be changed except with the written approval of the Engineer.
- (4) A proposed work schedule demonstrating the Bidder's plan to complete the work in the required time frame.

- N. **AWARD OF CONTRACT:** Only one Contract will be awarded for all the work called for in the plans and specifications.

- O. **RETURN OF PROPOSAL GUARANTY:** Not Applicable

P. EXECUTION OF CONTRACT AND BONDS: The Contract will include all Contract Documents. Within seven (7) days after award of the Contract, the successful bidder shall execute the Contract in triplicate, and furnish the Client with Performance and Payment Bonds each in the full amount of the Contract price executed by a surety company acceptable to the Client. The Bonds are to be furnished as a guaranty of the faithful performance of the work and for protection of the claimants for labor and materials.

Q. FAILURE TO EXECUTE CONTRACT AND BONDS: Should the bidder to whom the Contract is awarded refuse or neglect to execute the Contract and furnish the required bonds within seven (7) days after notice of award of the Contract, at the option of the Client, the bidder's proposal shall be treated as withdrawn.

1.02 RELATED WORK SPECIFIED ELSEWHERE

Not applicable.

PART 2 – PRODUCTS

Not applicable.

PART 3 – EXECUTION

Not applicable.

END OF SECTION

SECTION 00330

EXISTING CONDITIONS AND SUBSURFACE INFORMATION

PART 1 - GENERAL

1.01 UNDERGROUND UTILITY DESCRIPTION

- A. There are historical abandoned utilities located within the Work Area of the Site. There is a storm drain from the detention pond which outlets to the Inner Cove which will remain active during a portion of the work and require rerouting during the dewatering of the Inner Cove. A portion of the work is also within active utility and railroad easements. The Contractor shall exercise extreme caution when working in the vicinity of existing active utilities and rail lines.
- B. Existing known utilities are shown on the Drawings. Utilities are shown diagrammatically and should be considered incomplete. It should not be inferred that the locations shown are precise, or that all existing utilities or underground structures are depicted.
- C. The Contractor shall locate or have located all existing utilities or underground structures in the vicinity of the Work Area on the Site. All utilities will be identified and marked in the field in accordance with required Rhode Island regulations. The Contractor shall contact Dig-Safe (1-888-DIG-SAFE) prior to commencing any on-site excavation.
- D. The Contractor shall be responsible for any and all work-related damage to any existing utilities, which are not to be abandoned and are to remain in service.
- E. The Contractor shall contact the affected utility or property owner as soon as any damage is discovered.

1.02 SUBSURFACE DESCRIPTION

- A. Various subsurface explorations have been conducted for the sole purpose of assisting the Engineer in the evaluation of the extent of on-site contamination. Logs of these explorations are included in Attachment A.
- B. Explorations are not intended to indicate subsurface conditions except at the locations of the borings and are based on the information available and the Engineer's interpretations at the time borings were made.
- C. Explorations were not made for the purposes of determining or facilitating the constructability of the project or the cost thereof. Therefore, they may not be suitable or adequate for any purpose other than for the Engineer's use in designing the project.
- D. Any reuse of the exploration logs or other subsurface information, including, without limitation, any subsurface investigation prepared by the Engineer on behalf of the Client, by the Contractor or its subcontractors, regardless of tiers, shall be at its own risk and without legal liability on the Engineer or Client. Therefore, the Contractor shall indemnify and hold the Engineer and Client harmless from all claims, damages, expenses, or costs resulting from the Contractor's interpretation of this information.

- E. Additional test borings and other exploratory operations may be made by the Contractor at no cost to the Client.

1.03 SUMMARY OF SOIL PARAMETERS

The Contractor shall review the available subsurface information (and conduct additional explorations as deemed necessary) to develop independent soil parameters for the purposes of shoring design, slope stability, and constructability.

1.04 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01500: Temporary Facilities and Controls
- B. Section 02110: Waste Excavation, Removal, and Handling
- C. Section 02221: Select Site Demolition
- D. Section 02231: Clearing and Grubbing
- E. Section 02235: Temporary Dam
- F. Section 02300: Earthwork
- G. Section 02522: Groundwater Monitoring Wells
- H. Section 02526: Well Abandonment

PART 2 – PRODUCTS

Not applicable.

PART 3 – EXECUTION

Not applicable.

END OF SECTION

SECTION 00410
BID FORM

BIDDER: _____

PROJECT: Phase II, III and Parcel C Cap

CLIENT: Textron, Inc.

The undersigned, hereafter referred to as the BIDDER has examined the Contract Documents prepared in connection herewith by the ENGINEER. In addition, he has examined the site and is familiar with all the conditions surrounding the Work contemplated. He hereby submits the following:

BIDDER agrees to perform all the work described in the CONTRACT DOCUMENTS for the following unit prices or lump sums:

BID PROPOSAL
PART I – BASE BID

NO.	ITEM	UNIT	EST QTY	LUMP SUM OR UNIT PRICE (WORDS)	LUMP SUM OR UNIT PRICE (FIGURES)	TOTAL PRICE (FIGURES)
1.	General Conditions	L.S.	1	_____ _____ _____ Dollars and _____ cents per lump sum.	\$ _____	\$ _____
2.	General Site Work	L.S.	1	_____ _____ _____ Dollars and _____ cents per lump sum.	\$ _____	\$ _____
3.	Clearing and Grubbing	L.S.	1	_____ _____ _____ Dollars and _____ cents per lump sum.	\$ _____	\$ _____
4.	Upland Excavation and Filling	L.S.	1	_____ _____ _____ Dollars and _____ cents per lump sum.	\$ _____	\$ _____

NO.	ITEM	UNIT	EST QTY	LUMP SUM OR UNIT PRICE (WORDS)	LUMP SUM OR UNIT PRICE (FIGURES)	TOTAL PRICE (FIGURES)
5.	Sediment Removal and Dewatering	L.S.	1	_____ _____ _____ Dollars and _____ cents per lump sum.	\$ _____	\$ _____
6.	Geotextile	L.S.	1	_____ _____ _____ Dollars and _____ cents per lump sum.	\$ _____	\$ _____
7.	Common Soil	L.S.	1	_____ _____ _____ Dollars and _____ cents per lump sum.	\$ _____	\$ _____
8.	Inner Cover Cap (10% Organic Soil Mix)	L.S.	1	_____ _____ _____ Dollars and _____ cents per lump sum.	\$ _____	\$ _____
9.	20% Organic Soil	L.S.	1	_____ _____ _____ Dollars and _____ cents per lump sum.	\$ _____	\$ _____
10.	Restoration, Loam, and Seed	L.S.	1	_____ _____ _____ Dollars and _____ cents per lump sum.	\$ _____	\$ _____

Total Price Part I (Items 1 – 10)

(Figures) _____

(Written) _____

dollars and _____

cents

**BID PROPOSAL
PART IA – QUANTITY INFORMATION**

BIDDER shall provide the following information along with the above bid form:

Indicate the number of in-situ cubic yards of sediments estimated by BIDDER under Bid Item No. 5, to be removed	_____CY
Indicated the number of in-situ cubic yards of dewatered, processed, amended, and compacted at the dredge material consolidation area, accounting for all loss or gain of volume upon final placement	_____CY
Indicate the number of cubic yards of Inner Cover Cap material (10% Organic Soil Mix) to be provided under Bid Item No. 8	_____CY
Indicate the number of cubic yards of 20% Organic Soil Mix to be provided under Bid Item No. 9	_____CY

PART II - SUPPLEMENTAL UNIT PRICES

Should certain additional work be required, or should quantities of certain classes of work be increased or decreased from those on which the Contract Sum is based, by order or approval of the Engineer, the undersigned agrees that the following supplemental unit prices may be used as the basis of payment to him/her or credit to the Client for such addition, increase, or decrease in the work as determined solely by the Client.

Supplemental prices shall cover all costs, complete in place, and the prices given shall balance with the respective amount per unit to be paid to the Contractor under applicable items of Part I – Base Bid, or refunded to the Client (in the case of deductions or decreases). No additional adjustments will be allowed for overhead, profit, insurance, or indirect expenses of the Contractor beyond the prices as listed. Client has the right to reject any or all supplemental unit prices when in Client’s opinion the price appears not to be balanced with Client’s assessment of balanced prices in comparison to other bidders.

PART II – SUPPLEMENTAL UNIT PRICE ITEMS

NO.	ITEM	Unit	UNIT PRICE (WORDS)	UNIT PRICE (FIGURES)
SU-1	Addition or Reduction in Clearing and Grubbing	Ac.	_____ _____ _____ Dollars and _____ cents per acre.	\$ _____
SU-2	Addition or Reduction in Upland Excavation and Filling	C.Y.	_____ _____ _____ Dollars and _____ cents per cubic yard.	\$ _____
SU-3	Addition or Reduction in Sediment Removal and Dewatering	C.Y.	_____ _____ _____ Dollars and _____ cents per cubic yard.	\$ _____
SU-4	Addition or Reduction in Geotextile	S.Y.	_____ _____ _____ Dollars and _____ cents per square yard.	\$ _____

SU-5	Addition or Reduction in Common Soil	C.Y.	_____ _____ ____ Dollars and _____ cents per cubic yard.	\$ _____
SU-6	Addition or Reduction in 10% Organic Soil	C.Y.	_____ _____ ____ Dollars and _____ cents per cubic yard.	\$ _____
SU-7	Addition or Reduction in 20% Organic Soil	C.Y.	_____ _____ ____ Dollars and _____ cents per cubic yard.	\$ _____
SU-8	Addition or Reduction in Loam	C.Y.	_____ _____ ____ Dollars and _____ cents per cubic yard.	\$ _____
SU-9	Addition or Reduction in Seeding	Ac.	_____ _____ ____ Dollars and _____ cents per square yard.	\$ _____ -

The Bidder agrees to **add or deduct** work required by the Client or Engineer for the above mentioned Lump Sum, Unit, or Supplemental Unit prices (as applicable).

The undersigned, as Contractor declares the following:

- (1) The only parties interested in the BID as Principals are named herein;
- (2) This BID is made without collusion with any other person, firm, or corporation;
- (3) The Bidder has carefully examined the site of the proposed work and is fully informed and is satisfied as to the conditions there existing, the character and requirements of the proposed Work, and the difficulties attendant upon its execution. The Bidder has carefully read and examined the Drawings, the proposed AGREEMENT and the Specifications and other Contract Documents therein referred to and knows and understands the terms and

provisions thereof;

- 4) The Bidder understands the information relative to subsurface and other conditions, natural phenomena, existing pipes and other structures (surface and/or subsurface) has been furnished only for his information and convenience without any warranty or guarantee, expressed or implied, that the subsurface and/or other conditions, natural phenomena, existing pipes and other structures (surface or subsurface) actually encountered will be the same as those shown on the Drawings or in any other Contract Documents and he agrees that he shall not use or be entitled to use such information made available to him through the Contract Documents or otherwise obtained by him in his own examination of the site, as a basis of or ground for any claim against the Client or Engineer arising from or by reasons of any variance which may exist between the aforesaid information made available to, or otherwise obtained by, him and the subsurface and/or other conditions, natural phenomena, existing pipes and other structures (surface and/or subsurface) actually encountered during the construction work, and he has made due allowance therefore in the BID;
- (5) He understands that all reports of investigations and tests of subsurface physical conditions at the site and other information affecting the performance of the Work which have been relied upon by the Engineer in preparation of the Drawings and Specifications are not guaranteed as to accuracy or completeness and are not part of the Contract Documents.
- (6) And he understands that the quantities of work tabulated in this Proposal and indicated on the Drawings and in the Specifications and other Contract Documents are approximate and are subject to increase or decrease as deemed necessary by the Engineer, and as allowed for under the Contract Documents.

The undersigned agrees that for extra work, if any, authorized in writing by the Engineer to be performed by him in accordance with the terms and provisions of the Agreement, he will accept compensation as stipulated in the Contract Documents in full payment for such extra work, and agrees that for reductions in work as directed by the Engineer, he will accept reduced compensation as stipulated in the Contract Documents.

If this Bid Proposal is accepted by the Client, the undersigned agrees to substantially complete the work in accordance with the schedule for substantial completion of work per the Special Conditions, provided to be done under the Contract, and accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete any element of the work on time, except as otherwise expressly provided in the AGREEMENT.

Liquidated damages in the amount of **\$1,000 for each calendar day** of delay from the date established for Substantial Completion and or Contract Completion as provided in Section 00200.

The Bidder hereby agrees that, once opened, he will not withdraw this Bid within 60 days of Bid opening, and that if the Client shall accept this Bid, the Bidder will duly execute the Contract and provide BONDS as provided in paragraph 16 of Instructions to Bidders.

Respectfully Submitted:

Name Company

By: _____
Name (Printed)

Address

Title

Address

Signature

Date

(SEAL if Proposal is by a Corporation)

Attest

ADDENDA

The BIDDER acknowledges receipt of the following Addenda*

No. _____ Dated

No. _____ Dated

No. _____ Dated

No. _____ Dated

No. _____ Dated

No. _____ Dated

** to be filled in as appropriate*

**SECTION 00510
NOTICE OF AWARD**

Dated _____, 20 ____

TO: _____
 (BIDDER)

ADDRESS: _____

CLIENT'S PROJECT NO. N/A

PROJECT: Phase II, III, and Parcel C Cap

CLIENT'S CONTRACT NO. N/A

CONTRACT FOR: Former Gorham Manufacturing Site – Phase II, III and Parcel C Cap
(Insert name of contract as it appears in the Bid Documents)

You are notified that your Bid dated _____, 2015 for the above Contract has been considered. You are the apparent successful bidder and have been awarded a contract for

_____ (Indicate total Work, alternates or sections of Work awarded)

The Contract Price of your contract is _____ Dollars (\$_____).

Three copies of each of the proposed Contract Documents (except Drawings) accompany this Notice of Award. Three sets of the Drawings will be delivered separately or otherwise made available to you immediately.

You must comply with the following conditions precedent within seven (7) days of the date of this Notice of Award, by _____, 20 ____ .

1. You must deliver to the CLIENT three (3) fully executed counterparts of the Agreement including all the Contract Documents. This includes three (3) sets of Drawings. Each of the Contract Documents must bear your signature on (the cover) every page.

2. You must deliver with the executed Agreement the Contract Security (Bonds) as specified in the Information for Bidders and General Conditions.

3. (List other conditions precedent).

Failure to comply with these conditions within the time specified will entitle **CLIENT** to consider your bid abandoned, to annul this Notice of Award and to declare your Bid Security forfeited.

Within ten (10) days after you comply with those conditions, **CLIENT** will return to you one fully signed counterpart of the Agreement with the Contract Documents attached.

(CLIENT)

By _____
(AUTHORIZED SIGNATURE)

(TITLE)

SECTION 00520
AGREEMENT FOR REMEDIATION SERVICES

This Agreement is made and entered into as of the ____ day of _____, 2015, by and between Textron Inc., a Delaware corporation (hereinafter all referred to as "Client"), and _____, a _____ corporation ("Contractor").

WHEREAS, this Agreement is for the performance of the professional services ("Work") described in the Contract Documents. Client issues to Contractor during the term of this Master Services Agreement at the location described in such Contract Documents;

WHEREAS, Contractor represents and warrants that it possesses the requisite knowledge, ability, and professional experience, skill, and qualifications to perform the Work in accordance with Client's requirements and the requirements of any applicable government order, demand or permit;

WHEREAS, Contractor acknowledges that Client has relied on this representation and warranty in its selection of Contractor;

WHEREAS, Client has selected Amec Foster Wheeler Environment and Infrastructure, Inc. of 271 Mill Road, Chelmsford, Massachusetts 01824 (hereinafter referred to as "Engineer") to oversee the work on the Client's behalf;

WHEREAS Contractor is willing to provide these services for the consideration and on the terms stated under this Agreement;

NOW, THEREFORE, in consideration of these premises and of the mutual covenants set forth herein, Client and Contractor agree as follows:

1. CONTRACT DOCUMENTS

1.1 Contract Documents includes the Contract Plans, Contract Specifications, and any other documents specifically referenced therein. The Contract Documents shall also include any applicable governmental standards, government order (whether unilateral or by consent), decree, demand, permit, record of decision, or Contract referenced by or incorporated into any of the foregoing documents, pursuant to which such work is performed regardless of whether any of the foregoing documents are specifically referenced in the Contract Documents.

2. SERVICES OF THE CONTRACTOR

2.1 Contractor shall perform the Work described in the Contract Documents and all applicable federal, state, and local laws.

2.2 If requested in the Contract Documents, the following services shall be provided by Contractor under Section 2.1:

- 2.2.1 Serving as remediation contractor and hiring all necessary subcontractors for performance of the Work.
- 2.2.2 Constructing and implementing the remedy, as described in Contract Documents.

- 2.2.3 Providing oral or written reports concerning construction progress, technical issues, regulatory issues, and other information reasonably requested by Client.
- 2.2.4 Obtaining temporary easements, rights of way, and access to enter upon public and/or private lands required to perform the Work, as reasonably requested by Client.
- 2.2.5 Obtaining all federal, state and local permits and approvals necessary for the Work or required under the Contract Documents, and submitting timely applications and requests for all such permits and approvals.
- 2.2.6 Securing and maintaining insurance coverage in the amounts and categories described in Section 17 of this Agreement and in the Contract Documents.

2.3 The Work will be completed in accordance with the substantive and procedural requirements of the Contract Documents and will be designed to achieve, and will meet, all performance standards, cleanup levels, and other requirements set forth in the Contract Documents.

2.4 In agreeing to perform the services under this Agreement for the Contract Price, Contractor recognizes and assumes the following risks inherent in performing the Work: the level of effort required to perform administrative obligations as indicated in the Contract Documents, secure needed permits and other government approvals, and construct remedial facilities; variances in the quantities of materials of construction; constructability of the components and productivity of the work force and equipment during construction of remedial facilities; and construction cost increases due to price changes or inflation.

2.5 The Work will be performed in a manner to avoid the incurrence of any work or cost obligation for which Client rather than Contractor would be responsible under this Agreement. If such work or cost obligation cannot be avoided, Contractor shall provide Engineer with prompt written notice of any event, occurrence, condition, fact, claim, or circumstance that caused, will cause, or might reasonably be expected to cause the incurrence of such obligation.

3. AMOUNT AND METHOD OF PAYMENT

3.1 Contractor shall supply all labor, equipment, materials, utilities, management, supervision, and subcontractors necessary to perform the Work in accordance with this Agreement and the Contract Documents.

- 3.1.1 Contractor shall submit simultaneously with each invoice the necessary supporting information, which shall contain adequate detail to permit Client and Engineer to verify the invoice and Contractor's estimates of the percentage of Work completed, including a statement of the percentage of Work completed in, and the full amount to be invoiced for, each item of Work activity. Upon Client and Engineers verification of the invoice and percentage of Work completed, Client shall pay to Contractor the properly invoiced amount less ten percent (10%) of the full value of the invoice (the "Retainage"). If any invoiced amount is disputed, Client shall pay the undisputed amount, and shall use best efforts to resolve the dispute with Contractor prior to Contractor's issuance of the next invoice. All Retainage Amounts shall be disbursed in accordance with Section 3.1.6 of this Agreement.

- 3.1.2 Each invoice submitted by Contractor shall constitute a representation by Contractor that (i) the amount requested is justly due based on Contractor's best good faith estimates of the percentage of Work completed, (ii) the Work which is the subject of the invoice has been performed in accordance with this Agreement and the Contract Documents, (iii) the materials, supplies, and equipment for which such invoice is submitted have been installed at the Site, (iv) the materials, supplies, and equipment for which such invoice is submitted are not subject to any encumbrances, and, (v) no mechanics', laborers', vendors', materialmen's, or other liens have been filed in connection with or on account of the Work or any of the materials, supplies, or equipment incorporated therein or purchased in connection therewith.
- 3.1.3 Invoices shall be due and payable within thirty (30) calendar days after receipt of the invoice and the necessary supporting information. Client shall notify Contractor in writing of any disputed amount within twenty (20) calendar days after receipt of the invoice.
- 3.1.4 Client shall have the right at its own expense to audit Contractor's books and documents relating to the Agreement during the period in which the Work is being performed and for one (1) year following termination of this Agreement. Any such audits may be carried out at reasonable intervals and shall be accomplished during normal business hours.
- 3.1.5 In the event that Contractor fails, neglects, or refuses to comply with any material provision of this Agreement, Client may withhold payment from Contractor until there has been compliance with such provision to the extent the payment is directly related to the failure, neglect, or refusal of Contractor or damage suffered by Client.
- 3.1.6 Within sixty (60) days of the submission by Contractor to Client of the Final Completion Certification that all components of the Work are constructed in accordance with the Contract Documents and with all applicable statutory and regulatory requirements and are properly operating, Client shall either approve or reject the certification, and, upon Client's approval of the submitted or resubmitted certification, which approval shall not be unreasonably withheld, shall pay to Contractor all Retainage Amounts.
- 3.1.7 When applicable within thirty (30) days of: (1) Client's receipt of written notice of the government agency ("Agency") overseeing the Work's determination that all remedial construction has been completed, or if the Agency indicates that such a determination is not required, Client's receipt of written notice of the Agency's approval of Contractor's closeout reports for all components of the remedy, and, following Client's receipt of the Agency's determination or approval, (2) the submission by Contractor to Client of the Final Completion Certification that all components of the remedy have been constructed in accordance with the Contract Documents and with all applicable statutory and regulatory requirements and are properly operating, Client shall pay to Contractor all Retainage Amounts.
- 3.1.8 No payment (including payment of the Retainage Amounts) under this Agreement shall be deemed acceptance of the performance of this Agreement, either in whole or in part, or be construed as an acceptance of defective or non-conforming work or material; or in any manner release the obligations of Contractor under this Agreement.

- 3.1.9 Neither Contractor nor Client shall make any adjustments to the Contract Price other than for reasons expressly identified in this Agreement.
- 3.1.10 If an Agency requests a change in the Work or performance of any activity that would not be included in the price specified in Section 3.1 herein, Contractor shall consult with Client and then respond to the Agency by proposing to the extent available an alternative change or activity that would be included in the price specified in Section 3.1. In no event may Contractor propose or suggest to the Agency, directly or indirectly, orally or in writing, any activity or work not included within the price set forth in Section 3.1 without the express prior written consent of Client.

4. PROJECT SCHEDULE

4.1 Contractor shall commence the performance of services under this Agreement immediately upon execution of this Agreement by all parties.

4.2 Contractor shall, upon execution of this Agreement, submit to Engineer a detailed schedule showing all activities and sequence of operations needed for the orderly performance and completion of all separable parts of the Work and the entire Work in accordance with this Agreement and the Contract Documents. Such schedules shall set forth the dates at which Contractor will start each separable part of the Work and the estimated dates of completion of each such part of the Work.

4.3 Contractor shall not modify the Work schedule without the prior written approval of Client and Engineer. Contractor shall promptly inform Engineer of any proposed change in the schedule and, in the event Client approves such change, Contractor shall furnish Engineer with a revised schedule within five (5) calendar days after such approval. The schedule shall be kept up to date at all stages of performance of the Work under this Agreement, taking into account the actual progress of the Work. The schedule shall comply with the time requirements for the completion of the separable parts of the Work and the entire Work as set forth in the Contract Documents.

5. WORK CHANGES

5.1 Client, from time to time, may authorize or require changes in the Work, consisting of additions, deletions, or other revisions in the Work. Client shall indicate its intention to order changes in the Work by either giving Contractor a written change order proposal ("Change Order Proposal") or requesting Contractor to prepare a Change Order Proposal and then countersigning that Proposal, which shall set forth in detail the nature of the proposed change.

5.2 Upon the issuance of any Change Order Proposal under Section 5.1 of this Agreement, Contractor shall forthwith furnish to Client a statement signed by Contractor ("Contractor's Statement"), setting forth in detail, with a suitable breakdown by trades and work classifications, Contractor's estimate of the cost or savings of the change, if any, together with Contractor's estimate of changes, if any, in the performance schedule which will be required as a result of such change. If Client countersigns Contractor's Statement, such Change Order Proposal, together with Contractor's Statement, collectively shall constitute a change order ("Change Order"), the changes in the Work reflected therein shall become part of the Work, and Contractor shall revise the performance schedule in accordance therewith.

5.3 [DELETED]

5.4 [DELETED]

6. CONSULTATION WITH CLIENT AND ENGINEER

6.1 Contractor shall provide Client and Engineer with copies of all draft submissions and/or deliverables required for any reason to be submitted to any federal, state, or local governmental or regulatory authority sufficiently in advance of any deadline for such submission to allow meaningful review and comment by Client and Engineer.

6.2 Contractor shall provide Client and Engineer prompt written notice of any event or condition, fact that might reasonably be expected to have a material adverse effect on the Contractor's ability to fulfill its obligations under this Agreement.

6.3 Contractor shall provide Client and Engineer with written notice of any proposed change in key Contractor personnel and consultants at least five (5) business days prior to making such proposed change.

6.4 Contractor shall utilize only those environmental testing laboratories approved by Client.

7. PERSONNEL AND LABOR

7.1 Contractor has, or will secure all personnel required for the performance of its obligations under this Agreement. Contractor shall be responsible for the supervision and direction of the performance of the Work under this Agreement by Contractor's employees and any subcontractors. Contractor reserves the right to review the qualifications of any individuals assigned by Contractor to perform the Work under this Agreement and to reject those who are not in Client's reasonable opinion qualified or otherwise acceptable. Any such review and/or rejection shall in no way relieve Contractor of the obligation to select and assign qualified personnel to perform the Work under this Agreement or of the liability incurred therefrom.

7.2 Contractor agrees that, other than those persons designated in writing by Client, only agents and employees of Contractor or subcontractors, and authorized federal, state, and local officials, will be allowed access to any Work location.

7.3 Contractor shall take all necessary precautions for the safety of its employees, subcontractors, agents, and others who may be affected by Contractor's performance of Work under this Agreement.

7.4 Contractor shall inform its employees, agents, subcontractors, and other persons who may come into contact with any Work location of the nature and extent of the health and environmental risk, if any, associated with the Work location and Contractor's performance of Work at the Work location.

7.5 Contractor shall adopt working conditions and other employment policies reasonably satisfactory to Client and shall comply with all applicable federal, state, and local labor laws, regulations and ordinances as now or hereafter in effect.

7.6 Contractor shall take all reasonable precautions to prevent labor disputes which could interfere in any way with the performance of the Work under this Agreement. Contractor shall notify Client and Engineer of any actual or potential labor disputes as soon as the existence thereof is known to Contractor.

7.7 Contractor recognizes that, subsequent to completion and final acceptance of the Work, the need may arise to provide testimony during hearings and/or court proceedings involving specific activities or other matters relating to the Work, with regard to which personnel provided by Contractor under this Agreement (including subcontractor personnel) would have gained expertise and first-hand knowledge as a result of the tasks performed under this Agreement. Therefore, Contractor agrees to make available its personnel in such proceedings and to enter into intent agreements as necessary with subcontractors to ensure the availability of subcontractor personnel provided under this Agreement.

8. SUBCONTRACTORS

8.1 Contractor may employ one or more subcontractors or other persons to complete a portion of the Work, including, but not limited to, drilling, laboratory analysis, and engineering.

8.2 In the event Contractor subcontracts any Work pursuant to this provision each subcontractor shall be required in its contract with Contractor to waive all liens against Contractor and Client and any Work location and agree to be joined in any dispute resolution matter between Client and Contractor pursuant to Section 26 of this Agreement that requires the subcontractor's joinder to complete resolution of the dispute and Contractor shall remain responsible and accountable for all Work performed or to be performed by a subcontractor to the same extent as if Contractor had performed such Work itself.

8.3 Client may reject any subcontractors whom Client reasonably determines not to be acceptable, and notwithstanding client's approval of or failure to reject any subcontractor, Contractor shall remain fully responsible for such subcontractor's performance.

9. MATERIALS, EQUIPMENT, AND TOOLS

9.1 Unless otherwise provided under this Agreement, all materials and equipment for the Work are to be provided by Contractor.

9.2 Materials, equipment, and tools furnished by Contractor arriving at the Site, whether before or after the commencement of the Work, shall be unloaded, transported, handled, and stored by Contractor.

9.3 Contractor shall be responsible for the care, custody, and control of materials until such time as all of the Work is approved by Client.

9.4 To the extent that Client has complied with the requirements for payment to Contractor under this Agreement, title to materials and equipment shall pass to Client upon incorporation into the project or, if delivered to the Site and stored for incorporation into the project, upon delivery to the Site. If materials, equipment, or tools are lost, stolen, or damaged while in the care, custody, or control of Contractor, its employees, agents, or subcontractors, the replacement cost thereof shall be charged to Contractor.

10. COMPLIANCE WITH LAW AND PREVENTIVE MAINTENANCE

10.1 In performing the Work, Contractor shall comply with all of the laws, decrees, and orders of all governmental authorities having jurisdiction. Without limiting the foregoing,

Contractor shall observe all laws and regulations relating to labor, occupational safety, health, sanitation, fire, pollution, and, if necessary, hazardous materials.

10.2 Client reserves the right to review Contractor's operations and safety procedures, but Client's review or failure to review shall in no way affect Contractor's obligations under this Agreement or pursuant to law.

10.3 Contractor shall provide sufficient, safe, and proper facilities at all times for the installation of the Work.

10.4 Contractor shall maintain the Site, excavations, staging areas, access roads, borrow areas, and all other Work areas free from dust.

10.5 Contractor shall not permit unauthorized fires within or adjacent to any Work location and shall be liable for all damage from fire due directly or indirectly to its own activities, or to those of its employees or of its subcontractors or their employees.

10.6 All mobile equipment and all machinery located at any Work location shall be locked or otherwise made inoperable whenever unattended.

10.7 All construction debris deposited on public ways shall be removed immediately and all vehicles engaged in the Work shall be so policed and cleaned so that no debris carried from any Work location is deposited on public ways. Contractor and its subcontractors are mutually liable for enforcement of this provision and Contractor shall hold Client harmless from all liability due to Contractor's failure to observe the precautions of this provision.

10.8 Contractor shall provide all guard rails or temporary enclosures around pits, open excavation, trenches, and other hazards as shall be necessary or appropriate to protect any person or property located about any Work location.

10.9 Contractor shall at all times keep any Work location free from accumulation of unusable materials caused by its operations or the operations of its representatives, agents, or subcontractors. At the completion of the Work, Contractor shall remove all such materials from and about any Work location, as well as its tools, construction equipment, machinery, and surplus materials.

10.10 If Contractor fails to clean up at the completion of the Work, Client may do so or arrange to have a third party do so and the cost thereof shall be charged to the Contractor and may be withheld from any payment due to Contractor.

10.11 [DELETED]

11. DISPOSAL OF HAZARDOUS SUBSTANCES

11.1 Contractor shall assist Client and Engineer with logistical matters associated with off-site transportation, treatment, and/or disposal of hazardous substances from any Work location. Client will contract offsite transportation and disposal activities directly.

12. PENALTIES FOR LATE OR INADEQUATE PERFORMANCE

12.1 Contractor shall be responsible for any costs incurred by Client, including, but not limited to legal, investigative and stipulated penalty costs imposed by any federal, state or local governmental or regulatory agency, to the extent such costs are the consequence of, or result from, delays by Contractor in complying with the schedule approved by Client in accordance with Section 4 of this Agreement, or otherwise as a result of Contractor's failure to perform the Work in accordance with the requirements of

this Agreement, and to the extent the performance schedule for the Work has not been changed or excused pursuant to the Force Majeure provisions of Section 13 of this Agreement. When payment is required by Contractor pursuant to this provision, payment shall be made by the Contractor in a timely manner to prevent additional fines or penalties but in no event shall payment occur any later than twenty (20) days after notification.

12.2 If both Contractor and Client are responsible for late or improper performance resulting in the imposition of costs described in Section 12.1, then Contractor and Client shall each pay the proportionate share of such costs attributable to the relative responsibility or fault of each party giving rise to the late or improper performance.

12.3 It is understood and agreed that if any dispute arises between Contractor and Client concerning responsibilities for late or improper performance giving rise to the imposition of costs described in Section 12.1, Contractor and Client shall suspend consideration of the matter for a period of five (5) business days and at the end of such five days shall meet to reconsider the matter.

12.4 Notwithstanding anything in this Agreement to the contrary, the right of Client to obtain reimbursement of costs pursuant to this Section 12 is not an exclusive remedy and shall not preclude Client from electing to pursue any other remedies or sanctions, in law and equity, which may be available to them by reason of Contractor's violation of this Agreement.

13. FORCE MAJEURE

13.1 No delay or failure in performance by either party hereto shall constitute default hereunder or give rise to any claim for damages, if, and to the extent, such delay or failure is caused by an unforeseen occurrence beyond the control and without the fault or negligence of the party affected and which said party is unable to prevent or provide against by exercise of reasonable diligence, including, but not limited to, acts of God or the public enemy, expropriation or confiscation of facilities, changes in applicable law, war, legal disputes, rebellion, sabotage or riots, floods, unusually severe weather, fires, explosions, or other catastrophes, strikes, lockouts or similar occurrences ("Force Majeure").

13.2 Unless the Force Majeure substantially frustrates the performance of this Agreement, it shall not operate to excuse but only to delay, performance hereunder. Contractor shall adopt all reasonable measures necessary to avoid or minimize delay, and shall restart the Work as soon as reasonably possible following termination of the Force Majeure, and in no event shall the time for performance of the Work under this Agreement be extended for a period greater than the period equal to the delay directly resulting from the Force Majeure.

13.3 Contractor understands that to the extent Client is required under the Contract Documents to perform the Work strictly in accordance with the schedules set forth therein, that time is of the essence in the performance of this Agreement.

14. DOCUMENTS AND RECORDKEEPING

14.1 Contractor understands the Client may have recordkeeping and record preservation obligations in accordance with the Contract Documents and agrees to be bound by, and comply with, those obligations and to require that any subcontractors comply with those obligations, notwithstanding final payment under this Agreement.

14.2 All written data, notes, and information, samples, materials, documents (including, but not limited to reports, studies, drawings, photographs, plans and specifications, and laboratory tests), and all copies, reproductions, and portions thereof, prepared or furnished by or for Contractor, its associates, consultants and subcontractors (including documents obtained from third parties) pursuant to this Agreement, shall be and remain the exclusive property of Client. Contractor shall provide Client and Engineer with copies of such documents, promptly upon Client or Engineer's request, at any time during the term of this Agreement or with the original documents following its termination.

14.3 Contractor represents that Client and any successor in interest or assignee of Client may rely upon any final reports or recommendations produced by Contractor, as well as any data generated by or for Contractor during the course of performing the Work under this Agreement.

15. CONFIDENTIALITY; PRIVILEGE

15.1 Contractor shall not disclose or use for any purpose other than the performance of Work under this Agreement any data, samples, materials or other information disclosed to, made available to, obtained by, or developed, directly or indirectly, by Contractor (whether directly from Client or otherwise) pursuant to its performance of Work under this Agreement.

15.2 If any legal proceedings (including, but not limited to, any court orders, subpoenas, notices of deposition, or other discovery requests) are instituted against, or if any governmental or regulatory directive is issued against, Contractor to obtain any Confidential Information, Contractor shall immediately notify Client in writing thereof. Client may seek an appropriate protective order or may waive Contractor's compliance with this provision. If, in the absence of a protective order or the receipt of a waiver hereunder, Contractor is nonetheless, in the opinion of its counsel, compelled to disclose any confidential information to any tribunal or governmental or regulatory agency or else stand liable for contempt or suffer other censure or penalty, Contractor agrees that it will furnish only that portion of the Confidential Information which is legally required and will exercise its best efforts to obtain reliable assurance that confidential treatment will be accorded to that portion of the Confidential Information so disclosed.

15.3 Contractor shall restrict the knowledge of all Confidential Information to its officers, employees, and others who are directly connected with the performance of Contractor's obligations under this Agreement and have need of such knowledge. The confidentiality obligations set forth in this Section 15 shall apply to all such persons, and Contractor shall take all reasonable steps to obligate and bind all such persons to honor such confidentiality obligations.

15.4 Contractor may make, retain and use copies of any documents generated by or prepared for it under this Agreement, consistent with the confidentiality obligations as set forth in this Section 15 and provided that such copies are maintained as confidential in a secure file with access restricted only to Contractor's personnel or counsel with a need for access thereto, and are not used for any purpose other than performance of Contractor's obligations under this Agreement.

16. PATENTS AND INVENTIONS

16.1 Contractor hereby agrees to defend, protect, indemnify and hold harmless Client, its parents, subsidiaries, affiliates, successors, and assigns, and its and their stockholders,

directors, officers, employees, agents, and representatives from and against any and all damages, liabilities, claims, demands, fines, penalties, forfeitures, losses, actions, and suits (and the costs and expenses incident thereto, including reasonable attorneys' fees and costs, and court costs relating to defense or settlement), which any of the same may hereafter incur, become responsible for or pay out in relation to the alleged infringement of any patent rights in the manufacture, use or disposition of any article or material supplied under this Agreement, except for articles or materials provided by Client to Contractor.

17. INSURANCE AND BONDING

17.1 In addition to any insurance that may be required by the Contract Documents, Contractor shall, at its sole cost and expense, secure and at all times during the term of this Agreement maintain such insurance as will provide the following types and limits of coverage to Contractor:

	<u>Type</u>	<u>Limits</u>
(a)	Workers' Compensation	Statutory
(b)	Employer's Liability	\$1,000,000 each occurrence
(c)	Automobile Liability	Bodily injury and property damage: \$1,000,000 combined single limit
(d)	General Commercial	Bodily injury and property damage: \$1,000,000 combined single limit, \$2,000,000 aggregate
(e)	Contractor's Pollution	Bodily injury and property damage: \$2,000,000 combined single limit, \$2,000,000 aggregate
(f)	Engineer's Professional	Bodily injury and property with damage: \$1,000,000 combined Pollution Coverage single limit, \$2,000,000 aggregate

17.2 Contractor shall name Client and Engineer and the City of Providence, and, where as required by the Contract Documents, any government agency, as additional insureds under the policies providing the foregoing coverages, and shall provide that such insurance is primary to any similar insurance that Client may have.

17.3 Within thirty (30) days of the execution of this Agreement, and prior to the commencement of Work, Contractor shall provide Client with certificates of such insurance. The certificates shall specify the dates when such insurance expires and shall provide further that Contractor shall provide Client not less than twenty (20) days' written notice before termination, cancellation of, or any material change in, such insurance (which notice shall not relieve Contractor from any breach of this Agreement). A renewal certificate shall be furnished to Client prior to the expiration date of policies noted therein.

17.4 Contractor, on behalf of itself, and any and all of its officers, directors, employees, agents, subcontractors, suppliers and consultants, hereby releases Client from all claims, demands, causes of action, liability, damages, losses, costs and expense due to any act or omission of Client which is subject to coverage by one or more of the insurance policies required to be maintained pursuant to this Section 17.

17.5 Where applicable, Contractor shall maintain the coverage specified in (d), (e), and (f), above, until three months after: (1) Client's receipt of written notice that a

government agency has issued a determination that all remedial construction has been completed, or if the agency indicates that such a determination is not required, Client's receipt of written notice of the agency's approval of Contractor's closeout reports for all components of the remedy, and, following Client's receipt of the agency's determination or approval, (2) the submission by Contractor to Client of a final certification that all components of the remedy have been constructed in accordance with the Contract Documents and with all applicable statutory and regulatory requirements and are properly operating.

17.6 Contractor shall furnish performance and payment bonds, each in an amount at least equal to the price of the Work as security for the faithful performance and payment of all of Contractor's obligations under this Agreement. These bonds shall remain in effect at least until one year after the date when Client makes its final payment to Contractor for the Work, except as otherwise provided by an applicable federal, state, or local laws, regulations, or ordinances. Each bond shall be in form and substance acceptable to Client and shall be executed by such sureties as are named in the current 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 Audit Staff, Bureau of Government Financial Operations, U.S. Treasury Department. All bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act.

17.7 [DELETED]

18. REPRESENTATIONS OF CONTRACTOR

18.1 Contractor hereby represents to Client and acknowledges that Client is relying on Contractor's representations that:

- 18.1.1 Contractor is a qualified and experienced construction firm with such expertise in construction remediation and related activities as is necessary and sufficient to perform the Work in accordance with this Agreement and the Contract Documents.
- 18.1.2 Contractor is familiar with and understands the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("CERCLA"), as amended by the Superfund Amendments and Reauthorization Act ("SARA"), the Resource Conservation and Recovery Act ("RCRA"), regulations promulgated under CERCLA and RCRA, including the National Contingency Plan ("NCP"), U.S. EPA Guidance Documents and policy statements applicable to site remediation under CERCLA and RCRA, and analogous remediation laws, regulations and policies in effect in the State in which the Work is to be performed.
- 18.1.3 Contractor warrants that it is familiar with the requirements of all the Contract Documents pertaining to the Work.
- 18.1.4 Contractor understands that Work location conditions may differ from those presently known to Contractor.
- 18.1.5 Contractor represents that it currently has no, and shall not accept for the duration of this Agreement, employment or engagement for its services that would lead to a conflict of interest with respect to its obligations to Client under this Agreement.

19. WARRANTIES

19.1 Contractor warrants that it shall use its best professional judgment in the performance of the Work and shall at all times in the performance of its duties under this Agreement exercise the degree of care and skill ordinarily exercised, under similar circumstances, by reputable contractors performing comparable services. Contractor further warrants that it shall be responsible for the safe condition and operation of all equipment employed by it in the performance of the Work, and shall take all action necessary to protect the health and safety of all personnel (whether or not Contractor's employees) engaged by Contractor in the performance of the Work.

19.2 Contractor warrants that the services hereunder shall be performed in accordance with generally and currently accepted engineering and construction principles and practices.

19.3 Contractor warrants that the services hereunder shall be performed in a skillful and workmanlike manner, free from defects in design, materials, and workmanship.

19.4 Contractor warrants that the services hereunder shall be performed in conformance with the Contract Documents and that all performance standards, cleanup levels, and other requirements of the Contract Documents shall be achieved.

19.5 Contractor warrants that it, and its subcontractors, will perform the Work under this Agreement in a manner consistent with all applicable federal, state and local laws, regulations, standards, orders and decrees.

19.6 To the extent that any manufacturer, distributor or supplier provides any guarantee or warranty in excess of the guarantees and warranties provided herein, Contractor shall provide or assign to Client any benefits associated therewith. Contractor shall render reasonable assistance to Client when requested in order to enable Client to enforce such warranties and guarantees by the third party manufacturers, distributors or suppliers.

19.7 Nothing in this Section 19 shall be construed to limit or restrict any other right, claim, cause of action, or remedy available to Client under federal or state law, including common law.

19.8 In addition to any and all other remedies afforded Client herein or by law, if Contractor breaches any representations or warranties contained in this Agreement, Contractor shall correct any aspect of the Work not performed in accordance with such representations and warranties at no additional charge to Client.

19.9 Where the Work involves subsurface exploration, excavation or drilling at any Work location, Contractor warrants that it shall be responsible for determining the existence and location of underground utilities, conveyances and structures of any kind and shall undertake the Work so as not to destroy, damage, or come into contact with any such utilities, conveyances and structures.

20. INDEMNIFICATION

20.1 Contractor acknowledges and is aware of hazards inherent in performing the Work under this Agreement and as between Client and Contractor, Contractor knowingly and voluntarily assumes all risk of injury and damage to Contractor and Contractor's property while at any Work location.

20.2 Contractor hereby agrees to defend, protect, indemnify and hold harmless Client, its parents, subsidiaries, affiliates, successors, and assigns, and its and their stockholders, directors, officers, employees, agents, and representatives from Engineer and against any and all damages, liabilities, claims, demands, fines, penalties, forfeitures, losses, actions, and suits (and the costs and expenses incident thereto, including reasonable attorneys' fees and costs, and court costs relating to defense or settlement), which any of the same may hereafter incur, become responsible for or pay out as a result of death or bodily injuries to any person, destruction or damage to or loss of any property, contamination of or adverse effects on the environment, or any violation of any federal, state, or local law, regulation, rule, or order to the extent caused by (i) Contractor's breach of any term of this Agreement; or (ii) any negligent, wrongful, or willful act, error, or omission of Contractor, its directors, officers, employees, associates, agents, consultants and subcontractors. Contractor shall cause its indemnity obligation under this provision to be insured under its professional liability insurance policy and its general liability insurance policies carried pursuant to Section 17.1.

20.3 Client hereby agrees to defend, protect, indemnify and hold harmless Contractor, its parents, subsidiaries, affiliates, successors, and assigns, and its and their stockholders, directors, officers, employees, agents, and representatives from and against any and all damages, liabilities, claims, demands, fines, penalties, forfeitures, losses, actions, and suits (and the costs and expenses incident thereto, including reasonable attorneys' fees and costs, and court costs relating to defense or settlement), which any of the same may hereafter incur, become responsible for or pay out as a result of death or bodily injuries to any person, destruction or damage to or loss of any property, contamination of or adverse effects on the environment, or any violation of any federal, state, or local law, regulation, rule, or order to the extent caused by (i) Client's breach of any term of this Agreement; or (ii) any negligent, wrongful, or willful act, error, or omission of Client, its directors, officers, employees, associates, agents, consultants and subcontractors (other than Contractor and its subcontractors); or (iii) Contractor's assisting Client in arranging transportation, treatment and/or disposal of hazardous substances subject to the terms of Section 11.1 of this Agreement.

20.4 Client shall have the right if it so elects to participate at its own expense in the defense of any claim or action referred to in Section 20.2, but such participation shall not affect Contractor's liability for any judgment herein, or release Contractor from the indemnity therein provided.

22. LIENS AND RELEASES

22.1 Contractor shall promptly discharge its obligations to its laborers, materialmen, creditors, and Subcontractors. Client may, but shall not be obligated to, discharge any such obligations of Contractor and charge the Contractor therefor and set off the amount thereof against its obligations to Contractor under this Agreement.

22.2 The final invoice submitted by Contractor for payment shall be accompanied by waivers of any lien by Contractor.

22.3 Contractor shall at all times defend, indemnify and hold harmless Client, its parents, subsidiaries, affiliates, successors, and assigns, and its and their stockholders, directors, officers, employees, agents, and representatives from and against any and all damages, liabilities, claims, demands, fines, penalties, forfeitures, losses, actions, and suits (and the costs and expenses incident thereto, including reasonable attorneys' fees and costs, and court costs relating to defense or settlement), which any of the same may hereafter

incur, become responsible for or pay out in relation to any claims or liens for labor performed or materials furnished in the performance of Work. Contractor may, in good faith, dispute any such lien and may litigate same, provided that, at the request of Client, Contractor shall provide adequate security to protect Client from any such claims or liens and to discharge such liens when such discharge is available under applicable law.

22.4 Concurrently with final payment by Client to Contractor, Contractor shall deliver to Client an instrument satisfactory to Client in form and substance releasing Client from all contractor, subcontractor, supplier, and materialmen's claims, liens, or encumbrances of whatever kind arising out of this Agreement.

23. SUSPENSION OF SERVICES

23.1 In the event the Work is prevented or suspended by order of any legally constituted governmental or regulatory agency or judicial body, or should Client at its sole option decide to suspend, at any time, the performance of all or any portion of the Work to be performed under this Agreement, Contractor will be notified of such decision or order by Client in writing. During the period of suspension, Contractor shall use its best efforts to utilize its labor and equipment in such manner as to minimize costs associated with the suspension.

23.2 Upon receipt of any such notice or order, and as long as there is no violation of any law or regulation, the Contractor shall, unless the notice requires otherwise: (i) immediately discontinue Work on the date and to the extent specified in the notice; (ii) place no further orders or subcontracts for materials, services, or facilities with respect to suspended Work other than to the extent required in the notice; (iii) promptly make every reasonable effort to obtain suspension of all orders, subcontracts, and rental agreements to the extent they relate to performance of the Work suspended; and (iv) unless otherwise specifically stated in the notice, continue to protect and maintain the Work theretofore completed, including those portions on which Work as been suspended.

23.3 Contractor shall be paid for services performed to the suspension date plus, as full compensation for suspension, suspension costs reasonably incurred, without duplication of any item, to the extent such costs are directly attributable to the suspension of Work, such as standby costs, demobilization costs, and personnel and equipment rescheduling and/or reassignment adjustments.

23.4 Upon receipt of notice to resume suspended Work, Contractor shall immediately resume Work on the suspended Work to the extent required in the notice. Any claim on the part of Contractor for an extension of time or for compensation under Section 23.3 shall be made within twenty (20) calendar days after receipt of notice to resume Work and shall be accompanied by a revised Work schedule.

23.5 Should a suspension exceed ninety (90) days in duration, Contractor shall have the right to terminate this Agreement.

23.6 Should Contractor be obstructed or delayed in its performance or completion of the Work for any reason, including any act or omission of Client, Contractor, or any subcontractors, Contractor shall in no event and under no circumstances be entitled to any additional compensation, cost or damage.

23.7 If Contractor is delayed or disrupted by the neglect of Client, Contractor's sole remedy is to receive a non-compensable extension of time, provided claim is submitted in writing within three (3) days of delay or disruption. If delay is caused by any reason

other than the sole neglect or default of Client, Contractor shall in no event and in no circumstances be entitled to any additional compensation, damage or extension of time.

24. TERMINATION

24.1 This Agreement may be terminated without cause by mutual agreement of the parties or by Client for any reason at any time.

24.2 [DELETED]

24.3 [DELETED]

24.4 If this Agreement is terminated by Client without cause under Section 24.1, Contractor shall be paid for services performed to the date of termination plus reasonable termination costs incurred by Contractor. Termination costs may include personnel and equipment rescheduling and/or reassignment adjustments and other costs incurred directly attributable to termination including subcontract termination and/or cancellation fees or penalties.

24.5 If this Agreement is terminated by Client for cause, Client may exclude Contractor from the Work location, and take possession of the design plans and all Contractor's tools, appliances, equipment and machinery at the Work location, if any, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion), incorporate in the Work all materials and equipment stored at the Work location or for which Client had paid Contractor, but which are stored elsewhere, and complete (or cause to be completed) the Work as Client may deem expedient. In such case, Contractor shall not be entitled to receive any further payment until the Work is completed. If direct, indirect and consequential costs of completing the Work, including but not limited to fees and charges of all engineers, architects, attorneys and other professionals and consultants and court and arbitration costs, exceed the unpaid balance of the contract price, Contractor shall pay the difference to Client. Termination of the Agreement by Client shall not affect any of Client's existing or thereafter accruing rights or remedies against Contractor. Any retention or payment of monies due Contractor by Client will not release Contractor from liability. Upon completion of the Work, Client shall pay Contractor any outstanding and unpaid amounts due Contractor on account of Work satisfactorily completed by Contractor, less any increased costs of completing the Work suffered or incurred by Client.

24.6 Upon receipt of any notice of termination, Contractor shall: (i) immediately discontinue the Work on the date and to the extent specified in the notice; (ii) place no further orders or subcontract for materials, equipment, services, or facilities, except as may be necessary for completion of such portion of the Work as is not to be discontinued; (iii) at Client's request, either promptly make every reasonable effort to procure cancellation upon terms satisfactory to Client of all orders, subcontracts, and rental agreements to the extent they relate to the performance of the work discontinued or assign to Client all such orders, subcontractors, and rental agreements; and (iv) thereafter do only such work as may be necessary to preserve and protect the Work already in progress and to protect materials and equipment at the Site or in transit thereto.

24.7 Contractor recognizes that the services under this Agreement are vital to Client and must be continued without interruption and that, upon a termination by Client, a successor (either Client or another contractor) may continue such services. Contractor

agrees to furnish phase-in training and exercise its best efforts and cooperation to effect an orderly and efficient transition to any such successor.

24.8 Unless the parties agree otherwise, in the event of termination, Contractor shall submit to Client no later than thirty (30) days after the date of termination a final invoice based on the percentage of Work completed up to the effective date of termination. Client shall be entitled to take possession of and to use all materials and equipment for which they have paid Contractor pursuant to this Agreement.

25. NOTICES

25.1 Any notice, notification, request, demand, statement, or other communication (any of the foregoing being a "notice") which any party hereto is required, permitted, or desires to serve on another party shall be in writing and served personally by United States certified mail, return receipt requested, or by electronic mail (e-mail), with hard copy to follow by certified mail, return receipt requested to the party to be charged with receipt thereof. Notices shall be deemed given and effective hereunder when received by the persons and at the addresses shown below:

For Client:

For Contractor:

Director of Site Remediation

Textron Inc.

40 Westminster Street

Providence, RI 02903

25.2 [DELETED]

26. DISPUTE RESOLUTION; ARBITRATION

26.1 If there is a dispute arising out of or relating to this Agreement or the alleged breach thereof, there shall be a meeting of the parties which shall be attended by a representative of each party who has authority to resolve the dispute and at which the representatives will make a good faith effort to resolve the dispute without litigation. The meeting shall take place within seven (7) days from written notice by any party that the dispute exists.

26.2 All disputes arising out of or relating to this Agreement or the alleged breach thereof that are not resolved pursuant to Section 26.1 shall be decided by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then in effect. This agreement to arbitrate shall be specifically enforceable and the determination rendered by the arbitrators shall be final and judgment may be entered upon it in accordance with the applicable law of any court having jurisdiction thereover.

26.3 Any arbitration proceeding initiated under the terms of this Agreement may, at the request of either party hereto, be joined or consolidated with other arbitration proceedings involving additional parties if the dispute arises out of common or interrelated factual occurrences.

26.4 Notice of demand for arbitration shall be filed in writing with the other party to this Agreement and with the American Arbitration Association. The demand for arbitration shall be filed within a reasonable period of time after the claim, dispute, or other matter in question has arisen, but in no event shall it be made after the date when institution of

legal or equitable proceedings based on such claim, or dispute, or other matter in question would be barred by the applicable statute of limitations.

26.5 [DELETED]

26.6 Unless otherwise agreed in writing, Contractor shall remain obligated to perform the Work and duly adhere to the project schedule pending resolution of any dispute and/or during any arbitration proceeding with Client. No Work shall be delayed or postponed pending resolution of any dispute and/or during any arbitration proceeding with Client, and all provisions of the Agreement shall remain in effect during the period of any dispute and/or arbitration.

27. CONTRACTUAL RELATIONSHIP

27.1 Contractor and Client agree that Contractor is an independent contractor and that this Agreement shall not be construed to make Contractor or any of the officers, employees, agents, representatives or subcontractors of Contractor the employees, agents, or representatives of Client.

27.2 Contractor shall have exclusive control over its employees, agents, representatives and subcontractors and over all details and means of performing the Work under this Agreement.

27.3 Neither Contractor nor anyone employed or engaged by it in connection with this Agreement shall be, represent, act, purport to act or be deemed to be the agent, representative, employee or servant of Client, except as specifically provided in this Agreement.

28. SUCCESSORS AND ASSIGNS

28.1 This Agreement shall inure to the benefit of and be binding on the successors and assigns of Client and Contractor.

28.2 Notwithstanding the foregoing, this Agreement may not be assigned by Contractor without the express, prior written consent of Client.

28.3 Unless otherwise provided herein, no provision of this Agreement, express or implied, is intended to confer any right or remedy on any person other than the parties hereto and their respective successors and assigns, nor is any provision of this Agreement intended to relieve or discharge the obligation or liability of any third person to any party hereto.

29. ENTIRE AGREEMENT; SEVERABILITY

29.1 This Agreement (and the Contract Documents incorporated by reference) constitutes the entire agreement between the parties with respect to the subject matter hereof and supersedes all prior agreements and understandings, whether written or oral, between the parties in connection with said subject matter.

29.2 No terms, conditions, prior course of dealings, course of performance, usage of trade, understandings, purchase orders, or agreements purporting to modify, vary, implement, or explain any provision of this Agreement shall be effective unless in writing, signed by representatives of the parties hereto.

29.3 The headings of the several sections of this Agreement are inserted solely for convenience of reference and are not a part of and are not intended to govern, limit, or aid in the construction of any term or provision hereof to which they refer.

29.4 If any section or provision of this Agreement is adjudged by any court of competent jurisdiction to be illegal or unenforceable, such adjudication shall not affect the legality, or enforceability of the Agreement as a whole or of any provision hereof not so adjudged.

29.5 This Agreement may be executed in any number of counterparts, each of which shall be deemed to be an original and all of which together shall be deemed to the same instrument.

30. GOVERNING LAW

30.1 This Agreement shall be governed and construed in accordance with the laws of the State of Rhode Island.

For Contractor:

By: _____

Title: _____

Date: _____

For Client:

By: _____

Title: _____

Date: _____

SECTION 00614

CONSTRUCTION PERFORMANCE BOND

Any singular reference to Contractor, surety, Client or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name and Principal Place of Business):

CLIENT (Name and Address):

CONSTRUCTION CONTRACT

Date:

Amount:

Description (Name and Location):

BOND

Date (Not earlier than Construction Contract Date):

Amount:

Modifications to this Bond Form:

CONTRACTOR AS PRINCIPAL

Company: (Corp. Seal)

SURETY

Company: (Corp. Seal)

Signature:

Name and Title:

Signature:

Name and Title:

CONTRACTOR AS PRINCIPAL

Company:

SURETY

Company:

(Corp. Seal)

(Corp. Seal)

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Client for the performance of the Construction Contract, which is incorporated herein by reference. *
 2. If the Contractor performs the Construction Contract the Surety and the Contractor shall have no obligation under this Bond, except to participate in conferences as provided in Subparagraph 3.
 3. If there is no Client Default, the Surety's obligation under this Bond shall arise after:
 - 3.1. The Client has notified the Contractor and the Surety at its address described in Paragraph 10 below, that the Client is considering declaring a Contractor Default and has requested and attempted to arrange a conference with the Contractor and the Surety to be held not later than fifteen days after receipt of such notice to discuss methods of performing the Construction Contract. If the Client, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract but such an agreement shall not waive the Client's right, if any, subsequently to declare a Contractor Default; and
 - 3.2. The Client has declared a Contractor Default and formally terminated the Contractor's right to complete the contract. Such Contractor Default shall not be declared earlier than twenty days after the Contractor and the Surety have received notice as provided in Subparagraph 3.1; and
 - 3.3. The Client has agreed to pay the Balance of the Contract Price to the Surety in accordance with the terms of the Construction Contract or to a contractor selected to perform the Construction Contract in accordance with the terms of the contract with the Client.
 4. When the Client has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:
 - 4.1. Arrange for the Contractor with consent of the Client, to perform and complete the Construction Contract, or
 - 4.2. Undertake to perform and complete the Construction Contract itself, through its agents or through independent contractors; or
 - 4.3. Obtain bids or negotiated proposals from qualified contractors acceptable to the Client for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Client and the contractor selected with the Client's concurrence to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Client the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by the Client resulting from the Contractor's default; or
 - 4.4. 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 the Client and, as soon as practicable after the amount is determined, tender payment therefor to the Client; or
 2. Deny liability in whole or in part and notify the Client citing reasons therefor.
 5. If the Surety does not proceed as provided in Paragraph 4 with reasonable promptness, the Surety shall be deemed to be in default on this Bond fifteen days after receipt of an additional written notice from the Client to the Surety demanding that the Surety perform its obligations under this Bond, and the Client shall be entitled to enforce any remedy available to the Client. If the Surety proceeds as provided in Subparagraph 4.4, and the Client refuses the payment tendered or the Surety has denied liability, in whole or in part, without further notice the Client shall be entitled to enforce any remedy available to the Client.
 6. After the Client has terminated the Contractor's right to complete Construction Contract, and if the Surety elects to act under Subparagraph 4.1., 4.2., or 4.3 above then the

*including, without limitations, the one year correction period under Paragraph 13.12 of the Standard General Conditions.
 (FOR INFORMATION ONLY-Name, Address and Telephone)
 AGENT or BROKER: CLIENT'S REPRESENTATIVE (Architect, Engineer or other party.
- responsibilities of the Surety to the Client shall not be greater than those of the Contractor under the Construction Contract and the responsibilities of the Client to the Surety shall not be greater than those of the Client under the Construction Contract. To limit of the amount of this Bond, but subject to commitment by the Client of the Balance of the Contract Price to mitigation of costs and damages on the Construction Contract the Surety is obligated without duplicate for:
- 6.1. The responsibilities of the Contractor for correction of defect work and completion of the Construction Contract;
 - 6.2. Additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions failure to act of the Surety under Paragraph 4; and
 - 6.3. Liquidated damages, or if no liquidated damages are specified, the Construction Contract, actual damages caused by delay performance or non-performance of the Contractor.
7. The Surety shall not be liable to the Client or others for obligation the Contractor that are unrelated to the Construction Contract, and 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 Bond to any person or entity other than the Client or its heirs, executed administrators, or successors, or assigns.
 8. The Surety hereby waives notice of any challenge including change time, to the Construction Contract or to related subcontracts purchase orders and other obligations.
 9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the or part of the work is located and shall be instituted within two years after Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform obligations under this Bond, whichever occurs first. If the provision this Paragraph are void or prohibited by law, the minimum period limitation available to sureties as a defense in the jurisdiction shall be applicable.
 10. Notice to the Surety, the Client or the Contractor shall be made delivered to the address shown on the signature page.
 11. When this Bond has been furnished to comply with a statutory other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory legal requirement shall be deemed deleted here from and provisions forming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed statutory bond and not as a common law bond.
 12. Definitions.
 - 12.1. Balance of the Contract Price: The total amount payable by Client to the Contractor under the Construction Contract, all proper adjustments have been made, including allowance the Contractor of any amounts received or to be received, the Client in settlement of insurance or other claims for ages to which the Contractor is entitled, reduced by all and proper payments made to or on behalf of the Contractor under the Construction Contract.
 - 12-2. Construction Contract: The agreement between the Client, the Contractor identified on the signature page, including Contract Documents and changes thereto.
 - 12-3. Contractor Default: Failure of the Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Construction Contract.
 - 12.4. Client Default: Failure of the Client, which has neither remedied nor waived, to pay the Contractor as required by Construction Contract or to perform and complete or comply with the other terms thereof, in any material respect.
 13. Any Contractor selected to perform the obligations of the Contractor under the construction contract must be approved, in advance, by the Client, which approval shall not be unreasonably withheld.

SECTION 00615
CONSTRUCTION PAYMENT BOND

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address): **SURETY** (Name and Principal Place of
Business):

CLIENT (OWNER) (Name and Address):

CONSTRUCTION CONTRACT

Date:
Amount:
Description (Name and Location):

BOND

Date (Not earlier than Construction Contract Date):
Amount:
Modifications to this Bond Form:

CONTRACTOR AS PRINCIPAL

Company: (Corp. Seal)

SURETY

Company: (Corp. Seal)

Signature:

Name and Title:

Signature:

Name and Title:

CONTRACTOR AS PRINCIPAL

Company: (Corp. Seal)

SURETY

Company: (Corp. Seal)

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference.*

2. With respect to the Owner, this obligation shall be null and void if the Contractor:

- 2.1 Promptly makes payment directly or indirectly, for all sums due Claimants, and
- 2.2 Defends, indemnifies and holds harmless the Owner from all claims, demands, liens or suits by any person or entity who furnished labor, materials or equipment for use in the performance of the Construction Contract, provided the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 12) of any claims, demands, liens or suits and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety, and provided there is no Owner Default.

3. With respect to Claimants, this obligation shall be null and void if the Contractor promptly makes payment, directly or indirectly, for all sums due.

4. The Surety shall have no obligation to Claimants under this Bond until:

- 4.1 Claimants who are employed by or have a direct contract with the Contractor have given notice to the Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to the 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 the Contractor:
 - 1. Have furnished written notice to the Contractor and sent a copy, or notice thereof, to the 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 were furnished or supplied or for whom the labor was done or performed; and
 - 2. Have either received an injection in whole or in part from the Contractor, or not received within 30 days of furnishing the above notice any communication from the Contractor by which the Contractor has 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 the Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to the Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to the Contractor.

5. If a notice required by Paragraph 4 is given by the Owner to the Contractor or to the Surety that is sufficient compliance.

6. When the Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at the Surety=s expense take the following actions:

- 6.1 Send an answer to the Claimant, with a copy to the Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.
- 6.2 Pay or arrange for payment of any undisputed amounts.

7. The 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 the Surety.

8. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any Construction Performance Bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of Construction Contract are dedicated to satisfy obligations of the Contractor and the Surety under this Bond, subject to the Owner=s priority to use the funds for the completion of the work.

9. The Surety shall not be liable to the Owner, Claimants or others obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

10. The Surety hereby waives notice of any change, including change time, to the Construction 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 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 Subparagraph 4.1 or Clause 4.2 (iii), or (2) on which the last labor service was performed by anyone of the last materials or equipment work furnished by anyone under the Construction Contract, whichever of 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 deft in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the Owner or the Contractor shall be mailed, delivered to the address shown on the signature page. Actual receipt notice by Surety, the Owner or the Contractor, however accomplish 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, other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or other legal requirement shall be deemed incorporated herein. The intent is, that this Bond shall be construed statutory bond and not as a common law bond.

14. Upon t by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor shall promptly furnish a copy of this Bond or shall permit a copy to the made.

15. DEFINITIONS

- 15.1 Claimant: An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor 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 of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of work of the Contractor and the Contractor=s subcontractors, and all other items for which a mechanic=s lien may be asserted; the jurisdiction where the labor, materials or equipment furnished.
- 15.2 Construction Contract: The agreement between the Owner and the Contractor identified on the signature page, including Contract Documents and changes thereto.
- 15.3 Owner Default: Failure of the Owner, which has neither remedied nor waived, to pay the Contractor as required by Construction Contract or to perform and complete or comply with the other items thereof, in any material respect.

*including without limitations the one year correction period under Paragraph 13.12 of the Standard General Conditions.

(FOR INFORMATION ONLY-Name, Address and Telephone)

AGENT or BROKER:

OWNER'S REPRESENTATIVE (Architect, Engineer or other party)

SECTION 00700
GENERAL CONDITIONS

1.0 DEFINITIONS

- A. Wherever used in the Contract Documents, the following terms shall have the meanings indicated which shall be applicable to both the singular and plural thereof:
- B. Addenda: Written or graphic instruments issued prior to the opening of Bids which modify or interpret the Contract Documents, Drawings, and Specifications, by additions, deletions, clarifications, or corrections.
- C. Bid: The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
- D. Bidder: Any person, firm, or corporation submitting a Bid for the Work.
- E. Bonds: Bid, Performance, and Payment Bonds and other instruments of security, furnished by the Contractor and his surety in accordance with the Contract Documents.
- F. Change Order: A written order to the Contractor authorizing an addition, deletion, or revision in the Work within the general scope of the Contract Documents, or authorizing an adjustment in the Contract Price or Contract Time issued after the effective date of the Agreement.
- G. Client: A public or quasi-public body or authority, corporation, association, partnership, or individual for whom the Work is to be performed.
- H. Change Directive: A written directive effecting a change in the Work that may or may not involve an adjustment in the Contract Price or an extension of the Contract Time, issued by the Engineer to the Contractor during construction.
- I. Contract Documents: The contract, including, Instructions to Bidders, Bid Bond, Agreement, Notice of Award, Notice to Proceed, Change Order, Drawings, Specifications, and Addenda after the effective date of the Agreement.
- J. Contract Price: The total monies payable to the Contractor under the terms and conditions of the Contract Documents.
- K. Contract Time: The number of calendar days stated in the Contract Documents for the completion of the Work.
- L. Contractor: The person, firm, or corporation with whom the Client has executed the Agreement.
- M. Drawings: The part of the Contract Documents which show the characteristics and scope of the Work to be performed and which have been prepared or approved by the Engineer.
- N. Engineer: The person, firm, or corporation named as such in the Contract Documents.
- O. Notice of Award: The written notice of the acceptance of the Bid from Contractor to the Successful Bidder.
- P. Notice to Proceed: Written communication issued by the Contractor to the Contractor authorizing them to proceed with the Work and establishing the date of commencement of the Work.
- Q. Project: The undertaking to be performed as provided in the Contract Documents.

- R. Resident Project Representative: The authorized representative of the Contractor who is assigned to the Project site or any part thereof.
- S. Shop Drawings: All drawings, diagrams, illustrations, brochures, schedules, and other data which are prepared by the Contractor, their Contractor, manufacturer, supplier, or distributor, which illustrate how specific portions of the Work shall be fabricated or installed.
- T. Specifications: A part of the Contract Documents consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards, and workmanship.
- U. Contractor: An individual, firm, or corporation having a direct contract with the Contractor or with any other Contractor for the performance of a part of the Work at the site.
- V. Substantial Completion: That date as certified by the Engineer when the construction of the Project or a specified part thereof is sufficiently completed, in accordance with the Contract Documents, so that the Project or specified part can be utilized for the purposes for which it is intended.
- W. Supplementary Conditions: Modifications to General Conditions required by the Client or Engineer.
- X. Suppliers: Any person, supplier, or organization who supplies materials or equipment for the work, including that fabricated to a special design, but who does not perform labor at the site.
- Y. Work: All labor necessary to produce the construction required by the Contract Documents, and all materials and equipment incorporated or to be incorporated in the Project.
- Z. Written Notice: Any notice to any party of the Agreement relative to any part of this Agreement in writing and considered delivered and the service thereof completed, when posted by certified or registered mail to the said party at their last given address, or delivered in person to said party or his authorized representative on the Work.

2.0 ADDITIONAL INSTRUCTIONS AND DRAWINGS

- A. The Contractor may be furnished additional instructions and detail drawings, by the Engineer, as necessary, to carry out the Work required by the Contract Documents.
- B. The additional detail drawings and instruction thus supplied will become a part of the Contract Documents. The Contractor shall carry out the Work in accordance with the additional detail drawings and instructions.
- C. In the event that the requirements in these General Conditions conflicts with the Agreement (Master Subcontract Agreement for Remediation Services), the Agreement shall take precedence.
- D. The Engineer will furnish to the Contractor up to 3 sets of Contract Documents free of charge. Additional sets shall be furnished at cost of reproduction.

3.0 SCHEDULES, REPORTS, AND RECORDS

- A. The Contractor shall submit to the Engineer such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, records, and other data as the Engineer may request concerning Work performed or to be performed.
- B. Prior to the first partial payment estimate the Contractor shall submit schedules showing the order in which they propose to carry on the Work, including dates at

which they will start the various parts of the Work, estimated date of completion of each part, and, as applicable:

1. The dates at which special detail drawings will be required; and
 2. Respective dates for submission of Shop Drawings, the beginning of manufacture, the testing and the installation of materials, supplies, and equipment.
- C. The Contractor shall also submit a schedule of payments that he anticipates he will earn during the course of the Work.

4.0 DRAWINGS AND SPECIFICATIONS

- A. The Drawings and Specifications indicate the Work to be performed by the Contractor. The Contractor shall furnish all labor, materials, tools, equipment, and transportation necessary for the proper execution of the Work in accordance with the Contract Documents and all incidental work necessary to complete the Project in an acceptable manner, ready for use, occupancy, or operation by the Client.
- B. In case of conflict between the Drawings and Specifications, the Specifications shall govern. Labeled dimensions on Drawings shall govern over scale dimensions, and detailed Drawings shall govern over general Drawings.
- C. Any discrepancies found between the Drawings and Specifications and site conditions or any inconsistencies or ambiguities in the Drawings or Specifications shall be immediately reported to the Engineer, in writing, who shall promptly correct such inconsistencies or ambiguities in writing. Work done by the Contractor after his discovery of such discrepancies, inconsistencies, or ambiguities shall be done at the Contractor's risk.

5.0 SHOP DRAWINGS

- A. The Contractor shall provide Shop Drawings as required by the Engineer for the prosecution of the Work and as required by the Contract Documents. The Engineer shall promptly review all Shop Drawings. The Engineer's approval of any Shop Drawing shall not release the Contractor from responsibility for deviations from the Contract Documents. The approval of any Shop Drawing which substantially deviates from the requirement of the Contract Documents shall be evidenced by a Change Order.
- B. When submitted for the Engineer's review, Shop Drawings shall bear the Contractor's certification that he has reviewed, checked, and approved the Shop Drawings and that they are in conformance with the requirements of the Contract Documents.
- C. Portions of the Work requiring a Shop Drawing or sample submission shall not begin until the Shop Drawing or submission has been approved by the Engineer. A copy of each approved Shop Drawing and each approved sample shall be kept in good order by the Contractor at the Site and shall be available to the Engineer.
- D. Before ordering any material or doing any work, the Contractor shall verify all dimensions and shall be responsible for correctness of same. No extra charge or compensation will be allowed on account of any differences in dimensions or quantities from those indicated on the Contract Drawings, unless such difference is submitted to the Engineer before proceeding with the work.

6.0 MATERIALS, SERVICES, AND FACILITIES

- A. It is understood that, except as otherwise specifically stated in the Contract Documents, the Contractor shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, supervision, temporary construction of any nature, and all other services and facilities of any nature whatsoever necessary to execute, complete, and deliver the Work within the specified time.
- B. The Contractor shall provide such temporary enclosures as the Work may warrant. In addition, they shall provide the necessary temporary office, heat, utilities, telephone, and sanitary facilities, as required by the job, the Contractor, or the Engineer.
- C. Materials and equipment shall be so stored as to insure the preservation of their quality and fitness for the Work. Stored materials and equipment to be incorporated in the Work shall be located so as to facilitate prompt inspection.
- D. Manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned as directed by the manufacturer.
- E. Materials, supplies, and equipment shall be in accordance with samples submitted by the Contractor and approved by the Engineer.
- F. Materials, supplies, or equipment to be incorporated into the Work shall not be purchased by the Contractor or their Contractor subject to a chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller.
- G. Workmanship shall, at all times, be of a grade expected from skilled workers in each trade. Fitting of all materials shall be done to preserve the strength and durability of the materials and to present a clean, well worked appearance. The standards of all Work shall be such as to produce first-class results throughout. Where different materials abut, or where it is necessary to cut or pass through one material with other, care must be taken not to injure or deface one material in placing the other. Various trades shall, at all times, cooperate in the installation of their work to complete the whole in a satisfactory, acceptable manner.
- H. All materials permanently incorporated into the project shall be new unless otherwise noted.

7.0 INSPECTION AND TESTING

- A. All materials and equipment used in the construction of the Project shall be subject to adequate inspection and testing in accordance with generally accepted standards.
- B. The Contractor shall provide, at his expense or through agreement with Suppliers and Manufacturers, testing and inspection services required at source of supply or manufacture. The wages and overhead costs of inspectors and testing technicians, employed by the Contractor for inspection and materials quality control of on-site work, shall be paid by the Contractor except those costs associated with failing tests and services required anytime on Saturdays, Sundays, or holidays, or on weekdays outside of the hours 8:00 a.m. to 6:00 p.m. inclusive, shall be borne by the Contractor. The Contractor shall note that work performed on the following holidays shall require inspector's wages and overhead costs to be paid by the said Contractor: New Year's Day, President's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day, Friday after Thanksgiving Day, Day before Christmas, and Christmas Day.

- C. The Contractor shall provide all other inspection and testing services not required by the Contract Documents.
- D. If the Contract Documents, laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction require any Work to specifically be inspected, tested, or approved by someone other than the Contractor, the Contractor will give the Engineer timely notice of readiness. The Contractor will then furnish the Engineer the required certificates of inspection, testing, or approval.
- E. Neither observations by the Engineer nor inspections, tests, or approval by persons other than the Contractor shall relieve the Contractor from his obligations to perform the Work in accordance with the requirements of the Contract Documents.
- F. The Engineer and their representatives will at all times have access to the Work and shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials, and other relevant data and records. The Contractor will provide proper facilities for such access and observation of the Work and also for any inspection, or testing thereof.
- G. If any Work is covered contrary to the written request of the Engineer, it must, if requested by the Engineer, be uncovered for their observation and replaced at the Contractor's expense.
- H. If any Work has been covered which the Engineer has not specifically requested to observe prior to its being covered, or if the Engineer considers it necessary or advisable that covered Work be inspected or tested by others, the Contractor, at the Engineer's request, will uncover, expose, or otherwise make available for observation, inspection, or testing as the Engineer may require, that portion of the Work in question, furnishing all necessary labor, materials, tools, and equipment. If it is found that such Work is defective, the Contractor will bear all the expenses of such uncovering, exposure, observation, inspection, testing, and satisfactory reconstruction. If, however, such Work is not found to be defective, the Contractor will be allowed, an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, and reconstruction and an appropriate Change Order shall be issued.

8.0 SUBSTITUTIONS

- A. Whenever a material, article, or piece of equipment is identified on the Drawings or in the Specifications by reference to brand/product name or catalogue/model number, it shall be understood that this is referenced for the purpose of defining the performance or other salient requirements and that other products of equal capacities, quality and function shall be considered. The Contractor may recommend the substitution of a material, article, or piece of equipment of equal substance and function to that specified. If the Engineer approves the substitution, the Contractor may purchase it for incorporation into the Work. Any cost differential shall be deductible from the Contract Price and the Contract Documents shall be appropriately modified by Change Order. The Contractor warrants that if substitutes are approved, no major changes in the function or general design of the Project will result. Incidental changes or extra component parts required to accommodate the substitute will be made by the Contractor without a change in the Contract Price or Contract Time.
- B. Bids shall be prepared on the basis of the particular equipment and materials specified.

- C. An item shall be considered equal to the item so named or described if:
 - 1. It is at least equal in quality, durability, appearance, and design.
 - 2. Its performance is equal to or better than that specified and proven by an experience record of five years, minimum.
 - 3. It conforms substantially to the detailed requirements for the item specified.
- D. Prior to purchase, fabrication, or use of any substitute materials or equipment, detailed descriptive data shall be submitted to the Engineer for approval. Tests required by the Engineer to establish quality standards shall be at the Contractor's expense. Approval by the Engineer shall be in writing to be effective and their decision to approve or disapprove the item shall be final.
- E. The Contractor, when using substitute material or equipment, shall assume the cost of and responsibility for accomplishing all required changes, including costs of redesign by the Engineer.
- F. These Specifications for bids are not written in such a way or such a manner as to contain proprietary, exclusionary, or discriminatory requirements other than those based on performance, unless such requirements are necessary to test or demonstrate a specific function or to provide for necessary interchangeability of parts and equipment.

9.0 PATENTS

The Contractor shall pay all applicable royalties and license fees. They shall defend all suits or claims for infringement of any patent rights and save the Contractor and Client harmless from loss on account thereof, except that the Client shall be responsible for any such loss when a particular process, design, or the product of a particular manufacturer(s) is specified, but if the Contractor has reason to believe that the design, process, or product specified is an infringement of a patent, he shall be responsible for such loss unless he promptly gives such information to the Engineer.

10. SURVEYS, PERMITS, REGULATIONS

- A. The Client shall furnish all land surveys and establish a baseline or survey coordinates for locating the principal component parts of the Work together with a suitable number of bench marks adjacent to the Work as shown in the Contract Documents. The Contractor shall provide construction surveys to establish layout stakes, batter boards, and other working points, lines, and elevations as required.
- B. The Contractor shall carefully preserve bench marks and survey control points. In case of willful or careless destruction, the Contractor shall be charged with the resulting expense to replace and shall be responsible for any mistakes that may be caused by their unnecessary loss or disturbance.
- C. Permits and licenses of a temporary nature necessary for the prosecution of the Work shall be secured and paid for by the Contractor. Permits, licenses and easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the Client, unless otherwise specified. The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the Work as drawn and specified. If the Contractor observes that the Contract Documents are at variance therewith, they shall promptly notify the Engineer in writing, and any necessary changes shall be adjusted as provided in Section 13.0, Changes in the Work.

11.0 PROTECTION OF WORK, PROPERTY, AND PERSONS

- A. This Project is subject to all of the Safety and Health Regulations (CFR 29 Part 1926 and all subsequent amendments) as promulgated by the U.S. Department of Labor. Contractors are urged to make themselves familiar with the requirements of these regulations.
- B. The Contractor will be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. They will take all necessary precautions for the safety of, and will provide the necessary protection to prevent damage, injury, or loss to all employees and other persons who may be affected thereby.
- C. The Contractor will take all necessary precautions to provide the necessary protection to prevent damage to the Work and materials or equipment to be incorporated therein, whether in storage on or off the site, and other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.
- D. The Contractor will comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction. They will erect and maintain, as required by the conditions and progress of the Work, all necessary safeguards for safety and protection. They will notify Owners of adjacent utilities when prosecution of the Work may affect them. The Contractor will remedy all damage, injury, or loss to any property caused, directly or indirectly, in whole or in part, by the Contractor, their Sub-contractors or anyone directly or indirectly employed by either of them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of the Contractor.
- E. In emergencies affecting the safety of persons or the Work or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from the Engineer or Client, shall act to prevent threatened damage, injury, or loss. They will give the Engineer prompt Written Notice of any significant changes in the Work or deviations from the Contract Documents caused thereby, and a Change Order shall thereupon be issued covering the changes and deviations involved.
- F. All equipment used on this Project must be maintained and operated so as to provide maximum safety for workers and the public.
- G. The Contractor, or their Sub-contractors, shall be responsible for the proper care and protection of all materials, equipment, etc. during transportation and after delivery at the site. The Contractor and their Sub-contractors shall handle all material as directed so that it may be inspected by the Engineer. All materials capable of being injuriously affected by weather shall be protected from injury while being transported to the site as well as while being stored there.
- H. The Contractor shall take such action as may be required to protect labor, materials, and equipment including the land, trench, and appurtenances in any way connected with the Project, from the effect of extremes of heat, cold, wind, and rain; and other climatological conditions. Such action by the Contractor shall meet the requirements of the Engineer.
- I. The Contractor shall ascertain the true location of all underground structures of any kind whatsoever and shall be completely responsible for same regardless of their indication on Drawings or Specifications. They shall assume the cost of and make

such arrangements as may be warranted to protect same or adjust or replace with the appropriate authority.

12.0 SUPERVISION BY CONTRACTOR

- A. The Contractor will supervise and direct the Work. They will be solely responsible for the means, methods, techniques, sequences, and procedures of construction. The Contractor will employ and maintain on the Work a qualified supervisor or superintendent who shall have been designated in writing by the Contractor as the Contractor's representative at the Site. The supervisor shall have full authority to act on behalf of the Contractor and all communications given to the supervisor shall be as binding as if given to the Contractor. The supervisor shall be present on the Site at all times as required to perform adequate supervision and coordination of the Work. There will be no supervision by a designated working foreman without prior approval of the Engineer each time.
- B. If so ordered by the Engineer, the Contractor shall immediately remove any employee, Sub-contractor, or supplier, or any employee of a sub-contractor or supplier, who fails or refuses to carry out orders properly given, or who is, in the judgment of the Engineer, disorderly, unwilling to submit to authority, or lacking in requisite skill, and such person shall not again be employed on the Work.
- C. If, in the opinion of the Engineer, the progress of the work is such that the completion date of the Contract cannot be met for causes other than those provided in Section 15, he may request the Contractor to work additional men, additional hours, or both. The cost of all such overtime shall be borne by the Contractor.

13.0 CHANGES IN THE WORK

- A. The Contractor may at any time, as the need arises, order changes within the scope of the Work without invalidating the Agreement. If such changes increase or decrease the amount due under the Contract Documents, or in the time required for performance of the Work, an equitable adjustment shall be authorized by Change Order.
- B. The Engineer, also, may at any time issue a Change Directive, which directs Contractor to perform such additional and/or modified Work prior to agreement by Contractor on an adjustment in compensation or schedule, or both. To the extent that a Change Directive modifies the Work, Contractor may be entitled to an equitable adjustment in compensation or schedule, or both. Contractor shall promptly give written notice to seek an adjustment to the Contractor within (3) business days. Contractor shall promptly proceed to perform the changes in Work, notwithstanding its disagreement with the Change Directive.

14.0 CHANGES IN CONTRACT PRICE

- A. The Engineer may at any time by written order and without notice to the sureties require the performance of extra work or changes in the Work as may be found necessary or desirable. The amount of compensation to be paid to the Contractor for any extra work so ordered shall be made in accordance with whichever of the following plans the Engineer elects: (1) a price agreed upon between the parties and stipulated in the order for the extra work, (2) a price based on the unit prices of the contract, (3) a price determined by adding 15% to the "reasonable cost" of the extra work performed, such "reasonable cost" to be determined by the Engineer in accordance with the following paragraph.

- B. In arriving at the "reasonable cost" for the purposes of (3) above, the Engineer shall include the reasonable cost to the Contractor of all materials used, of all labor common and skilled, of foreman, trucks, and the fair-market rental rate for all machinery and equipment for the period employed directly on the Work. The reasonable cost for extra work shall include the cost to the Contractor of any additional insurance that may be required covering public liability for injury to persons and property, the cost of Workmen's Compensation Insurance, Federal Social Security, and any other costs based on payrolls, and required by law. The cost of extra work shall not include any cost or rental of small tools, buildings, or any portion of the time of the Contractor, their project supervisor or superintendent, or any allowance for use of capital or the premium on the bond as assessed upon the amount of extra work, these items being considered covered by the fifteen percent (15%) added to the reasonable cost.
- C. In the case of extra work which is done by a Sub-contractor of the Contractor, whether these are under the specific contract items provided herein, or otherwise if so approved by the Engineer, the 15% added to the reasonable cost of the Work will be allowed only to the Sub-contractor. On such work, an additional 5% of the reasonable cost (before addition of the 15%) will be paid to the Contractor for his work in directing the operations of the Sub-contractor and for any overhead involved.

15.0 TIME FOR COMPLETION AND LIQUIDATED DAMAGES

- A. The date of beginning and the time for completion of the Work are essential conditions of the Contract Documents and the Work embraced shall be commenced on a date specified in the Notice to Proceed.
- B. The Contractor will proceed with the Work at such rate of progress to insure full completion within the Contract Time. It is expressly understood and agreed, by and between the Client, Engineer, and the Contractor that the Contract Time for the completion of the Work described herein is a reasonable time, taking into consideration the average climatic, economic conditions, and other factors prevailing in the locality of the Work.
- C. If the Contractor shall fail to complete the Work within the Contract Time, or extension of time granted by the Engineer, then the Contractor will pay to the Engineer the amount for liquidated damages as specified in the Bid for each calendar day that the Contractor shall be in default after the time stipulated in the Contract Documents.
- D. The Contractor shall not be charged with liquidated damages or any excess cost when the delay in completion of the Work is due to the following, and the Contractor has promptly given Written Notice of such delay to the Engineer.
 - 1. to any preference, priority, or allocation order duly issued by the Engineer;
 - 2. to unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including but not restricted to, acts of God, or of the public enemy, acts of the Client, acts of another Contractor in the performance of a contract with the Client, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and abnormal and unforeseeable weather; and
 - 3. to any delays of Sub-Contractors of the Contractor occasioned by any of the causes specified in paragraphs 1 and 2 of this section.

16.0 CORRECTION OF WORK

- A. The Contractor shall promptly remove from the premises all Work rejected by the Engineer for failure to comply with the Contract Documents, whether incorporated in the construction or not, and the Contractor shall promptly replace and re-execute the Work in accordance with the Contract Documents and without expense to the Client and shall bear the expense of making good all Work of Contractors or Sub-contractors destroyed or damaged by such removal or replacement.
- B. All removal and replacement Work shall be done at the Contractor's expense. If the Contractor does not take action to remove such rejected Work within ten (10) days after receipt of Written Notice, the Engineer may remove such Work and store the materials at the expense of the Contractor.
- C. The Engineer or a designated representative of the Engineer has the right to remove and replace rejected work after ten (10) days of receipt of Written Notice at the expense of the Contractor.

17.0 SUBSURFACE CONDITIONS

- A. The Contractor shall promptly, and before such conditions are disturbed, except in the event of an emergency, notify the Engineer by Written Notice of:
 - 1. Subsurface or latent physical conditions at the Site differing materially from those indicated in the Contract Documents; or
 - 2. Unknown physical conditions at the Site, of an unusual nature, differing materially from those ordinarily encountered.
- B. The Engineer shall promptly investigate the conditions, and if they find that such conditions do so materially differ and cause an increase or decrease in the cost of, or in the time required for, performance of the Work, an equitable adjustment shall be made and the Contract Documents shall be modified by a Change Order. Any claim of the Contractor for adjustment hereunder shall not be allowed unless he has given the required Written Notice; provided that the Engineer may, if he determines the facts so justify, consider and adjust any such claims asserted before the date of final payment.

18.0 SUSPENSION OF WORK, TERMINATION, AND DELAY

- A. The Engineer may, at any time and without cause, suspend the Work or any portion thereof for a period of not more than ninety days or such further time as agreed upon by the Contractor, by Written Notice to the Contractor which notice shall fix the date on which Work shall be resumed. The Contractor will resume that Work on the date so fixed. The Contractor will be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension. When the whole or any portion of the Work is suspended for any reason, the Contractor shall properly cover, secure, and protect or caused to be so protected, such Work as may be liable to sustain injury from any cause.
- B. If the Contractor is adjudged bankrupt or insolvent, or if they make a general assignment for the benefit of their creditors; or if a trustee or receiver is appointed for the Contractor or for any of their property; or if they file a petition to take advantage of any debtor's act; or to reorganize under the bankruptcy or applicable laws; or if they repeatedly fail to make prompt payments to their Contractors or for labor, materials, or equipment; or if they disregard laws, ordinances, rules, regulations, or orders of any public body having jurisdiction of the Work; or if they disregard the authority of the Engineer; or if they otherwise violate any provision of

the Contract Documents, then the Client may, without prejudice to any other right or remedy and after giving the Contractor and his surety a minimum of ten (10) days from delivery of a Written Notice, terminate the services of the Contractor and take possession of the Project and of all materials, equipment, tools, construction equipment, and machinery thereon owned by the Contractor, and finish the Work by whatever method the Contractor may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds the direct and indirect costs of completing the Project, including compensation for additional professional services, such excess shall be paid to the Contractor. If such costs exceed such unpaid balance, the Contractor will pay the difference to the Contractor. Such costs incurred by the Contractor will be determined by the Engineer and incorporated in a Change Order.

- C. Where the Contractor's services have been so terminated by the Client, said termination shall not affect any right of the Client against the Contractor then existing or which may thereafter accrue. Any retention or payment of monies by the Client due the Contractor will not release the Contractor from compliance with the Contract Documents.
- D. After ten (10) days from delivery of a Written Notice to the Contractor, the Client may, without cause and prejudice to any other right or remedy, elect to abandon the Project and terminate the Contract. In such case, the Contractor shall be paid for all Work executed and any expense sustained plus reasonable profit.
- E. If, through no act or fault of the Contractor, the Work is suspended for a period of more than ninety (90) days by the Client or under an order or court or other public authority, or the Client fails to act on any request for payment within thirty (30) days after it is submitted, or the Client fails to pay the Contractor substantially the sum approved by the Engineer or awarded by arbitrators within thirty (30) days of its approval and presentation, then the Contractor may, after ten (10) days from delivery of a Written Notice to the Client and the Engineer, terminate the Contract and recover from the Client payment for all Work executed and all expenses sustained. In addition and in lieu of terminating the Contract, if the Engineer has failed to act on a request for payment or if the Client has failed to make any payment as aforesaid, the Contractor may upon ten (10) days' notice to the Client and the Engineer stop the Work. Change Orders shall be issued for adjusting the Contract Price or extending the Contract Time or both to compensate for the costs and delays attributable to the stoppage of the Work.
- F. If the performance of all or any portion of the Work is suspended, delayed, or interrupted as a result of a failure of the Client or Engineer to act within the time specified in the Contract Documents, or if no time is specified, within a reasonable time, an adjustment in the Contract Price or an extension of the Contract Time, or both, shall be made by Change Order to compensate the Contractor for the costs and delays necessarily caused by the failure of the Client or Engineer.

19.0 PAYMENTS TO CONTRACTOR

- A. At least ten days before each progress payment falls due (but not more often than once a month), the Contractor will submit to the Engineer a partial payment estimate filled out and signed by the Contractor covering the Work performed during the period covered by the partial payment estimate and supported by such data as the Engineer may reasonably require. If payment is requested on the basis of materials and equipment not incorporated in the Work, but delivered and suitably stored at or

near the site, the partial payment estimate shall also be accompanied by such supporting data, satisfactory to the Client, as will establish the Client's title to the material and equipment and protect his interest therein, including applicable insurance. The Engineer will, within ten days after receipt of each partial payment estimate, either indicate in writing their approval of payment and present the partial payment estimate to the Client or return the partial payment estimate to the Contractor indicating in writing their reasons for refusing to approve payment. In the latter case, the Contractor may make the necessary corrections and resubmit the partial payment estimate.

B. Progress payments are detailed in Section 3 of the Agreement (Section 00520) and summarized below:

The Client will retain an amount of the progress payment, each month, in accordance with the following procedures:

1. Retainage shall be 10 percent of the monthly payments claimed.
2. Upon substantial completion, the amount of retainage will be reduced to 2 percent of the total amount due the Contractor plus an additional retainage based on the Engineer's estimate of the fair value of the punch list items and the cost of completing specified amounts for each incomplete or defective item of work. As these items are completed or corrected, they shall be paid for out of the retainage until the entire project is declared complete. The final 2 percent retainage shall be held during the one-year warranty period and released only after the project has been accepted by the Client.

C. On completion and acceptance of a part of the Work on which the price is stated separately in the Contract Documents, payment may be made in full, including retained percentages, less authorized deductions.

1. The request for payment may also include an allowance for the cost of such major materials and equipment which are suitably stored either at or near the site.
2. All Work covered by partial payment made shall thereupon become the sole property of the Client, but this provision shall not be construed as relieving the Contractor of the sole responsibility for the care and protection of the Work upon which payments have been made or the restoration of any damaged Work, or as a waiver of the right of the Contractor to require the fulfillment of all terms of the Contract Documents.
3. The Client also reserves the right to occupy certain finished portions of the work before final acceptance. If such right is exercised, the Client will assume all responsibility for his damage to the structure, but assumption of such responsibility by the Client in no way relieves the Contractor of his obligation as defined under Section 29, Guaranty.
4. Upon completion and acceptance of the Work, the Engineer shall issue a certificate attached to the final payment request that the Work has been accepted by them under the conditions of the Contract Documents. The entire balance found to be due the Contractor, including the retained percentages, but except such sums as may be lawfully retained by the Client, shall be paid to the Contractor within sixty (60) days of completion and acceptance of the Work.
5. The Contractor will indemnify and save the Client or the Client's agents harmless from all claims growing out of the lawful demands of Sub-

contractors, laborers, workmen, mechanics, material men, and furnishers of machinery and parts thereof, equipment, tools and all supplies, incurred in the furtherance of the performance of the Work. The Contractor shall, at the Client's request, furnish satisfactory evidence that all obligations of the nature designated above have been paid, discharged, or waived. If the Contractor fails to do so, the Client may, after having notified the Contractor, either pay unpaid bills 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 the Contractor shall be resumed, in accordance with the terms of the Contract Documents, but in no event shall the provisions of this sentence be construed to impose any obligations upon the Client to either the Contractor, their Surety, or any third party. In paying any unpaid bills of the Contractor, any payment so made by the Contractor shall be considered as a payment made under the Contract Documents by the Client to the Contractor and the Client shall not be liable to the Contractor for any such payments made in good faith.

20.0 ACCEPTANCE OF FINAL PAYMENT AS RELEASE

The acceptance by the Contractor of final payment shall be and shall operate as a release to the Client of all claims and all liability to the Contractor other than claims in stated amounts as may be specifically excepted by the Contractor for all things done or furnished in connection with this Work and for every act and neglect of the Contractor and others relating to or arising out of this Work. Any payment, however, final or otherwise, shall not release the Contractor or his sureties from any obligations under the Contract Documents.

21.0 INSURANCE

Refer to Section 17 of the Agreement (Section 00520) for insurance requirements.

22.0 SEPARATE CONTRACTS

- A. The Client reserves the right to let other contracts in connection with this Project. The Contractor shall afford other Contractors reasonable opportunity for the introduction and storage of their materials and the execution of their Work, and shall properly connect and coordinate their Work with the others. If the proper execution or results of any part of the Contractor's Work depends upon the Work of any other Contractor, the Contractor shall inspect and promptly report to the Engineer any defects in such Work that render it unsuitable for such proper execution and results.
- B. The Contractor may perform additional Work related to the Project on their own, or may let other contracts containing provisions similar to these. The Contractor will afford the other Contractors who are parties to such contracts (or the Contractor, if they are performing the additional Work themselves), reasonable opportunity for the introduction and storage of materials and equipment and the execution of Work, and shall properly connect and coordinate their Work with the others.
- C. If the performance of additional Work by other subcontractors or the Engineer is not noted in the Contract Documents prior to the execution of the Contract, written notice thereof shall be given to the Contractor prior to starting any such additional Work. If the Contractor believes that the performance of such additional Work by the Engineer or others involved results in additional incurred expense or entitles them to an extension of the Contract Time, they may make a claim thereof as provided in Sections 14 and 15.

23.0 SUBCONTRACTING

- A. The Contractor may utilize the services of specialty Sub-contractors on those parts of the Work which, under normal contracting practices, are performed by specialty Sub-contractors.
- B. The Contractor shall not award Work to Sub-contractor(s), in excess of fifty (50%) percent of the Contract Price, without prior written approval of the Engineer. The Contractor shall obtain the Engineer's approval of all Sub-contractors prior to entering into a sub-contractor's agreement.
- C. The Contractor shall be fully responsible to the Client for the acts and omissions of their Sub-contractors, and of persons either directly or indirectly employed by them, as they are for the acts and omissions of persons directly employed by them.
- D. The Contractor shall cause appropriate provisions to be inserted in all other subcontracts relative to the Work to bind other Sub-contractors to the Contractor by the terms of the Contract Documents insofar as applicable to the Work of other Sub-contractors and to give the Contractor the same power in regard to terminating any subcontract that the Client may exercise over the Contractor under any provision of the Contract Documents.
- E. Nothing contained in this Contract shall create any contractual relation between any Sub-contractor of the Contractor and the Client.

24.0 ENGINEERS AUTHORITY

- A. The Engineer shall act as the Client's representative during the construction period. They shall decide questions which may arise as to quality and acceptability of materials furnished and Work performed. They shall interpret the intent of the Contract Documents in a fair and unbiased manner. The Engineer will make visits to the site and determine if the Work is proceeding in accordance with the Contract Documents.
- B. The Contractor will be held strictly to the intent of the Contract Documents in regard to the quality of materials, workmanship, and execution of the Work. Inspections may be made of the factory or fabrication plant of the source of material supply.
- C. The Engineer will not be responsible for the construction means, controls, techniques, sequences, procedures, or construction safety.
- D. The Engineer shall promptly make decisions relative to interpretation of the Contract Documents.

25.0 LAND AND RIGHTS-OF-WAY

- A. Prior to issuance of Notice to Proceed, the Client shall obtain all land and rights-of-way necessary for carrying out and for the completion of the Work to be performed pursuant to the Contract Documents, unless otherwise mutually agreed.
- B. The Engineer shall provide to the Contractor information which delineates and describes the lands owned and rights-of-way acquired.
- C. The Contractor shall provide at their own expense and without liability to the Client any additional land and access thereto that the Contractor may desire for temporary construction facilities, or for storage of materials.

26.0 GUARANTY

The Contractor shall guarantee all materials and equipment furnished and Work performed for a period of one (1) year from the date of Substantial Completion. The Contractor warrants

and guarantees for a period of one (1) year from the date of Substantial Completion of the system that the completed system is free from all defects due to faulty materials or workmanship and the Contractor shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to other parts of the system resulting from such defects. The Engineer will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, adjustments, or perform other Work that may be made necessary by such defects, the Client may do so and charge the Contractor the cost thereby incurred.

27.0 DISPUTE RESOLUTION

Refer to Section 26 of the Agreement (Section 00520) for dispute resolution requirements.

28.0 TAXES

The Contractor will pay all sales, consumer, use, and other similar taxes required by the law of the place where the Work is performed.

END OF SECTION

SECTION 00943
CHANGE ORDER No. _____

PROJECT:	Former Gorham Manufacturing Plant – Phase II, III and Parcel C Cap		
DATE OF ISSUANCE:			
CLIENT (OWNER):	Textron, Inc.	CONTRACTOR:	
RIDEM Project No.:		ENGINEER:	Amec Foster Wheeler

You are directed to make the following changes in the Contract Documents.

DESCRIPTION:

**REASON FOR
CHANGE ORDER:**

ATTACHMENTS:

CHANGE IN CONTRACT PRICE	CHANGE IN CONTRACT TIME:
Original Contract Price: \$	Original Contract Times: Substantial Completion: Ready for Final Payment:
Net Changes from Previous Change Orders No. _____ to No. _____ \$	Net Change from previous Change Orders No. _____ to No. _____
Contract Price prior to this Change Order \$	Contract Time Prior to this Change Order Substantial Completion: Ready for Final Payment:
Net Increase of this Change Order \$	Net Increase of this Change Order (days)
Contract Price with all approved Change Orders \$	Contract Times with all approved Change Orders Substantial Completion: Ready for Final Payment:

RECOMMENDED:

By: _____

Date: _____

Engineer – Amec Foster Wheeler

APPROVED:

By: _____

Date: _____

Client - Textron

APPROVED:

By: _____

Date: _____

Contractor -

SECTION 01110

SUMMARY OF WORK

PART 1 - GENERAL

1.01 DESCRIPTION

A. SECTION INTENT: This section is intended to provide a summary of the project and the various elements of work associated with it. This summary should be used in conjunction with other Contract Specifications and Drawings. This section does not provide the technical detail for particular Work Items, but describes the work as a whole, providing an overall perspective to the separate tasks and their interrelationships.

B. GENERAL: The scope of work for the Phase II, III, and Parcel C Cap project (the Project) is comprised of the following work areas:

- Phase II Area – 3 acres of Mashapaug Inner Cove
- Phase III Area – 5.8 acres of northeast upland of Parcel C-1
- Parcel C – 5.7 acres immediately west of the high school

The remediation work proposed for these areas includes capping the area of Parcel C west of Alvarez High School, removing one to two feet of sediment from the Inner Cove (Phase II Area), and then placing and capping the dewatered sediment within a defined location of the Phase III Area Northeast Upland. The Inner Cove and the delineated wetlands located along the downgradient edge of the Phase I and Phase III Areas will then be restored. This restoration will provide a smooth transition from the perimeter wetland (50 feet above the delineated fringe wetland) into the water. The placed sediment and the soils in the Phase III Area will be capped.

The scope of work includes, but is not limited to the following activities:

1. Install erosion and sedimentation controls
2. Clear and grub
3. Prepare the inner cove for dewatering and dredging activities including dam and dewatering system installation, treatment system installation, and dewatering
4. Grade and cap Parcel C
5. Dredge sediments from within the inner cove
6. Process dredged sediments, place and cap within identified area
7. Restore fringe wetlands and cap inner cove
8. Remove dewatering treatment system and grade and cap Phase III
9. Restore the site

1.02 DEFINITIONS

A. "Engineer" as used in the Specifications/Drawings shall mean Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler)

B. "Contractor" as used in these specifications shall refer to the company who has entered into a contractual agreement with the Client for scope of work and price to complete the work identified in the project's Contract Documents. The term

Contractor also includes all agents, employees, vendors, and their sub-contractors.

- C. "Client" as used in these specifications shall refer to Textron, Inc.
- D. "Owner" as used in these specifications shall refer to the City of Providence, RI.

1.03 WORK COVERED BY THE SPECIFICATIONS AND DRAWINGS

- A. The Work for this contract includes:
 - 1. Submit a Construction Work Plan, Health and Safety Plan, and Contractor Quality Control Plan to the Engineer. Work plans shall include details on equipment and personnel, schedule, work sequence, and means and methods. Construction Quality Control Plan shall be as specified in Section 01450, "Contractor Quality Assurance / Quality Control". Health and Safety Plan shall be as detailed in Section 01351, "Safety, Health, and Emergency Response."
 - 2. Mobilize equipment and personnel to the Site.
 - 3. Stage Site to provide temporary facilities, material storage, and laydown areas.
 - 4. Install fence fabric as shown on the Contract Drawings.
 - 5. Install erosion and sedimentation controls (sedimentation barriers, stabilized construction accesses, turbidity curtain) prior to any soil disturbance.
 - 6. Clear and grub the Phase II, III, and Parcel C limits of work and apply chemical control of invasive species.
 - 7. Install temporary dam and dewatering system (design to be submitted for approval prior to construction). Discharge dewatering water according to the following:
 - a. Initial dewatering of pond down to a depth of one foot; water to be discharged into Mashapaug Pond between the temporary dam and the turbidity curtain;
 - b. Dewatering of the remaining one foot of water in the Inner Cove to be discharged within the upland infiltration gallery; and
 - c. Construction dewatering water shall be treated to meet temporary surface water discharge criteria to be issued by RIDEM water resources. Treatment shall be performance based and may include fract tanks, bag filters, and activated carbon.
 - 8. Prepare subgrade within the Parcel C limits of work and install the capping system.
 - 9. Dredge sediments from the Inner Cove and process within the Phase III limits of work.
 - 10. Install wetlands fringe cap (elevation 39 ft to edge of wetland), wetlands perimeter cap (50 ft wetlands buffer zone), and inner cove sediment cap (Inner Cove area below elevation 39') for restoration of the pond.
 - 11. Place and cap processed, dredged sediments within the identified consolidation area.
 - 12. Remove dewatering and sediment processing equipment.
 - 13. Prepare subgrade within the Phase III limits of work and install the capping system.
 - 14. Stabilize and seed capped areas.

15. Repair and seed disturbed areas used for construction staging and storage.
16. Remove temporary erosion and sedimentation controls and temporary facilities.

1.04 WORK SEQUENCE

- A. The work shall be planned, scheduled, and performed in stages in order to complete the work within the requirements of the Specifications and Drawings and the requirements of appropriate regulatory agencies and permits.
- B. The Contractor's proposed sequence shall be consistent with the suggested general sequence described by Article 1.03. If the Contractor proposed sequence differs from the general sequence, Contractor should clearly indicate differences in proposed sequence to enable Engineer to conduct an evaluation against the approved Remedial Action Work Plan.
- C. Project Closeout:
 1. Request a Certificate of Substantial Completion;
 2. Perform a Site Inspection with Engineer to accept work and identify remaining work to be completed (punch list);
 3. Complete all remaining work noted in the punch list;
 4. Perform a Final Site Inspection with Engineer to verify all work is complete;
 5. Submit final record documents to Engineer;
 6. Complete final pay requisition with accompanying balancing change order as required; and
 7. Achieve Certificate of Final Completion.

1.05 OTHER GENERAL REQUIREMENTS

- A. Comply with all project related permits and apply/obtain all Contractor responsible permits prior to the commencement of work.
- B. Make arrangements for temporary storage of materials and supplies and for timely delivery to the job site.
- C. Maintain up-to-date records on site.
- D. Maintain the project Site in a neat condition.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.01 HEALTH AND SAFETY

- A. The Contractor is advised that the work will be performed on a Site that contains hazardous waste. The Contractor and its Subcontractors are responsible for developing a Site-Specific Health and Safety Plan (HASP) for its operations. The Contractor shall implement this plan taking precautions as necessary to protect the

public and their personnel from potential hazards. The Contractor shall utilize personnel with current OSHA Hazardous Waste Operations and Emergency Response Standard (HAZWOPER) training (initial 40-hr training and annual 8-hr refresher).

3.02 PROTECTION OF PROPERTY AND OPERATIONS

- A. The Contractor shall utilize reasonable precautions in accordance with standard practice to protect the property from damage during execution of the Work. Any damage that the Contractor may inflict shall be repaired or replaced in a prompt manner as directed by Engineer at no additional cost to the Client.
- B. The Contractor shall implement reasonable precautions to minimize adverse impacts from execution of the work on property abutters and shall not interfere with their operations. The Site includes active property easements with the Narragansett Bay Commission (NBC) and the National Railroad Passenger Corporation (Amtrak) which are to remain operational during all stages of work.
- C. The Contractor shall coordinate site restrictions and vehicular/pedestrian traffic control plans as appropriate.

3.03 CONTRACTOR'S USE OF PREMISES

- A. The Contractor shall only use designated areas of the Site for staging and storage. Staging and storage areas are to be agreed upon and accepted by Engineer and the Client.
- B. The Contractor shall assume full responsibility for the protection and safe keeping of products and equipment under this Contract that are stored on-site during the project construction.

3.04 OTHER REQUIREMENTS

- A. The Contractor is responsible for using special care and or special considerations which may be necessary for proper execution of the work, but which may not be specifically identified in this section. The Contractor shall comply with the entire requirements of the Specifications and Drawings and shall exercise special care wherever required for proper execution of the intended work of this contract.
- B. The Contractor shall comply with all the requirements of any necessary permits.

END OF SECTION

SECTION 01270
MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Measurement of Quantities
- B. Scope of Payment
- C. Payment for Increased and Decreased Quantities
- D. Eliminated Bid Items
- E. Partial Payments
- F. Payment for Materials on Hand
- G. Incidental (Subsidiary) Work
- H. Measurement and Payment of Bid Items

1.02 RELATED REQUIREMENTS

Not Used

1.03 GENERAL

- A. Each unit and lump sum price stated in the Bid Proposal shall constitute full compensation, as herein specified, for each item of the work completed.
- B. All unit price bid items will be measured to determine final quantities of Work in place after completion of the Work and prior to the Final Payment of the Contract.
- C. All units of measurement shall be standard United States units as applied to the specific items of work by industry tradition and as interpreted by the Engineer.

1.04 PARTIAL PAYMENT/MONTHLY PAY ESTIMATE

- A. After Award of the Contract and prior to the Contractor's Mobilization on-site, the Contractor shall submit a breakdown of component quantities (and their unit prices) of the individual lump sum unit bid prices. This information shall form the basis for preparation of the monthly cost estimate in the Application for Payment form.
- B. Prior to request for partial payment, the Contractor's superintendent or other authorized representative of the Contractor shall meet with the Engineer and determine and agree upon quantities of the unit price work accomplished and/or completed during the work period.
- C. Once each month, the Contractor will prepare the Application for Payment form as part of his partial payment request.
- D. These completed forms will provide the basis of the Engineer's review of monthly quantity estimates upon which payment will be made. Items not appearing on the Application for Payment will not be considered for payment.

- E. The Contractor shall submit with each payment application a bill of sale, invoice, or other documentation warranting that the Client has received the material and equipment free and clear of all liens and that the materials and equipment are covered by appropriate insurance per Section 19 of the General Conditions.

1.05 SCOPE OF PAYMENT

- A. For lump sum payment items, payments to the Contractor will be based upon the Engineer's estimate of percentage completion of the lump sum tasks. The estimate shall be based on approximated quantities of work completed in accordance with the Plans and Specifications and shall be reviewed and approved by the Engineer.
- B. The Contractor shall accept as payment as herein provided, full compensation for furnishing all materials, labor, tools, equipment, and incidentals necessary to perform the completed work and for performing all work contemplated and embraced by the contract. The payment shall be made with the prices contained in the Bid Form and shall include compensation for all loss or damage arising from the nature of the work, or from the action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the work and until its final acceptance by the Engineer, and for all risks of every description connected with the prosecution of the work, except as provided herein, and also for all expenses incurred in consequence of the suspension of the work as herein authorized.
- C. The payment of any partial estimate or of any retained percentage except by and under the approved final invoice in no way shall affect the obligation of the Contractor to repair or renew any defective parts of the construction or to be responsible for any damage due to such defects.

1.06 PAYMENT FOR INCREASED OR DECREASED QUANTITIES

- A. When alterations in the quantities of work not requiring supplemental agreements are ordered and performed, the Contractor shall accept payment in full at the contract price for the actual quantities of work done. No allowance will be made for anticipated profits.

Unit quantity bid items and prices shall apply to extra authorized work or decreases in work as determined by the Engineer, where required work is in addition to or decreased from the limits of work indicated on the Drawings.

- B. Increased or decreased work involving supplemental agreements will be paid for as stipulated in such agreements.
- C. Measurements for increased or decreased work shall be based on actual field surveys performed jointly by the Engineer and Contractor unless other measurement techniques are approved by the Engineer.

1.07 ELIMINATED ITEMS

- A. The Engineer may eliminate any items from the Contract should they be found unnecessary for the proper completion of the work contracted. Such action shall in no way invalidate the contract, and no allowance will be made for items so eliminated in making final payment to the Contractor.

1.08 PARTIAL PAYMENT

- A. Partial Payments shall be made monthly as the work progresses. All partial invoices and payments shall be subject to correction in the final quantity invoice and payment.
- B. No monthly payment shall be required to be made when, in the judgment of the Engineer, the work is not proceeding in accordance with the provisions of the contract, or when, in his judgment, the total value of the work done since the last payment amounts to less than \$1,000.

1.09 PAYMENT FOR MATERIAL DELIVERED ON LUMP SUM PROJECTS

- A. At the discretion of the Engineer, acting upon the request of the Contractor, an invoice, accompanied by receipted bills, may be made for payment of all or part of the value of acceptable, non-perishable materials and equipment which are to be incorporated into the contract which have been delivered to the site of the work or in acceptable storage places, and not used at the time of such invoice.
- B. Materials, when so paid for by the Client shall become the property of the Client and, in the event of default on the part of the Contractor, the Client may use, or cause to be used, these materials in the construction of the work provided for in the contract.
- C. The Contractor shall be responsible for any damage to, or loss of, these materials.
- D. The amount thus paid by the Client shall go to reduce estimated amounts due the Contractor as the material is used in the work.

1.10 INCIDENTAL WORK

- A. Incidental work items for which payment is not measured or made include but are not limited to, the following items:
 - 1. Bond, insurance, and administrative costs.
 - 2. Incidental Site preparation.
 - 3. Clean up.
 - 4. Security, signs, safety equipment, etc.
 - 5. Restoration of property impacted by remediation and construction activities other than those impacts that are covered elsewhere under other payment items.
 - 6. Cooperation with other Contractors, abutters and easement holders.
 - 7. Minor items - such as replacement of fences, guard rails, rockwalls, etc.
 - 8. Roadway and parking area - signage.

9. Erosion control.
10. Preconstruction photographs.
11. Temporary utilities.
12. Traffic regulation.
13. Other associated work.
14. Testing.
15. All other work indicated on the Drawings or in the Specifications which is required and not specifically indicated in the bid items below.

PART I - BASE BID

Item Number 1 - General Conditions

MEASUREMENT: This item will be measured as a percentage.

PAYMENT: Payment for General Conditions will be full compensation for all labor, materials, equipment, administration required to mobilize the Contractor's work force and initiate administrative functions, both on-site and off-site. Payment will include compensation for the provision of the Contractor's field office and Engineer's field office per specification 01510, and all other on-site activities required to start Work. In addition, payment shall include full compensation for demobilizing Contractor's equipment, completion of administrative and closeout tasks, and removal of all construction related temporary materials from the site.

Partial payment under bid item #1 General Conditions will be as follows:

The adjusted contract amount for construction items used below is defined as the total contract amount less the lump sum bid for General Conditions.

When 5% of the adjusted contract amount for construction items is earned, 25% of the lump sum bid will be paid.

When 25% of the adjusted contract amount for construction items is earned, 50% of the lump sum bid will be paid.

When 50% of the adjusted contract amount for construction items is earned, 75% of the lump sum bid will be paid.

Upon completion of all work under this contract, payment for the remainder of the lump sum bid for General Conditions will be made. The amount bid for General Conditions cannot exceed ten percent (10%) of the total Bid Price.

Item Number 2 - General Site Work

MEASUREMENT: This item will be measured as the estimated percentage of total work (lump sum) under this item completed during each pay period.

PAYMENT: Payment for this item will be full compensation for all labor, materials, and equipment required to complete all general site work as shown on the Drawings. Payment for this item includes demolition as described in Section 02221, transportation and off-site disposal of construction and demolition debris described in Section 02120, the removal of chain link fence, installation, maintenance, removal of all (existing and proposed) temporary erosion

control devices described in Section 02370, and removal of privacy fencing. Material staging area preparation, maintenance and removal. Temporary gravel access road installation, maintenance and removal. Adjustments, installation and abandonment of monitoring wells as described in Section 02522 and Section 02526 in full conformance with the Drawings and Specifications.

This item shall include all other work required to complete the Work not included on other payment items.

Item Number 3 - Clearing and Grubbing

MEASUREMENT: This item will be measured as the estimated percentage of total acres (lump sum) cleared and grubbed during each pay period.

PAYMENT: Payment for this item will be full compensation for all labor, materials, and equipment required to clear and grub to the limits shown on the Drawings and stage the debris for Client transportation and off-site disposal. Removal of stumps shall be in full conformance with the Drawings and Specifications.

Item Number 4 – Upland Excavation and Filling

MEASUREMENT: This item will be measured as the estimated percentage of excavation and filling completed during each pay period.

PAYMENT: Payment for this item will be full compensation for all labor, materials, and equipment required to complete all upland (perimeter wetland and upland areas) excavation, filling and grading to prepare the subgrade for installation of the capping system elevations as shown on the Drawings and as necessary to complete the work. Payment for this item includes regrading and consolidating impacted soils within the limits of cap areas, excavation and filling to the proposed limit of waste subgrade within the cap areas and to proposed grades outside the limit of waste footprint. The work also includes all sorting, hauling and stockpiling of excavated materials in designated areas to balance the site as required in all respects of the Contract Documents.

Item Number 5 – Sediment Removal and Dewatering

MEASUREMENT: This item will be measured as the estimated percentage of Sediment Removal and dewatering completed during each pay period.

PAYMENT: Payment for this item will be full compensation for all labor, materials, and equipment required to dewater and remove Inner Cove Sediments. Payment will include all efforts to design, furnish, install, operate and maintain a system for dewatering of the Inner Cove and to excavate, haul, stockpile, dewater, process with amendments, excavate from stockpiles, transport, screen, test, install and compact the dredged material in full conformance with the Drawings and Specifications. The dewatering system may include a well point system, submersible pumps, or other approved dewatering method, frac tanks, infiltration galleries, and a treatment system to conform to discharge limits set by RIPDES in full conformance with the Drawings and Specifications.

Item Number 6 – Geotextile

MEASUREMENT: This item will be measured as the estimated percentage of geotextile completed during each pay period.

PAYMENT: Payment for this item will be full compensation for all labor, materials, and equipment required to furnish and install the non-woven geotextile in full conformance with the Drawings and Specifications.

Item Number 7 – Common Borrow

MEASUREMENT: This item will be measured as the estimated percentage of Common Borrow completed during each pay period.

PAYMENT: Payment for this item will be full compensation for all labor, materials, and equipment required to haul, stockpile, excavate from stockpiles, transport, screen, test, install and compact the Common Borrow as a component of the Upland Soil Cap in full conformance with the Drawings and Specifications.

Item Number 8 – Inner Cove Cap (10% Organic Soil Mix)

MEASUREMENT: This item will be measured as the estimated percentage of 10% Organic Soil Mix completed during each pay period.

PAYMENT: Payment for this item will be full compensation for all labor, materials, and equipment required to haul, stockpile, excavate from stockpiles, transport, screen, test, install and compact the 10% Organic Soil Mix for the Inner Cove Cap in full conformance with the Drawings and Specifications.

Item Number 9 – 20% Organic Soil Mix

MEASUREMENT: This item will be measured as the estimated percentage of 20% Organic Soil Mix completed during each pay period.

PAYMENT: Payment for this item will be full compensation for all labor, materials, and equipment required to haul, stockpile, excavate from stockpiles, transport, screen, test, install and compact the 20% Organic Soil Mix as a component of the Fringe and Perimeter Wetland Caps in full conformance with the Drawings and Specifications.

Item Number 10 – Restoration, Loam and Seed

MEASUREMENT: This item will be measured as the estimated percentage of the total work under this item completed during the pay period.

PAYMENT: Payment for this item will be full compensation for all labor, materials, and equipment required to haul, stockpile, and spread loam and seed in complete conformance with the Drawings and Specifications. This item includes furnishing and application of all fertilizer, limestone, and mulch in full conformance with the Drawings and Specifications. This item also includes as-built survey of the final surface elevations of all soil caps installed including the Upland Soil Cap, Perimeter and Fringe Wetland Cap and Inner Cove cap. All incidental site

cleanup and restoration to existing pavement or other surfaces which were damaged during construction is also included in this payment item.

PART II - SUPPLEMENTAL UNIT PRICES

Item Number SU-1 - Authorized Addition or Reduction in Clearing and Grubbing

MEASUREMENT: Authorized Addition or Reduction in Clearing and Grubbing will be measured by survey as the number of acres added, or the number of acres deleted, as authorized in writing by the Engineer.

PAYMENT: Payment or credit will be at the unit price per acre in the Bid Form, and will constitute full compensation for all labor, materials, and equipment required to complete the work.

Item Number SU-2 - Authorized Addition or Reduction in Upland Excavation and Filling

MEASUREMENT: Authorized Addition or Reduction in Excavation or Filling will be measured by survey as the number of cubic yards of excavation added, or the number of cubic yards deleted, as authorized in writing by the Engineer.

PAYMENT: Payment or credit will be at the unit price per in-place cubic yard in the Bid Form, and will constitute full compensation for all labor, materials, and equipment required to complete the work.

Item Number SU-3 - Authorized Addition or Reduction in Dredging

MEASUREMENT: Authorized Addition or Reduction in Filling will be measured by survey as the number of cubic yards of dredging, added or deleted as authorized in writing by the Engineer. Includes all components of dewatering as described for Payment Item Number 5, Dredging and Dewatering

PAYMENT: Payment or credit will be at the unit price per in-place cubic yard in the Bid Form, and will constitute full compensation for all labor, materials, and equipment required to complete the work using on-site materials.

Item Number SU-4 - Authorized Addition or Reduction in Geotextile

MEASUREMENT: Authorized Addition or Reduction in Geotextile will be measured by survey as the number of square yards of material which may be added or deleted as authorized in writing by the Engineer.

PAYMENT: Payment or credit will be at the unit price per square yard (installed in place, excluding all overlap and waste) in the Bid Form, and will constitute full compensation for all labor, materials, and equipment required to complete the work.

Item Number SU-5 - Authorized Addition or Reduction in Common Soil

MEASUREMENT: Authorized Addition or Reduction in Common Soil materials will be measured by survey as the number of cubic yards (installed in place) of material added or deleted as authorized in writing by the Engineer.

PAYMENT: Payment or credit will be at the unit price per cubic yard in the Bid Form, and will constitute full compensation for all labor, materials, and equipment required to sort, process, and install Common Soil.

Item Number SU-6 - Authorized Addition or Reduction in 10% Organic Soil Mix

MEASUREMENT: Authorized Addition or Reduction in 10% Organic Soil Mix materials will be measured by survey as the number of cubic yards (installed in place) of material added or deleted as authorized in writing by the Engineer.

PAYMENT: Payment or credit will be at the unit price per cubic yard in the Bid Form, and will constitute full compensation for all labor, materials, and equipment required to sort, process, and install 10% Organic Soil Mix.

Item Number SU-7 - Authorized Addition or Reduction in 20% Organic Soil Mix

MEASUREMENT: Authorized Addition or Reduction in 20% Organic Soil Mix materials will be measured by survey as the number of cubic yards (installed in place) of material added or deleted as authorized in writing by the Engineer.

PAYMENT: Payment or credit will be at the unit price per cubic yard in the Bid Form, and will constitute full compensation for all labor, materials, and equipment required to sort, process, and install 20% Organic Soil Mix.

Item Number SU-8 - Authorized Addition or Reduction in Loam

MEASUREMENT: Authorized Addition or Reduction in Loam will be measured by survey as the number of cubic yards (installed in place) of Loam added or deleted as authorized in writing by the Engineer.

PAYMENT: Payment or credit will be at the unit price per cubic yard in the Bid Form, and will constitute full compensation for all labor, materials, and equipment required to complete the work.

Item Number SU-9 - Authorized Addition or Reduction in Seeding

MEASUREMENT: Authorized Addition or Reduction in Seeding will be measured by survey as the number of acres of Seeding added or deleted as authorized in writing by the Engineer. (unit price in the bid form shall be per acre - quantities will be measured to 1/10 acre)

PAYMENT: Payment or credit will be at the unit price per acre in the Bid Form, and will constitute full compensation for all labor, materials, and equipment, including maintenance through the warranty period, required to complete the work.

END OF SECTION

SECTION 01290
PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. 00700 – General Conditions

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections:
 - 1. 01270 – Measurement and Payment
 - 2. 00943 – Change Order
 - 3. 01320 – Construction Progress Documentation
 - 4. 01330 – Submittal Procedures

1.3 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments.
 - 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Client and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement. Application Preparation: Complete every entry on form. Engineer will return incomplete applications without action.
 - 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 - 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 - 3. Include amounts of Change Orders issued before last day of construction period covered by application.
 - 4. Indicate separate amounts for work being carried out under Client-requested project acceleration.
- C. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
 - 1. Provide certificate of insurance, evidence of transfer of title to Client, and consent of surety to payment, for stored materials.
 - 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 - 3. Provide summary documentation for stored materials indicating the following:

- a. Materials previously stored and included in previous Applications for Payment.
 - b. Work completed for this Application utilizing previously stored materials.
 - c. Additional materials stored with this Application.
 - d. Total materials remaining stored, including materials with this Application
- D. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Engineer by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments.
- E. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the followingList of subcontractors.
 - 1. Schedule of values.
 - 2. Payment schedule.
 - 3. Contractor's construction schedule (preliminary if not final).
 - 4. Products list (preliminary if not final).
 - 5. Schedule of unit prices.
 - 6. Submittal schedule (preliminary if not final).
 - 7. List of Contractor's staff assignments.
 - 8. List of Contractor's principal consultants.
 - 9. Copies of building permits.
 - 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 - 11. Initial progress report.
 - 12. Performance and payment bonds.
 - 13. Data needed to acquire Client's insurance.
- F. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
 - 1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 - 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Client occupancy of designated portions of the Work.
- G. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
 - 1. Updated final statement, accounting for final changes to the Contract Sum.
 - 2. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Client took possession of and assumed responsibility for corresponding elements of the Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01312
PROJECT MEETINGS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Contractor attendance and participation in preconstruction conferences.
- B. Contractor attendance at progress meetings and pre-installation conferences.

1.02 RELATED REQUIREMENTS

- A. Section 01320 – Construction Progress Documentation: Schedule.
- C. Section 01330 – Submittal Procedures: Schedule, shop drawings, etc.
- D. Section 01450 – Contractor Quality Assurance/Quality Control.
- E. Section 01770 – Project Closeout Procedures: Project record documents.

1.03 PRECONSTRUCTION CONFERENCES

- A. After award of the bid and prior to beginning construction, a conference will be held with representatives of the Contractor, Client, Owner and Engineer to discuss the Project. This conference is intended to establish lines of communication between the parties involved. Time and place of the preconstruction conference will be determined at time of bid award.
- B. The Engineer will administer the preconstruction conference at the Project site for clarification of Contractor responsibilities and for review of administrative procedures.

1.04 PROGRESS MEETINGS

- A. The Contractor will schedule Project meetings throughout progress of the Work at one- to two-week intervals.
- B. The Contractor will make physical arrangements for meetings. The Engineer will prepare agenda with copies for participants, preside at meetings, record minutes, and distribute copies to participants and those affected by decisions made at meetings.
- C. Attendance: Job superintendent, major subcontractors, and suppliers; Client, and Engineer as appropriate to agenda topics for each meeting.
- D. Suggested Agenda: Review of Work progress, status of progress schedule and adjustments thereto, delivery schedules, submittals, maintenance of quality standards, pending changes and substitutions, and other items affecting progress of Work.
- E. The Contractor's representatives at project meetings shall have the authority to make relevant decisions on behalf of the Contractor.

1.05 PRE-INSTALLATION CONFERENCES

- A. When required in the individual specification Section, convene a conference prior to commencing work of the Section.
- B. Require attendance of entities directly affecting, or affected by, work of the Section.
- C. Review conditions of installation, preparation and installation procedures, and coordination with related work.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01320
CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. 00700 – General Conditions

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Start-up construction schedule.
 - 2. Contractor's construction schedule.
 - 3. Daily construction reports.
 - 4. Material location reports.
 - 5. Special reports.
- B. Related Sections:
 - 1. 00520 – Agreement for Remediation Services
 - 2. 01330 - Submittal Procedures
 - 3. 01450 – Contractor Quality Control

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- B. Cost Loading: The allocation of the schedule of values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum, unless otherwise approved by the Engineer.
- C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of the Project.
- D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- E. Event: The starting or ending point of an activity.
- F. Float: The measure of leeway in starting and completing an activity.
 - 1. Float time belongs to Client.
 - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
 - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

- G. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.4 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
 - 1. PDF electronic file.
 - 2. Two paper copies.
- B. Start-up construction schedule.
 - 1. Approval of cost-loaded start-up construction schedule will not constitute approval of schedule of values for cost-loaded activities.
- C. Start-up Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.
- D. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
 - 1. Submit a working electronic copy of schedule. Include type of schedule (initial or updated) and date on label.
- E. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
 - 1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
 - 2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
 - 3. Total Float Report: List of all activities sorted in ascending order of total float.
 - 4. Earnings Report: Compilation of Contractor's total earnings from commencement of the Work until most recent Application for Payment.
- F. Daily Construction Reports: Submit at weekly intervals.
- G. Material Location Reports: Submit at weekly intervals.
- H. Special Reports: Submit at time of unusual event.

1.5 QUALITY ASSURANCE

- A. Construction Conference: Conduct conference at Project site to comply with requirements in Section 01312 Project Meetings. Review methods and procedures related to the preliminary construction schedule and Contractor's construction schedule, including, but not limited to, the following:
 - 1. Review software limitations and content and format for reports.
 - 2. Verify availability of qualified personnel needed to develop and update schedule.
 - 3. Discuss constraints, including phasing, work stages, area separations, interim milestones and partial Client occupancy.
 - 4. Review delivery dates for Client-furnished products.
 - 5. Review schedule for work of Client's separate contracts.
 - 6. Review time required for review of submittals and resubmittals.
 - 7. Review requirements for tests and inspections by independent testing and inspecting agencies.

8. Review time required for completion.
9. Review and finalize list of construction activities to be included in schedule.
10. Review submittal requirements and procedures.
11. Review procedures for updating schedule.

1.6 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
 1. Secure time commitments for performing critical elements of the Work from entities involved.
 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for commencement of the Work to date of final completion.
 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
 1. Activity Duration: Define activities so no activity is longer than 30 calendar days, unless specifically allowed by the Engineer.
 2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 calendar days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, inspection, and delivery.
 3. Submittal Review Time: Include review and resubmittal times indicated in Section 01330 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
 4. Testing and Inspecting: Include not less than 7 calendar days for major testing and inspecting activities.
 5. Startup and Testing Time: Include not less than 15 calendar days for startup and testing.
 6. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Project Engineer's administrative procedures necessary for certification of Substantial Completion.
 7. Punch List and Final Completion: Include not more than 30 calendar days for punch list and final completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
 1. Phasing: Arrange list of activities on schedule by phase.
 2. Work Restrictions: Show the effect of the following items on the schedule:

- a. Limitations of continued occupancies.
 - b. Uninterruptible services.
 - c. Partial occupancy before Substantial Completion.
 - d. Use of premises restrictions.
 - e. Provisions for future construction.
 - f. Environmental control.
3. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
- a. Subcontract awards.
 - b. Submittals.
 - c. Purchases.
 - d. Fabrication.
 - e. Sample testing.
 - f. Deliveries.
 - g. Installation.
 - h. Tests and inspections.
 - i. Adjusting.
 - j. Startup and placement into final use and operation.
4. Construction Tasks: Identify each major task of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities. Provide the following level of detail at a minimum:
- a. Mobilization, Erosion and Sedimentation Controls and Site Preparation.
 - b. Clearing and Grubbing.
 - c. Temporary Dam Installation.
 - d. Dewatering of Inner Cove.
 - e. Sediment Excavation (with Sediment Management Units).
 - f. Hauling, Dewatering, and Processing of Excavated Sediments.
 - g. Consolidation of Excavated and Processed Sediments.
 - h. Install Inner Cove Cap, Wetlands Fringe Cap, and Wetlands Perimeter Cap.
 - i. Remove Temporary Dam.
 - j. Parcel C - Regrade, Install Capping Materials, Seed and Stabilize.
 - k. Parcel C-1 – Prepare Parcel for Capping, Install Capping Materials, Seed and Stabilize Cap.
 - l. Site Restoration and Cleanup.
 - m. Substantial Completion.
 - n. Final Completion.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, milestones from Project Engineer, Substantial Completion, and final completion.
- E. Cost Correlation: At the head of schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of the Work performed as of dates used for preparation of payment requests.
- 1. Refer to Section 01290 "Payment Procedures" for cost reporting and payment procedures.

- F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
 - 1. Unresolved issues.
 - 2. Unanswered RFIs.
 - 3. Rejected or unreturned submittals.
 - 4. Notations on returned submittals.
- G. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.
- H. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

2.2 START-UP CONSTRUCTION SCHEDULE

- A. Bar-Chart Schedule: Submit start-up horizontal bar-chart-type construction schedule to Engineer within one week after the Notice of Award. Start-up schedule must be approved by Engineer before Notice to Proceed will be issued.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities, restraints, submittals, including durations, start dates, and finish dates for period of 30 calendar days after Notice to Proceed. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- C. Start-up schedule will be in effect only until Engineer's approval of Contractor's construction schedule.

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- A. Gantt-Chart Schedule: Base schedule on the start-up construction schedule and additional information received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
 - 1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

2.4 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report, submitted to Project Engineer, recording the following information concerning events at Project site:
 - 1. Shift start and end times.
 - 2. List of subcontractors at Project site.
 - 3. Equipment at Project site.
 - 4. Material deliveries.
 - 5. Quantities of materials installed, excavated, treated, sediment quantity placed, and water discharged.
 - 6. Equipment and materials used.
 - 7. High and low temperatures and general weather conditions, including presence of rain or snow.

8. Accidents.
 9. Meetings and significant decisions.
 10. Unusual events (refer to special reports).
 11. Stoppages, delays, shortages, and losses.
 12. Meter readings and similar recordings.
 13. Emergency procedures.
 14. Orders and requests of authorities having jurisdiction.
 15. Change Orders received and implemented.
 16. Written or oral orders received and implemented.
 17. Services connected and disconnected.
 18. Equipment or system tests and startups.
 19. Partial completions and occupancies.
 20. Substantial Completions authorized.
- B. Material Location Reports: At weekly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.
- C. Daily reports and material location reports do not substitute for the notices, time slips, or other data required related to compensation for Change Orders.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At intervals to coordinate with Progress Meetings, update schedule to reflect actual construction progress and activities. Issue schedule before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 3. As the Work progresses, indicate final completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Engineer, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION

SECTION 01330
SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Required submittals are identified in each technical specification section of the Contract Documents. A summary of submittals is provided at the end of this section. Submittals shall be provided to the Engineer, as required, unless otherwise specified. Submittals may include:
1. Data;
 2. Drawings;
 3. Instructions;
 4. Schedules;
 5. Statements;
 6. Reports;
 7. Plans;
 8. Certificates;
 9. Samples;
 10. Records; and
 11. Operation and Maintenance Manuals.

1.02 GENERAL REQUIREMENTS

- A. All costs necessary for compliance with requirements of this Section shall be incidental to the bid items under which labor, equipment, and material is paid.
- B. All data, drawings, and correspondence from subcontractors, manufacturers, or suppliers shall be routed through Contractor. Engineer shall review only such data and details as are transmitted to him by Contractor. All correspondence from Contractor to Engineer shall refer to appropriate specification number and paragraph and/or sheet number of the Drawings containing subject matter of inquiry.
- C. Upon review and acceptance of the Submittal by the Engineer, the Submittal shall become a part of the Contract, and the work executed shall be in conformity with the same. Review of Submittals, however, shall in no way release the Contractor from his responsibility for proper fulfillment, by any fabrication, of the requirements of this Contract.
- D. The Contractor's attention is specifically directed to the fact that no work shall be conducted, nor equipment or materials ordered, nor any construction performed, prior to approval by Engineer of Submittals applicable thereto. Construction performed in violation of this requirement will be neither approved nor certified for payment until applicable Submittals have been submitted and approved. If any equipment or materials are ordered by Contractor prior to submission and approval of Submittals, it is done at Contractor's risk.

- E. The Contractor is responsible for making necessary changes to other items, which may result from deviations or changes requested by the Contractor and approved by Engineer, so that all items of work satisfy the requirements and intent of Contract Documents.

1.03 CONTRACTOR RESPONSIBILITIES

- A. Review submittals prior to submission.
- B. Coordinate each submittal with requirements of work and of Contract Documents.
- C. Contractor's responsibility for errors and omissions in submittals is not relieved by Engineer's review of submittals.
- D. Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by Engineer's review of submittals, unless Engineer gives written acceptance of specific deviations.
- E. Notify Engineer, in writing at time of submission, of deviations in submittals from requirements of Contract Documents.
- F. Begin work which requires submittals after return of Engineer's approval.
- G. After Engineer's review, maintain file copies.

1.04 ENGINEER'S REVIEW OF SUBMITTALS

- A. The Engineer's review of submittals shall not be construed as a complete check, but is only for general conformance with design concept for the project and general compliance with the information given in the Contract Documents. Review will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor is responsible for dimensions, the design of adequate connections and details, the fabrication processes, the construction methods, and the satisfactory construction of all work.
- B. Engineer's review action codes are listed below.
 - 1. Approved (Code 1): Fabrication and installation may proceed.
 - 2. Approved as Noted (Code 2): Contractor shall make the changes noted, and then may proceed with fabrication or installation.
 - 3. Resubmit with Revisions (Code 3): Contractor shall make the changes noted, and resubmit for an additional review cycle.
 - 4. Disapproved (Code 4): Contractor shall make the changes noted, which may involve a complete new product submittal, and resubmit for an additional review cycle.
 - 5. Not Subject to Approval (Code 5): For information only submittals provided by the Contractor.
- C. After submittals have received a review action 1 or 2 by the Engineer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by a detailed explanation of why a substitution is necessary.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

3.01 GENERAL

- A. The Contractor shall make submittals as required by the individual specification sections and as summarized in the Index of Submittals provided at the end of this section.
- B. The Engineer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections.
- C. Units of weights and measures used on all submittals shall be the same as those used in the contract drawings.
- D. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements.
- E. Prior to submittal, all items shall be checked and reviewed by the Contractor and each item shall be certified, signed, and dated by the Contractor. Proposed deviations from the Contract Documents shall be clearly identified.
- F. Submittals shall include items such as:
 - 1. Manufacturer's or fabricator's drawings;
 - 2. Descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves;
 - 3. Test reports;
 - 4. Samples;
 - 5. Operation and Maintenance Manuals (including parts list);
 - 6. Certifications;
 - 7. Warranties; and
 - 8. Other pertinent data.
- G. Submittals requiring Engineer review shall be scheduled and made prior to the acquisition of the material or equipment covered thereby.
- H. Samples remaining upon completion of the work shall be picked up and disposed of in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

3.02 SUBMITTAL REQUIREMENTS

- A. Transmittal Form:
 - 1. A Transmittal form shall accompany all submittals.
 - 2. The Transmittal form shall be developed and furnished by the Engineer.
 - 3. Transmittals shall include the following information, at a minimum:
 - a. Submittal number in sequence, beginning with 1 (subsequent revised submittals shall be identified with a number and letter);
 - b. Date;

- c. Project title and project number;
 - d. Contractor's name and address;
 - e. Identification of each item submitted under the single Transmittal with a separate sequential number (e.g., 1.1, 1.2, etc.);
 - f. Reference to the specification number and paragraph and/or Contract Drawing sheet number and detail number (if applicable) pertinent to the data submitted.
 - g. Notification of any deviations from Contract Documents;
 - h. Return date required by Contractor; and
 - i. Other pertinent data.
- B. Contractor Certification: The Contractor's Certification that the submittal meets contract requirements shall contain the following:
- 1. Contractor firm name;
 - 2. Point of contact name, signature, and title;
 - 3. Date; and
 - 4. Contractor's corrections as noted on submittal data and/or attached sheets(s).
 - 5. The certification may be provided as part of the Transmittal, on a separate sheet attached to the form, or as a stamp on the submittal itself.
- C. Procedures:
- 1. The Contractor shall schedule submissions at least 14 days before dates reviewed submittals will be needed, except where different lead time is specified.
 - 2. The Contractor shall deliver to Engineer four (4) copies of all hard copy submittals and Transmittals. To expedite the review, the Contractor is encouraged to provide submittals in pdf form by email.
 - 3. The Contractor shall maintain one copy of the submittal and Transmittal on site.
 - 4. At the time of each submission, the Contractor shall call to the Engineer's attention, in writing, any deviations that the submittal may have from the requirements of the Contract Documents.
- D. Submittals shall include:
- 1. Date and revision dates;
 - 2. Project title and number;
 - 3. The names of:
 - a. Engineer;
 - b. Contractor;
 - c. Subcontractor;
 - d. Supplier;
 - e. Manufacturer; and
 - f. Separate detailer when pertinent.
 - 4. Identification of product or material;
 - 5. Field dimensions, clearly identified as such;
 - 6. Specification section number and paragraph or sheet and detail number of the Drawings; and

7. Applicable standards, such as ASTM number or Federal Specification.
 8. For submittals which include proposed deviations requested by the Contractor, "variation" shall be clearly indicated on the transmittal form. The Contractor shall state the reason for any deviations and annotate such deviations on the submittal. The Engineer reserves the right to rescind inadvertent acceptance of submittals containing unnoted deviations.
- E. Submittals shall be of standardized sizes.
1. Approved standard sizes shall be:
 - a. 24 inches by 36 inches;
 - b. 11 inches by 17 inches; and
 - c. 11 inches by 8 1/2 inches.
 2. Provision shall be made in preparing submittals to afford a binding margin on left hand side of sheet.
 3. Submittals put forward other than as specified herein may be returned for resubmittal without being reviewed.

3.03 RESUBMITTALS

- A. The Contractor shall make all corrections required by the Engineer and promptly furnish a corrected submittal in the form and number of copies specified for the initial submittal. If the Contractor considers any correction indicated on a submittal to constitute a change to the Contract, a notice in accordance with the Contract shall be given promptly to the Department and the Engineer.
- B. Identify as a resubmission by adding a letter suffix to the original submittal number (1A for the first resubmission of the first submittal; 1B for the second resubmission; etc.).

3.04 REVIEW OF SUBMITTALS

- A. Upon completion of review of submittals, the Engineer will email review action and comments to the Contractor.

3.05 DISTRIBUTION OF SUBMITTALS PROVIDED IN HARD COPY FORMAT

- A. Two copies of the submittal will be retained by the Engineer, with review action and comments attached to each copy.
- B. Two copies of the submittal will be returned to the Contractor by the Engineer, with review action and comments attached to each copy.
- C. A file of all submittals made to the Engineer, reviews by the Engineer, resubmittals, and final approved submittals shall be maintained by the Contractor.
- D. This file or a copy of the file shall be maintained by the Contractor at the project Site while work is being conducted at the Site.

3.06 SUBMITTAL SUMMARY:

See Section 01340 Submittal Schedule Attachment

END OF SECTION

SECTION 01340
SUBMITTAL SCHEDULE ATTACHMENT

DIVISION I – GENERAL REQUIREMENTS			Revision Date	Rev. No.
01110		Summary of Work		
	1.03.A	Construction Work Plan		
01270		Measurement and Payment (No submittals required)		
01290		Payment Procedures (No submittals required)		
01312		Project Meetings (No submittals required)		
01320	1.4.B 1.4.C 1.4.D	Construction Progress Documentation Start-up Construction Schedule Start-up Network Diagram Contractor's Construction Schedule		
	1.4.E.1 1.4.E.2 1.4.E.3 1.4.E.4 1.4.F 1.4.G 1.4.H 2.2.A	Activity Report Logic Report Total Float Report Earnings Report Daily Construction Reports (weekly) Material Location Reports (weekly) Special Reports Bar-chart schedule		
01330		Submittal Procedures (No submittals required)		
01351		Safety, Health, and Emergency Response		
	1.04.A	Site Health and Safety Plan (HASP)		
	1.04.A.1.A	Activity Hazard Analyses		
	1.04.A.1.b	Emergency Response Plan		
	1.04.A.1.c	Spill Control Measures and Abatement Plan		
	1.04.A.1.d	Material Safety Data Sheets (MSDS)		
	1.20.B	SSHO's Daily Inspection Logs		
		Employee Medical Examination Statements		
01352		Environmental Protection (No submittals required)		
01354	1.02.A 1.02.B	Decontamination Proposed Decontamination Procedures Daily Vehicle Inspection Log		
01410		Regulatory Requirements (No submittals required)		
01420		Definitions, Standards and References (No submittals required)		
01450		Contractor Quality Control		
	1.03.A.1	Contractor Quality Control (CQC) Plan - shall identify personnel, procedures, instructions, records and forms to be used in carrying out the requirements of this project.		
	1.03.B	Weekly CQC Reports, Test Reports, Deficiency Reports, and Summary		

01460		Field Engineering and Survey Control		
	1.03.A	Qualifications – of persons providing field engineering and survey services		
	1.03.B	Documentation – verify accuracy of survey work		
	1.03.C	Results of Field Verification Surveys		
	1.03.D	Log of Control and Survey Work		
		Record Documents: (see also 01780 – “Project Record Documents”)		
01510		Temporary Facilities and Control (No submittals required)		
01560 01770	1.03.A 1.03.B 1.07.A 1.07.B 1.07.C	Dust and Odor Control Dust and Odor Control Plan Project Closeout Procedures Certification that work is complete DVD of Project Record Documents Transmittal Letter Project Record Directory		
02073	1.04A 1.04.B	Geotextile Product Data Manufacturer’s Quality Control Certifications		
02110 02111	1.03.A 1.2.B.1 1.2.B.2 1.2.B.3 1.2.B.4 1.2.B.5 1.2.B.6	Waste Excavation, Removal, and Handling Means and Methods for Management of all Waste Materials (see also Section 01110- Summary of Work) Sediment Removal Sediment Removal Plan Description of Methods, Procedures, and Equipment for any additional sediment sampling Description of Methods, Procedures, and Equipment for transportation of sediments Description of Methods, Procedures, and Equipment to amend sediments Inner Cove Restoration Plan Description of Equipment Decontamination Procedures		
02120	1.04.A	Off-site Transportation and Disposal Planned Means and Methods (see also Section 01110- Summary of Work)		
02221	1.5.A 1.5.B 1.5.C	Select Site Demolition (see also 01560- Dust and Odor Control) Schedule of Selective Demolition Activities Inventory of Items Removed and Salvaged		
02231		Clearing and Grubbing (No submittals required)		
02235	1.02.D	Temporary Dam Temporary Dam Design and Installation Plan		
02236	1.2.B.1	Dewatering Design Data		

	1.2.B.2 1.2.B.4 1.2.B.5 1.2.B.6	Geotechnical Subsurface Information Shop Drawings Product Data Field Reports		
02300		Earthwork		
	1.06.A	Borrow Source(s)		
	1.06.B	Contractor's Quality Control Testing Laboratory (QCTL)		
	1.06.C	Test Reports		
02370	1.05.B 1.05.C.1 1.05.C.2	Erosion and Sedimentation Control Proposed Means and Methods to Control Erosion and Sedimentation (see also Section 01110- Summary of Work) Manufacturer's Data for Products Data for materials incorporated into work		
02522	1.04.A.1 1.04.B	Groundwater Monitoring Wells Statements Field Test Reports		
02526		Well Abandonment		
	1.04.A.1	Well Abandonment Completion Form		
02921		Seeding and Soil Supplements		
	1.4.A	Grass Seed Vendor's Certificate		
	1.4.B	Fertilizer Product Data		
	1.4.C	Hydraulic Seeding Method		

SECTION 01351
SAFETY, HEALTH, AND EMERGENCY RESPONSE

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section covers the health and safety requirements to be followed for the Phase II, III, and Parcel C Cap (the Project). This Section provides requirements for preparing and submitting a Site Health and Safety Plan (HASP). The requirements shall apply to all work performed at the Site.
- B. Work at the Site will include clearing and grubbing existing vegetation, regarding to establish subgrade, installation of cap materials, stabilizing cap areas, dewatering and dredging and site restoration.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01110: Summary of Work
- B. Section 01330: Submittal Procedures

1.03 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
 - 1. CODE OF FEDERAL REGULATIONS (CFR)
 - a. 29 CFR 1910 Occupational Safety and Health Standards
 - b. 29 CFR 1926 Safety and Health Regulations for Construction

1.04 SUBMITTALS

- A. The following shall be submitted in accordance with Section 01340, Submittal Procedures:
 - 1. The HASP shall detail the health and safety procedures to be followed during completion of the work and shall be developed in accordance with this specification. The Contractor shall periodically review the plan during work operations to keep it current and technically correct. The HASP shall include, but not be limited to, the following:
 - a. Activity Hazard Analyses for each task scheduled to be completed as part of the work. Analysis shall detail anticipated or potential safety concerns and provide specific actions or engineering controls to mitigate potential hazards.
 - b. Emergency Response Plan.
 - c. Spill Control Measures and Abatement Plan.
 - d. Material Safety Data Sheets (MSDS) for materials identified for on-site use.

1.05 REGULATORY REQUIREMENTS

- A. Work performed under this contract shall comply with applicable Federal, state, and local safety and occupational health laws and regulations. This includes, but is not limited to, Occupational Safety and Health Administration (OSHA) standards, 29 CFR 1910.

1.06 PRE-CONSTRUCTION CONFERENCE

- A. As part of the Pre-construction Conference the Contractor, or his/her representative, the on-site construction superintendent and designated Site Safety and Health Officer (SSHO) will provide general details of the Contractor's HASP.
 - 1. Recommended discussion topics include:
 - a. Discussion and review of the Contractor's accident prevention plan.
 - b. Review of any specific local health and safety requirements.
 - c. Review of the Contractor's list of anticipated phases of work requiring an activity hazard analysis.
 - d. Review of accident investigation and reporting requirements.
 - 2. The discussions at the pre-construction safety conference shall become a matter of record and shall be included as amendments to the Contractor's accident prevention plan.

1.07 SAFETY AND HEALTH PROGRAM

- A. The site-specific program requirements of the OSHA Standards shall be integrated into one site-specific document. The HASP shall interface with the employer's (Contractor's) overall Safety and Health Program. Any portions of the overall Safety and Health Program that are referenced in the HASP shall be included as appendices to the HASP.

1.08 SITE HEALTH AND SAFETY PLAN

- A. Preparation and Implementation. A HASP shall be prepared covering on-site work to be performed by the Contractor and all their sub-contractors. The Contractor's SSHO shall be responsible for the development, implementation and oversight of the HASP. The HASP shall establish, in detail, the protocols necessary for the anticipation, recognition, evaluation, and control of hazards associated with each phase of the work. The HASP shall address site-specific safety and health requirements and procedures based upon site-specific conditions. The level of detail provided in the HASP shall be tailored to the type of work, complexity of operations to be performed, and hazards anticipated. Details about some activities may not be available when the initial HASP is prepared and submitted. Therefore, the HASP shall address, in as much detail as possible, anticipated tasks, their related hazards, and anticipated control measures. Additional details shall be included in the activity hazard analyses as described in Section 1.09 Hazard/Risk Analysis.
- B. Acceptance and Modifications. Prior to submittal, the HASP shall be signed by the SSHO and the Site Superintendent. The HASP shall be submitted for review 7 days prior to execution of work at the site. On-site work shall not begin until the plan has been accepted. A copy of the written HASP shall be maintained on site. As work proceeds, the HASP shall be adapted to new situations and new conditions. Changes and modifications to the accepted HASP shall be made with the knowledge and concurrence of the SSHO, the Site Superintendent, and the Engineer. Disregard for the provisions of this specification or the accepted HASP shall be cause for stopping of work until the matter has been resolved.

1.09 HAZARD/RISK ANALYSIS

- A. The HASP shall include a safety and health hazard/risk analysis for site tasks and operations to be performed as part of the contract. The hazard/risk analysis shall provide information necessary for determining safety and health procedures, equipment, and training to protect on-site personnel, the environment, and the public. The following elements, at a minimum, shall be addressed.
1. Site Tasks and Operations (Work Plan). The HASP shall summarize the tasks and objectives of the site operations of this project, and the logistics and resources required to achieve those tasks and objectives safely.
 2. Hazards. The following potential hazards may be encountered during site work. They are not complete lists; therefore, they shall be expanded and/or revised as necessary during preparation of the HASP.
 - a. Safety Hazards. Potential safety hazards associated with the work could be related to operation of heavy construction equipment.
 - b. Chemical Hazards. Potential chemical hazards that may be encountered during Site work shall be discussed in the HASP. The Hazard/Risk Analysis section of the HASP shall describe the chemical, physical, and toxicological properties of contaminants, sources and pathways of employee exposures, anticipated on-site and off-site exposure level potentials, and regulatory (including Federal, state, and local) or recommended protective exposure standards. The HASP shall also address employee exposure to hazardous substances brought on site, and shall comply with the requirements of 29 CFR 1910, Section 1910.1200 and 29 CFR 1926, Section 1926.59, Hazard Communication.
 - c. Physical Agents. Potential physical hazards during work on the Site could include: heat stress and cold stress; noise related hazards; physical strain from heavy lifting; and slips, trips, and falls.
 - d. Biological Hazards. Potential biological hazards associated with the work on the Site could include poison ivy, insect and animal bites and exposure to cyanobacteria (i.e., "blue-green algae") in Mashapaug Pond waters. The RI Department of Health and RIDEM work cooperative to detect cyanobacteria blooms, which have occurred in Mashapaug Pond. The following web address links provide information for the Contractor to use in developing appropriate procedures and monitor detections of cyanobacteria blooms to reduce dermal, inhalation, or ingestion risks related to contact with cyanobacteria in pond water:

<http://www.health.ri.gov/publications/datareports/2013CyanobacteriaBloomsInRhodeIsland.pdf>

<http://www.ri.gov/press/view/22893>
 3. Action Levels. Action levels shall be established in the HASP for situations anticipated or potential at the Site.

1.10 ACTIVITY HAZARD ANALYSES

- A. Prior to beginning work, Activity Hazard Analyses shall be prepared for each anticipated activity, by the Contractor or Subcontractor performing that work. Analyses shall define the activities to be performed and identify the sequence of work, the specific hazards anticipated, and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level. The activity hazard analyses shall be continuously reviewed and when appropriate modified to address changing site conditions or operations, with the concurrence of the SSHO, and the Site Superintendent. Activity hazard analyses shall be attached to, and become a part of, the HASP.

1.11 STAFF ORGANIZATION, QUALIFICATIONS, AND RESPONSIBILITIES

- A. An organizational structure shall be developed that sets forth lines of authority (chain of command), responsibilities, and communication procedures concerning site safety, health, and emergency response.

1.12 TRAINING

- A. Personnel shall receive training in accordance with the Contractor's written safety and health training program and shall have current Hazardous Waste Operations and Emergency Response Standard (HAZWOPER, 29 CFR 1910 Section 1910.120, 29 CFR 1926 Section 1926.65, and 29 CFR 1926 Section 1926.21) training. Proof of training shall be provided by the Contractor for each employee to be working on the site.
 - 1. Site-specific Training. Site-specific training sessions shall be documented, scheduled in advance, and attendance shall be mandatory and shall be extended to the Engineer.
 - a. Initial Session (Pre-entry Briefing). Prior to commencement of on-site field activities, all site employees, including those assigned to non-hazard areas, shall attend a site-specific safety and health training session of appropriate duration. Training shall be conducted by the SSHO or other qualified individual to ensure that all personnel are familiar with requirements and responsibilities for maintaining a safe and healthful work environment.
 - b. Periodic Sessions. Periodic on-site training shall be conducted by the SSHO at least weekly for personnel assigned to work at the Site during the following week. The training shall address safety and health procedures, work practices, any changes in the HASP, activity hazard analyses, work tasks, or schedule; results of previous week's monitoring; review of safety discrepancies; and accidents.

1.13 PERSONAL PROTECTIVE EQUIPMENT

- A. PPE Program. In accordance with 29 CFR 1910 Section 1910.120 (g)(5) and 29 CFR 1926 Section 1926.65 (g)(5), a written Personal Protective Equipment (PPE) program which addresses the elements listed in that regulation is to be included in the Contractor's Safety and Health Program. The HASP shall detail the minimum PPE ensembles (including any necessary respiratory protection) and specific materials from which the PPE components are constructed for each site-specific task and operation to be performed. On-site personnel shall be

provided with appropriate personal protective equipment. Protective equipment and clothing shall be kept clean and well maintained. The PPE Section of the HASP shall include site-specific procedures to determine PPE program effectiveness and for cleaning, maintenance, inspection, and storage of PPE.

- B. Levels of Protection. The SSHO shall establish appropriate levels of protection for each work activity based on review of historical site information, existing data, an evaluation of the potential for exposure (inhalation, dermal, ingestion) during each phase of the work.

1.14 MEDICAL SURVEILLANCE

- A. The Contractor's medical surveillance program shall be detailed in the HASP.
- B. A medical examination statement shall be obtained for all employees conducting work at the site similar to the one provided at the end of this specification.

1.15 HEAT AND COLD STRESS MONITORING

- A. The Site SSHO shall develop a heat stress and cold stress monitoring program for on-site activities. Schedules for work and rest, and physiological monitoring requirements, shall be described in the HASP. Details regarding the monitoring program shall be included in the HASP only as changes to the program are anticipated. Personnel shall be trained to recognize the symptoms of heat and cold stress. The SSHO and an alternate person shall be designated to be responsible for the heat and cold stress monitoring program.

1.16 SAFETY PROCEDURES, ENGINEERING CONTROLS AND WORK PRACTICES

- A. The HASP shall describe the standard operating safety procedures, engineering controls, and safe work practices to be implemented for the work. Possible procedures may include, but shall not be limited to, the following:
 1. General Site Rules/Prohibitions,
 2. Material Handling Procedures, and
 3. Spill and Discharge Control

1.17 PERSONAL HYGIENE

- A. Personnel, equipment, and material entering the Site shall adhere to the personal hygiene provisions identified in the HASP. A discussion of personal hygiene and procedures to be followed by site workers shall be submitted as part of the HASP.

1.18 EMERGENCY EQUIPMENT AND FIRST AID REQUIREMENTS

- A. The HASP shall describe the emergency and first aid equipment to be available on site, the specific locations of the equipment and identification of individuals trained in the use of such equipment who are first aid and/or CPR certified by a recognized training organization (e.g., American Red Cross).

1.19 EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES

- A. An Emergency Response Plan that meets the requirements of 29 CFR 1910 Section 1910.120 (I) and 29 CFR 1926 Section 1926.65 (I), shall be developed

and implemented as a Section of the HASP. This Plan/Section shall be formatted as a standalone document.

- B. In the event of any emergency associated with closure activities, the Contractor shall, without delay, alert all on-site employees that there is an emergency situation; take action to remove or otherwise minimize the cause of the emergency; alert the Engineer, and institute measures necessary to prevent repetition of the conditions or actions leading to, or resulting in, the emergency. Employees that are required to respond to hazardous emergency situations shall be trained in how to respond to such expected emergencies.
- C. The Contractor shall alert local emergency response personnel and dispatchers of the work in progress.

1.20 INSPECTIONS

- A. The SSHO shall perform inspections of the jobsite and the work in progress to ensure compliance with the Safety and Health Program, and other occupational health and safety requirements of the contract. Procedures for correcting deficiencies should be included.
- B. Safety inspection logs shall be used to document the inspections, noting safety and health deficiencies, and corrective actions taken. The SSHO's Daily Inspection Logs shall be attached to and submitted with the Daily project reporting and shall include the date, work area checked, employees present in work area, PPE and work equipment being used in each area, special safety and health issues and notes, and signature of preparer. In the event of an accident, the Engineer shall be notified immediately of any reportable accident; an appropriate Accident Report shall be completed and submitted by the Contractor within 24 hours of the accident.

EMPLOYEE MEDICAL EXAMINATION STATEMENT:

I have had a medical examination within the last twelve months which was paid for by my employer. The examination included: health history, pulmonary function tests, and may have included an evaluation of a chest x-ray. A physician made determination regarding my physical capacity to perform work tasks on the project while wearing protective equipment including a respirator. I was personally provided a copy and informed of the results of that examination. My employer's industrial hygienist evaluated the medical certification provided by the physician and checked the appropriate blank below. The physician determined that there:

Were no limitations to performing the required work tasks ()

Were identified physical limitations to performing the required work tasks ()

Date medical exam completed _____

[Employee's][Visitor's] Signature _____

Date _____

Printed Name _____

Contractor's Site Safety and Health Officer Signature _____

Date _____

Printed Name _____

END OF SECTION

SECTION 01352
ENVIRONMENTAL PROTECTION PROCEDURES

PART 1 – GENERAL

1.01 DESCRIPTION

Contractor shall perform the Work minimizing environmental pollution or damage as the result of construction operations. Environmental pollution or damage results from the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; the unfavorable altering of ecological balances of importance to human life; affecting other species of importance to humankind; or degrading the utility of the environment for aesthetic, cultural and/or historical purposes. The control of environmental pollution or damage requires consideration of land, water, and air, and includes management of visual aesthetics, noise, solid waste, and dust, as well as other pollutants. The environmental resources within the project limit of work and those affected beyond shall be protected during the entire duration of this Contract.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01351 – Health, Safety and Emergency Response
- B. Section 01500 – Temporary Facilities and Controls
- C. Section 01560 – Dust and Odor Control
- D. Section 02110 – Waste Removal, Handling, and Storage
- E. Section 02120 – Off-Site Transportation and Disposal
- F. Section 02370 – Erosion and Sedimentation Control

1.03 DEFINITIONS

- A. Sediment: soil and other debris that has eroded and has been transported by runoff water or wind.
- B. Solid Waste: typical municipal household and/or commercial/ industrial waste in solid form and not classified as bulky waste or hazardous waste, including rubbish/trash, garbage, other miscellaneous discarded material/debris, soil, sediment, sludge, and/or ash.
- C. Construction Water: wastes in liquid form collected during construction that may include construction water from dewatering activities, groundwater monitoring well development water, leachate, sediment laden stormwater runoff, and/or decontamination fluids.
- D. Leachate: waste generated from the percolation of liquids (usually stormwater) through or contact of liquids with solid waste or contaminated soils, sediment, or sludge.
- E. Sanitary Wastes: wastes characterized as sanitary sewage. Refer to Section 01500 – Temporary Facilities and Controls.
- F. Oily Waste: wastes generated from petroleum products and bituminous materials.

PART 2 - PRODUCTS

Not Applicable

PART 3- EXECUTION

3.01 PROTECTION OF NATURAL RESOURCES

- A. Preserve the natural resources within the limit of work and outside the project limit of disturbance. Restore to an equivalent or improved condition upon completion of Work. Confine construction activities to within the limit of disturbance indicated on the Contract Drawings.
- B. The Contractor shall provide means, methods, and facilities to prevent contamination of soil, water, and atmosphere from waste discharges due to spills and releases as a result of the Contractor's operation.
- C. Land Resources:
 - 1. Except in areas to be cleared, do not remove, cut, deface, injure, or destroy trees or shrubs without the Engineer's permission. Do not fasten or attach ropes, cables, or guys to existing trees for anchorages unless authorized by the Engineer. Where such use of attached ropes, cables, or guys is authorized, the Contractor shall be responsible for any resultant damage.
 - 2. Protect existing trees and shrubs which are to remain and which may be injured, bruised, defaced, or otherwise damaged by construction operations. Cut off vegetation to be cleared flush with or as close as practical to the original ground surface in areas to be cleared, except for trees and vegetation indicated or directed to be left standing.
 - 3. Remove traces of temporary construction facilities such as haul roads, work areas, stockpiles of excess or waste materials, and other signs of construction. Grade temporary roads and similar temporary areas to blend with surrounding conditions.
- D. Water Resources:
 - 1. Oily Wastes - Prevent oily or other hazardous substances from entering the ground, drainage areas, or local bodies of water.
 - 2. Sediments - Prevent sediment migration outside the limit of disturbance
 - 3. Leachate – minimize the generation of leachate and prevent migration of leachate to surface drainages beyond the limit of disturbance.
- E. Fish and Wildlife Resources – Refer to the Aquatic Wildlife Management Plan (Appendix C).

3.02 HISTORICAL AND ARCHAEOLOGICAL RESOURCES

- A. Carefully protect in-place any historical and archaeological items or human skeletal remains discovered in the course of work and report immediately to the Engineer.
- B. Stop work in the immediate area of the discovery until directed by the Engineer to resume work.

3.03 EROSION AND SEDIMENT CONTROL MEASURES

- A. Refer to the Construction Contract Drawings and Section 02370 - Erosion and Sedimentation Control for additional requirements.
- B. Burnoff of the ground cover is not permitted.

- C. Protection of Erodible Soils - Immediately finish the earthwork brought to a final grade, as indicated or specified. Immediately protect the side slopes and back slopes upon completion of rough grading. Plan and conduct earthwork to minimize the duration of exposure of unprotected soils.
- D. Temporary Protection of Erodible Soils - Use the methods prescribed in Section 02370 – Erosion and Sedimentation Control to prevent erosion and control sedimentation.

3.04 CONTROL AND DISPOSAL OF WASTES

- A. Existing solid waste to be consolidated and capped on-site shall be managed in accordance with the requirements of Section 02110 – Waste Excavation, Removal, and Handling.
- B. Liquid waste generated and captured during the course of the project shall be managed in accordance with the requirements of Section 02110 – Waste Excavation, Removal, and Handling and Section 02120 – Off-Site Transportation and Disposal.
- C. Pick up site trash, and place in containers which are regularly emptied. Do not prepare, cook, or dispose of food on the project Site. Prevent contamination of the Site or other areas when handling and disposing of wastes. Upon project completion, leave the Site clean. Control and properly handle and dispose of waste in accordance with Section 02110 – Waste Excavation, Removal, and Handling and Section 02120 – Off-Site Transportation and Disposal.
- D. Temporary sanitary facilities shall be managed in accordance with Section 1500 – Temporary Facilities and Controls. Include provisions for pest control and elimination of odors. Upon completion of the work, the facilities shall be removed by the Contractor from the premises, leaving the premises clean and free from nuisance.

3.05 DUST CONTROL

- A. Provisions shall be taken during all construction activities to keep airborne dust levels low, including during non-working periods. Dust control measures shall be implemented when visible air-borne dust becomes noticeable and is carried out of immediate work/disturbed areas.
- B. Contractor shall treat the soil stockpiles, haul roads, and other areas disturbed areas as directed in Section 01560 – Dust and Odor Control.
- C. Contractor shall adhere to the requirements of Section 01351 –Safety, Health and Emergency Response.

3.06 NOISE

- A. Make the maximum use of low-noise emission equipment according to USEPA regulations.

3.07 DIESEL EMISSIONS REDUCTION

- A. The Contractor shall comply with the Rhode Island Diesel Emissions Reduction Act, Public Laws 07177 (H 5574A) and 07219 (S 0566A) when using heavy duty vehicles.

END OF SECTION

**SECTION 01354
DECONTAMINATION**

PART 1 – GENERAL

1.01 SECTION INCLUDES:

- A. Submittals

1.02 SUBMITTALS:

- A. Contractor shall prepare and submit proposed decontamination procedures. Provide the following information:
 - 1. The number and location(s) of decontamination stations.
 - 2. The decontamination methods and equipment which will be used in accordance with USEPA Region 1 requirements.
 - 3. Procedures to prevent contamination of clean areas.
 - 4. Methods and procedures to minimize worker contact with contaminants during removal of personal protective clothing and equipment.
 - 5. Procedures for decontamination of vehicles leaving the Project site.
 - 6. Procedures for disposal of personal protective clothing and equipment.
 - 7. Procedures for the collection, treatment, and disposal of all decontamination water and residuals.
 - 8. Procedures for minimizing generation of wastewater.
- B. Contractor shall submit Vehicle Inspection Logs to Engineer on a daily basis, or as otherwise requested by Engineer.

1.03 RELATED SECTIONS:

- A. Section 01351 – Safety, Health and Emergency Response
- B. Section 02120 – Off-Site Transportation and Disposal

1.04 DEFINITIONS:

- A. Exclusion Zone (or hot zone) is the area with actual or potential contamination and the highest potential for exposure to hazardous substances.
- B. Support Zone (or cold zone) is the area of the site that is free from contamination and that may be safely used as a planning and staging area.

PART 2 – PRODUCTS

2.01 SECTION INCLUDES:

- A. Decontamination Facilities

2.02 DECONTAMINATION FACILITIES:

- A. Contractor shall construct and maintain decontamination facilities as shown on the Drawings or as otherwise proposed by Contractor and approved by Engineer.

PART 3 – EXECUTION

3.01 SECTION INCLUDES:

- A. Decontamination of Vehicles and Equipment
- B. Personnel Decontamination
- C. Decontamination Methods
- D. Management of Decontamination Residuals

3.02 DECONTAMINATION OF VEHICLES AND EQUIPMENT:

- A. Contractor shall decontaminate all vehicles and equipment which have entered the Exclusion Zone(s) prior to movement of vehicles or equipment off-site or to the Support Zone. Decontamination shall include removal of soil from the chassis (which includes undercarriage, suspension, and tires/tracks) and other parts of the vehicle known to have been contaminated or visually appearing to be contaminated.
- B. Extreme care shall be taken while decontaminating vehicles to avoid contaminating personnel, other parts of the vehicle or equipment, or the surroundings. Personnel involved in vehicle and equipment decontamination shall be dressed in the appropriate level of Personal Protective Equipment (PPE) as determined by the SSHO. All personnel shall follow all applicable safety procedures according to specification Section 01351 – Safety, Health and Emergency Response.
- C. Contractor shall be responsible for decontaminating haul trucks after loading, and ensuring that all haul trucks exit the Secured Zone through the Decontamination Zone and receive proper decontamination and inspection.
- D. Contractor shall maintain a Vehicle Decontamination Inspection Log to document that all trucks leaving the Project site have been properly decontaminated and inspected prior to operating on public streets.

3.03 PERSONNEL DECONTAMINATION:

- A. Contractor shall ensure personnel who have entered the Exclusion Zone perform decontamination as required in specification Section 01351 – Safety, Health and Emergency Response.

3.04 DECONTAMINATION METHODS:

- A. In addition to other physical extraction techniques, Contractor may use brushing, high-pressure steam, and water sprays to decontaminate materials and wastes. Contractor shall obtain approval of all techniques from Client's Representative prior to use.
- B. Brushing shall consist of removal of loose materials with the use of a broom and/or brushes.
- C. High-pressure steam and water sprays shall consist of application of water or steam sprays of sufficient temperature, pressure, residence time, and agitation surfactant and detergents to remove impacted materials. All high-pressure steam and water sprays shall be performed in a bermed and lined area. The decontamination area shall have a sump to collect decontamination water and be equipped with pumps to transfer the decontamination water to haul trucks for off-site disposal.

3.05 MANAGEMENT OF DECONTAMINATION RESIDUALS:

- A. Contractor shall collect decontamination water and containerize for characterization by the Contractor for off-site disposal by the Client per Section 02120 Off-Site Transportation and Disposal.
- B. Contractor shall consolidate all impacted materials within the capping system and/or dispose of impacted materials per Section 02120 – Off-Site Transportation and Disposal.
- C. Contractor shall load contaminated PPE along with impacted soil and debris for appropriate disposal.

END OF SECTION

**SECTION 01410
REGULATORY REQUIREMENTS**

PART 1 - GENERAL

1.01 DESCRIPTION

Comply with local, state, and federal regulations appropriate or applicable to the proposed work.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01352: Environmental Protection Procedures
- B. Section 01354: Decontamination
- C. Section 02120: Off-Site Transportation and Disposal
- D. Section 02236: Dewatering
- E. Section 02370: Erosion and Sedimentation Control

1.03 GENERAL REQUIREMENTS

Regulations applicable to remediation activities will include but not necessarily be limited to those promulgated by the following regulating authorities:

- A. Environmental Protection Agency (USEPA)
 - 1. Clean Air Act (CAA);
 - 2. Clean Water Act (CWA); and
 - 3. Resource Conservation and Recovery Act.
- B. United States Department of Labor
 - 1. Occupational Safety and Health Act (OSHA).
- C. Rhode Island Department of Environmental Management (the Department)
 - 1. Rules and Regulations for the Investigation of Hazardous Material Releases (Remediation Regulations, DEM-DSR-01-93);
 - 2. Rules and Regulations for Hazardous Waste Management (Hazardous Waste Regulations, DEM OWM-HW10-01);
 - 3. Rules and Regulations Governing the Administration and Enforcement of the Freshwater Wetlands Act (July 2014);
 - 4. Rhode Island Stormwater Design and Installation Standards Manual;
 - 5. Regulations for the Rhode Island Pollutant Discharge Elimination System (RIPDES); and
 - 6. Rhode Island Soil Erosion and Sediment Control Handbook.

1.04 PERMIT APPLICATION BY CONTRACTOR

Permits that must be applied for by Contractor and approved by regulating authority prior to commencing associated work.

- A. Rhode Island Department of Environmental Management – Rhode Island Pollutant Discharge Elimination System (RIPDES) for stormwater discharge from a construction activity. Notice of Intent to be filed by the Contractor (as the Operator) in compliance with a site Stormwater Pollution Prevention Plan (SWPPP – to be prepared by the Engineer). Approvals received to date include

the Program Letter (Site Investigation complete and nature and extent of contamination is defined) and the Remedial Decision Letter (Site Investigation Report complete and preferred alternative identified).

- B. General - Other permits as necessary to perform the work as described in the Contract Documents.

1.05 ACCESS PERMISSIONS

- A. The Client will secure access to the eastern staging area from Amtrak. Contractor shall coordinate work and access during construction. Use of Amtrak and NBC easements shall be limited to transport of equipment, ingress/egress, and limited staging of equipment for work within adjacent areas. Contractor shall immediately move any equipment within Amtrak's or NBC's easements upon notification by Amtrak or NBC that Contractor equipment is interfering with Amtrak's or NBC's activities.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

Not Applicable

END OF SECTION

SECTION 01420
DEFINITIONS, STANDARDS AND REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Not Used

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Engineer's action on Contractor's submittals, applications, and requests, "approved" is limited to Engineer's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Engineer. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- F. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work."Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Installer": An installer is the Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
- I. The term "experienced," when used with an entity, means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
 - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.
- J. "Provide": Furnish and install, complete and ready for the intended use.
- K. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Conflicting Requirements: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Engineer for a decision before proceeding.
 - 1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Engineer for a decision before proceeding.
- D. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

AA	Aluminum Association, Inc. (The) www.aluminum.org	(703) 358-2960
AAADM	American Association of Automatic Door Manufacturers www.aaadm.com	(216) 241-7333
AABC	Associated Air Balance Council www.aabchq.com	(202) 737-0202
AAMA	American Architectural Manufacturers Association www.aamanet.org	(847) 303-5664
AASHTO	American Association of State Highway and Transportation Officials www.transportation.org	(202) 624-5800

AATCC	American Association of Textile Chemists and Colorists www.aatcc.org	(919) 549-8141
ABAA	Air Barrier Association of America www.airbarrier.org	(866) 956-5888
ABMA	American Bearing Manufacturers Association www.abma-dc.org	(202) 367-1155
ACI	American Concrete Institute www.concrete.org	(248) 848-3700
ACPA	American Concrete Pipe Association www.concrete-pipe.org	(972) 506-7216
AEIC	Association of Edison Illuminating Companies, Inc. (The) www.aeic.org	(205) 257-2530
AF&PA	American Forest & Paper Association www.afandpa.org	(800) 878-8878 (202) 463-2700
AGA	American Gas Association www.aga.org	(202) 824-7000
AGC	Associated General Contractors of America (The) www.agc.org	(703) 548-3118
AHA	American Hardboard Association (Now part of CPA)	
AHAM	Association of Home Appliance Manufacturers www.aham.org	(202) 872-5955
AI	Asphalt Institute www.asphaltinstitute.org	(859) 288-4960
AIA	American Institute of Architects (The) www.aia.org	(800) 242-3837 (202) 626-7300
AISC	American Institute of Steel Construction www.aisc.org	(800) 644-2400 (312) 670-2400
AISI	American Iron and Steel Institute www.steel.org	(202) 452-7100
AITC	American Institute of Timber Construction www.aitc-glulam.org	(303) 792-9559
ALCA	Associated Landscape Contractors of America (Now PLANET - Professional Landcare Network)	

ALSC	American Lumber Standard Committee, Incorporated www.alsc.org	(301) 972-1700
AMCA	Air Movement and Control Association International, Inc. www.amca.org	(847) 394-0150
ANSI	American National Standards Institute www.ansi.org	(202) 293-8020
AOSA	Association of Official Seed Analysts, Inc. www.aosaseed.com	(405) 780-7372
APA	Architectural Precast Association www.archprecast.org	(239) 454-6989
APA	APA - The Engineered Wood Association www.apawood.org	(253) 565-6600
APA EWS	APA - The Engineered Wood Association; Engineered Wood Systems (See APA - The Engineered Wood Association)	
API	American Petroleum Institute www.api.org	(202) 682-8000
ARI	Air-Conditioning & Refrigeration Institute www.ari.org	(703) 524-8800
ARMA	Asphalt Roofing Manufacturers Association www.asphaltroofing.org	(202) 207-0917
ASCE	American Society of Civil Engineers www.asce.org	(800) 548-2723 (703) 295-6300
ASCE/SEI	American Society of Civil Engineers/Structural Engineering Institute (See ASCE)	
ASHRAE	American Society of Heating, Refrigerating and Air- Conditioning Engineers www.ashrae.org	(800) 527-4723 (404) 636-8400
ASME	ASME International (American Society of Mechanical Engineers International) www.asme.org	(800) 843-2763 (973) 882-1170
ASSE	American Society of Sanitary Engineering www.asse-plumbing.org	(440) 835-3040

ASTM	ASTM International (American Society for Testing and Materials International) www.astm.org	(610) 832-9500
AWCI	Association of the Wall and Ceiling Industry www.awci.org	(703) 534-8300
AWCMA	American Window Covering Manufacturers Association (Now WCMA)	
AWI	Architectural Woodwork Institute www.awinet.org	(571) 323-3636
AWPA	American Wood Protection Association (Formerly: American Wood Preservers' Association) www.awpa.com	(205) 733-4077
AWS	American Welding Society www.aws.org	(800) 443-9353 (305) 443-9353
AWWA	American Water Works Association www.awwa.org	(800) 926-7337 (303) 794-7711
BHMA	Builders Hardware Manufacturers Association www.buildershardware.com	(212) 297-2122
BIA	Brick Industry Association (The) www.bia.org	(703) 620-0010
BICSI	BICSI, Inc. www.bicsi.org	(800) 242-7405 (813) 979-1991
BIFMA	BIFMA International (Business and Institutional Furniture Manufacturer's Association International) www.bifma.com	(616) 285-3963
BISSC	Baking Industry Sanitation Standards Committee www.bissc.org	(866) 342-4772
BWF	Badminton World Federation (Formerly: IBF - International Badminton Federation) www.internationalbadminton.org	6-03-9283 7155
CCC	Carpet Cushion Council www.carpetcushion.org	(610) 527-3880

CDA	Copper Development Association www.copper.org	(800) 232-3282 (212) 251-7200
CEA	Canadian Electricity Association www.canelect.ca	(613) 230-9263
CEA	Consumer Electronics Association www.ce.org	(866) 858-1555 (703) 907-7600
CFFA	Chemical Fabrics & Film Association, Inc. www.chemicalfabricsandfilm.com	(216) 241-7333
CGA	Compressed Gas Association www.cganet.com	(703) 788-2700
CIMA	Cellulose Insulation Manufacturers Association www.cellulose.org	(888) 881-2462 (937) 222-2462
CISCA	Ceilings & Interior Systems Construction Association www.cisca.org	(630) 584-1919
CISPI	Cast Iron Soil Pipe Institute www.cispi.org	(423) 892-0137
CLFMI	Chain Link Fence Manufacturers Institute www.chainlinkinfo.org	(301) 596-2583
CRRC	Cool Roof Rating Council www.coolroofs.org	(866) 465-2523 (510) 485-7175
CPA	Composite Panel Association www.pbmdf.com	(301) 670-0604
CPPA	Corrugated Polyethylene Pipe Association www.cppa-info.org	(800) 510-2772 (202) 462-9607
CRI	Carpet and Rug Institute (The) www.carpet-rug.com	(800) 882-8846 (706) 278-3176
CRSI	Concrete Reinforcing Steel Institute www.crsi.org	(847) 517-1200
CSA	Canadian Standards Association	(800) 463-6727
CSA	CSA International (Formerly: IAS - International Approval Services) www.csa-international.org	(866) 797-4272 (416) 747-4000

CSI	Cast Stone Institute www.caststone.org	(717) 272-3744
CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300
CSSB	Cedar Shake & Shingle Bureau www.cedarbureau.org	(604) 820-7700
CTI	Cooling Technology Institute (Formerly: Cooling Tower Institute) www.cti.org	(281) 583-4087
DHI	Door and Hardware Institute www.dhi.org	(703) 222-2010
EIA	Electronic Industries Alliance www.eia.org	(703) 907-7500
EIMA	EIFS Industry Members Association www.eima.com	(800) 294-3462 (770) 968-7945
EJCDC	Engineers Joint Contract Documents Committee www.ejdc.org	(703) 295-5000
EJMA	Expansion Joint Manufacturers Association, Inc. www.ejma.org	(914) 332-0040
ESD	ESD Association (Electrostatic Discharge Association) www.esda.org	(315) 339-6937
ETL SEMCO	Intertek ETL SEMCO (Formerly: ITS - Intertek Testing Service NA) www.intertek.com	(800) 967-5352
FM Approvals	FM Approvals LLC www.fmglobal.com	(781) 762-4300
FM Global	FM Global (Formerly: FMG - FM Global) www.fmglobal.com	(401) 275-3000
FMRC	Factory Mutual Research (Now FM Global)	
FRSA	Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc. www.floridarroof.com	(407) 671-3772

FSA	Fluid Sealing Association www.fluidsealing.com	(610) 971-4850
FSC	Forest Stewardship Council www.fsc.org	49 228 367 66 0
GA	Gypsum Association www.gypsum.org	(202) 289-5440
GANA	Glass Association of North America www.glasswebsite.com	(785) 271-0208
GRI	(Part of GSI)	
GS	Green Seal www.greenseal.org	(202) 872-6400
GSI	Geosynthetic Institute www.geosynthetic-institute.org	(610) 522-8440
HI	Hydraulic Institute www.pumps.org	(973) 267-9700
HI	Hydronics Institute www.gamanet.org	(908) 464-8200
HMMA	Hollow Metal Manufacturers Association (Part of NAAMM)	
HPVA	Hardwood Plywood & Veneer Association www.hpva.org	(703) 435-2900
HPW	H. P. White Laboratory, Inc. www.hpwhite.com	(410) 838-6550
IAS	International Approval Services (Now CSA International)	
ICEA	Insulated Cable Engineers Association, Inc. www.icea.net	(770) 830-0369
ICRI	International Concrete Repair Institute, Inc. www.icri.org	(847) 827-0830
IEC	International Electrotechnical Commission www.iec.ch	41 22 919 02 11
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The) www.ieee.org	(212) 419-7900

IESNA	Illuminating Engineering Society of North America www.iesna.org	(212) 248-5000
IEST	Institute of Environmental Sciences and Technology www.iest.org	(847) 255-1561
IGCC	Insulating Glass Certification Council www.igcc.org	(315) 646-2234
IGMA	Insulating Glass Manufacturers Alliance www.igmaonline.org	(613) 233-1510
ILI	Indiana Limestone Institute of America, Inc. www.iliai.com	(812) 275-4426
ISO	International Organization for Standardization www.iso.ch	41 22 749 01 11
	Available from ANSI www.ansi.org	(202) 293-8020
ISSFA	International Solid Surface Fabricators Association www.issfa.net	(877) 464-7732 (702) 567-8150
ITS	Intertek Testing Service NA (Now ETL SEMCO)	
ITU	International Telecommunication Union www.itu.int/home	41 22 730 51 11
KCMA	Kitchen Cabinet Manufacturers Association www.kcma.org	(703) 264-1690
LMA	Laminating Materials Association (Now part of CPA)	
LPI	Lightning Protection Institute www.lightning.org	(800) 488-6864
MBMA	Metal Building Manufacturers Association www.mbma.com	(216) 241-7333
MFMA	Maple Flooring Manufacturers Association, Inc. www.maplefloor.org	(888) 480-9138
MFMA	Metal Framing Manufacturers Association, Inc. www.metalframingmfg.org	(312) 644-6610
MH	Material Handling (Now MHIA)	

MHIA	Material Handling Industry of America www.mhia.org	(800) 345-1815 (704) 676-1190
MIA	Marble Institute of America www.marble-institute.com	(440) 250-9222
MPI	Master Painters Institute www.paintinfo.com	(888) 674-8937 (604) 298-7578
MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc. www.mss-hq.com	(703) 281-6613
NAAMM	National Association of Architectural Metal Manufacturers www.naamm.org	(630) 942-6591
NACE	NACE International (National Association of Corrosion Engineers International) www.nace.org	(800) 797-6623 (281) 228-6200
NADCA	National Air Duct Cleaners Association www.nadca.com	(202) 737-2926
NAIMA	North American Insulation Manufacturers Association www.naima.org	(703) 684-0084
NBGQA	National Building Granite Quarries Association, Inc. www.nbgqa.com	(800) 557-2848
NCMA	National Concrete Masonry Association www.ncma.org	(703) 713-1900
NCPI	National Clay Pipe Institute www.ncpi.org	(262) 248-9094
NCTA	National Cable & Telecommunications Association www.ncta.com	(202) 775-2300
NEBB	National Environmental Balancing Bureau www.nebb.org	(301) 977-3698
NECA	National Electrical Contractors Association www.necanet.org	(301) 657-3110
NeLMA	Northeastern Lumber Manufacturers' Association www.nelma.org	(207) 829-6901
NEMA	National Electrical Manufacturers Association www.nema.org	(703) 841-3200

NETA	InterNational Electrical Testing Association www.netaworld.org	(888) 300-6382 (269) 488-6382
NFHS	National Federation of State High School Associations www.nfhs.org	(317) 972-6900
NFPA	NFPA (National Fire Protection Association) www.nfpa.org	(800) 344-3555 (617) 770-3000
NFRC	National Fenestration Rating Council www.nfrc.org	(301) 589-1776
NGA	National Glass Association www.glass.org	(866) 342-5642 (703) 442-4890
NHLA	National Hardwood Lumber Association www.natlhardwood.org	(800) 933-0318 (901) 377-1818
NLGA	National Lumber Grades Authority www.nlga.org	(604) 524-2393
NOFMA	The Wood Flooring Manufacturers Association (Formerly: National Oak Flooring Manufacturers Association) www.nofma.com	(901) 526-5016
NOMMA	National Ornamental & Miscellaneous Metals Association www.nomma.org	(888) 516-8585
NRCA	National Roofing Contractors Association www.nrca.net	(800) 323-9545 (847) 299-9070
NRMCA	National Ready Mixed Concrete Association www.nrmca.org	(888) 846-7622 (301) 587-1400
NSF	NSF International (National Sanitation Foundation International) www.nsf.org	(800) 673-6275 (734) 769-8010
NSSGA	National Stone, Sand & Gravel Association www.nssga.org	(800) 342-1415 (703) 525-8788
NTMA	National Terrazzo & Mosaic Association, Inc. (The) www.ntma.com	(800) 323-9736 (540) 751-0930
NTRMA	National Tile Roofing Manufacturers Association (Now TRI)	
NWWDA	National Wood Window and Door Association (Now WDMA)	

OPL	Omega Point Laboratories, Inc. (Now ITS)	
PCI	Precast/Prestressed Concrete Institute www.pci.org	(312) 786-0300
PDCA	Painting & Decorating Contractors of America www.pdca.com	(800) 332-7322 (314) 514-7322
PDI	Plumbing & Drainage Institute www.pdionline.org	(800) 589-8956 (978) 557-0720
PGI	PVC Geomembrane Institute http://pgi-tp.ce.uiuc.edu	(217) 333-3929
PLANET	Professional Landcare Network (Formerly: ACLA - Associated Landscape Contractors of America) www.landcarenetwork.org	(800) 395-2522 (703) 736-9666
PTI	Post-Tensioning Institute www.post-tensioning.org	(602) 870-7540
RCSC	Research Council on Structural Connections www.boltcouncil.org	
RISESCH	Rhode Island Soil Erosion and Sediment Control Handbook	(401) 500-0422
SIGMA	Sealed Insulating Glass Manufacturers Association (Now IGMA)	
SJI	Steel Joist Institute www.steeljoist.org	(843) 626-1995
SMA	Screen Manufacturers Association www.smacentral.org	(561) 533-0991
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association www.smacna.org	(703) 803-2980
SPFA	Spray Polyurethane Foam Alliance (Formerly: SPI/SPFD - The Society of the Plastics Industry, Inc.; Spray Polyurethane Foam Division) www.sprayfoam.org	(800) 523-6154
SPIB	Southern Pine Inspection Bureau (The) www.spib.org	(850) 434-2611

SPRI	Single Ply Roofing Industry www.spri.org	(781) 647-7026
SSINA	Specialty Steel Industry of North America www.ssina.com	(800) 982-0355 (202) 342-8630
SSPC	SSPC: The Society for Protective Coatings www.sspc.org	(877) 281-7772 (412) 281-2331
STI	Steel Tank Institute www.steeltank.com	(847) 438-8265
SWI	Steel Window Institute www.steelwindows.com	(216) 241-7333
SWRI	Sealant, Waterproofing, & Restoration Institute www.swrionline.org	(816) 472-7974
TCA	Tile Council of America, Inc. (Now TCNA)	
TCNA	Tile Council of North America, Inc. www.tileusa.com	(864) 646-8453
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance www.tiaonline.org	(703) 907-7700
TMS	The Masonry Society www.masonrysociety.org	(303) 939-9700
TPI	Truss Plate Institute, Inc. www.tpinst.org	(703) 683-1010
TPI	Turfgrass Producers International www.turfgrasssod.org	(800) 405-8873 (847) 649-5555
UL	Underwriters Laboratories Inc. www.ul.com	(877) 854-3577 (847) 272-8800
UNI	Uni-Bell PVC Pipe Association www.uni-bell.org	(972) 243-3902
USGBC	U.S. Green Building Council www.usgbc.org	(800) 795-1747
WASTEC	Waste Equipment Technology Association www.wastec.org	(800) 424-2869 (202) 244-4700
WCLIB	West Coast Lumber Inspection Bureau www.wclib.org	(800) 283-1486 (503) 639-0651

WCMA	Window Covering Manufacturers Association www.wcmanet.org	(212) 297-2122
WCSC	Window Covering Safety Council (Formerly: WCMA - Window Covering Manufacturers Association) www.windowcoverings.org	(800) 506-4636 (212) 297-2109
WDMA	Window & Door Manufacturers Association (Formerly: NWWDA - National Wood Window and Door Association) www.wdma.com	(800) 223-2301 (847) 299-5200
WMMPA	Wood Molding & Millwork Producers Association www.wmmpa.com	(800) 550-7889 (530) 661-9591

B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

IAPMO	International Association of Plumbing and Mechanical Officials www.iapmo.org	(909) 472-4100
ICC	International Code Council www.iccsafe.org	(888) 422-7233
ICC-ES	ICC Evaluation Service, Inc. www.icc-es.org	(800) 423-6587 (562) 699-0543
UBC	Uniform Building Code (See ICC)	

C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CE	Army Corps of Engineers www.usace.army.mil	(202) 761-0011
CPSC	Consumer Product Safety Commission www.cpsc.gov	(800) 638-2772 (301) 504-7923
DOC	Department of Commerce www.commerce.gov	(202) 482-2000

DOD	Department of Defense http://.dodssp.daps.dla.mil	(215) 697-6257
DOE	Department of Energy www.energy.gov	(202) 586-9220
EPA	Environmental Protection Agency www.epa.gov	(202) 272-0167
FAA	Federal Aviation Administration www.faa.gov	(866) 835-5322
FCC	Federal Communications Commission www.fcc.gov	(888) 225-5322
FDA	Food and Drug Administration www.fda.gov	(888) 463-6332
FRA	Federal Railroad Administration www.fra.dot.gov	(202) 493-6052
GSA	General Services Administration www.gsa.gov	(800) 488-3111
HUD	Department of Housing and Urban Development www.hud.gov	(202) 708-1112
LBL	Lawrence Berkeley National Laboratory www.lbl.gov	(510) 486-4000
NCHRP	National Cooperative Highway Research Program	
NIST	National Institute of Standards and Technology www.nist.gov	(301) 975-6478
OSHA	Occupational Safety & Health Administration www.osha.gov	(800) 321-6742 (202) 693-1999
PBS	Public Buildings Service (See GSA)	
PHS	Office of Public Health and Science www.osophs.dhhs.gov/ophs	(202) 690-7694
RUS	Rural Utilities Service (See USDA)	(202) 720-9540
SD	State Department www.state.gov	(202) 647-4000

TRB	Transportation Research Board http://gulliver.trb.org	(202) 334-2934
USDA	Department of Agriculture www.usda.gov	(202) 720-2791
USPS	Postal Service www.usps.com	(202) 268-2000

D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADAAG	Americans with Disabilities Act (ADA) Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities Available from U.S. Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080
CFR	Code of Federal Regulations Available from Government Printing Office www.gpoaccess.gov/cfr/index.html	(866) 512-1800 (202) 512-1800
DOD	Department of Defense Military Specifications and Standards Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil	(215) 697-2664
DSCC	Defense Supply Center Columbus (See FS)	
FED-STD	Federal Standard (See FS)	
FS	Federal Specification Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil Available from Defense Standardization Program www.dps.dla.mil Available from General Services Administration www.gsa.gov Available from National Institute of Building Sciences www.wbdg.org/ccb	(215) 697-2664 (202) 619-8925 (202) 289-7800

FTMS	Federal Test Method Standard (See FS)	
MIL	(See MILSPEC)	
MIL-STD	(See MILSPEC)	
MILSPEC	Military Specification and Standards Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil	(215) 697-2664
UFAS	Uniform Federal Accessibility Standards Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080
E. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.		
RIDEM	Rhode Island Department of Environmental Management www.dem.ri.gov	(401) 222-6800

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01450
CONTRACTOR QUALITY CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

This section covers quality control procedures and testing to be completed during Work. Prior to commencement of Work, the Contractor shall prepare a Contractor Quality Control (CQC) Plan detailing the procedures to be followed and testing to be completed. Quality control testing shall be executed as required in this Specification.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01330: Submittal Procedures
- B. Section 01770: Project Closeout Procedures

1.03 SUBMITTALS

- A. Pre-construction Submittals:
 - 1. Contractor Quality Control (CQC) Plan – shall identify personnel, procedures, instructions, records and forms to be used in carrying out the requirements of this project. The CQC Plan shall provide the Contractor with a means to provide and maintain effective Quality Control for construction, sampling and testing activities. No work on-site shall be permitted until comments received are adequately addressed by the Contractor and the CQC Plan is approved by the Engineer.
- B. Weekly CQC Reports, Test Reports, Deficiency Reports, and Project Summary.

1.04 CONSTRUCTION QUALITY ASSURANCE

- A. The Engineer on behalf of the Client is responsible for providing Construction Quality Assurance (CQA) services during the execution of the Work in accordance with applicable regulations.
- B. The Contractor's Quality Control procedures shall include coordinating and assisting the Engineer in conducting CQA services as required.

PART 2 - PRODUCTS

Not applicable

PART 3 – EXECUTION

3.01 GENERAL REQUIREMENTS

- A. The quality of all Work shall be the responsibility of the Contractor.
- B. Perform sufficient inspections and tests of all items of work, on a continuing basis, including that of sub-contractors, to ensure conformance to applicable specifications and drawings with respect to the quality of materials, workmanship, construction, and functional performance.
- C. Provide qualified personnel, appropriate facilities, instruments, and testing devices

necessary for the performance of the quality control function.

- D. Controls shall be adequate to cover all construction operations, shall be keyed to the proposed construction sequence, and shall be coordinated by the Contractor's quality control personnel.

3.02 CONTRACTOR QUALITY CONTROL (CQC) PLAN

- A. Prepare and submit a CQC Plan to the Engineer for approval.
- B. Comments or approval from the Engineer will be submitted to the Contractor within 14 calendar days following receipt of the plan. Contractor shall adequately respond to comments to the satisfaction of the Engineer within 7 calendar days following receipt of any comments from the Engineer.
- C. No work on site shall be permitted until the comments received are adequately addressed by the Contractor and the CQC Plan is approved by the Engineer.
- D. The CQC Plan, at a minimum, shall include the following:
 - 1. A description of the Quality Control Organization, including charts showing lines of internal Contractor authority, and external Contractor, subcontractor, and Owner's Representative relationships. The Quality Control Organization shall include the names, qualifications, duties, and responsibilities of each person assigned to a quality control function. The Quality Control Organization chart shall identify a Contractor's Quality Control Manager whose responsibilities and qualifications are described in the Article entitled "Contractor Quality Control Organization" in this section.
 - 2. Method of performing, documenting and enforcing quality control operations of both Contractor and subcontract work including inspection and testing.
 - 3. Inspections as described in the article entitled, "Inspections" in this section.
 - 4. Provide a list of analytical or testing laboratories to be used by the Contractor for testing required by these technical specifications with specific test methods to be performed by each laboratory indicated.
 - 5. Protocol describing corrective actions to be taken by the Contractor with specifically defined feedback systems. The Engineer will then decide what further corrective action, if any, shall be taken by the Contractor. Personnel responsible for initiating and carrying out corrective action shall be indicated in the protocol.
- E. Submit Weekly CQC Reports, Test Reports, Deficiency Reports and Project Summary as required by this specification.

3.03 NOTIFICATION OF CHANGE

- A. After submittal and approval of the CQC Plan, the Engineer shall be notified in writing of any proposed changes to the CQC Plan.

3.04 CONTRACTOR QUALITY CONTROL ORGANIZATION

- A. CQC Manager:
 - 1. Identify an individual, within the Contractor's organization at the work site, who shall be responsible for overall management of the CQC Plan and have the authority to act in all CQC matters for the Contractor.
 - 2. The CQC Manager for this contract shall be a qualified construction manager/engineer or comparable individual with a minimum of 2 years of applicable experience, at the Project Manager, Project Engineer,

Superintendent or CQC Manager level, whose responsibility is to ensure compliance with the contract plans and specifications. The CQC Manager shall be independent of the Project Superintendent.

3. The CQC Manager shall be on-site whenever work is in progress so that he/she may be in charge of the CQC Plan for the project.
4. All submittals for approval shall be reviewed and modified or corrected as needed by the CQC Manager the authorized assistants prior to forwarding each submittal to the Engineer.

3.05 INSPECTIONS

- A. The CQC Plan shall include the following inspections and tests:
 1. The Contractor shall perform preparatory inspections prior to beginning each feature of work on any on-site construction work conducted by the Contractor or a subcontractor. Preparatory inspections for the applicable feature of work shall include:
 - a. review of submittal requirements and all other Contract requirements with the performance of the work;
 - b. check to assure that provisions have been made to provide required field work control testing;
 - c. examine the work area to ascertain that all preliminary work has been completed;
 - d. verify all field dimensions and advise the Engineer of any discrepancies;
 - e. perform a physical examination of materials and equipment to assure that they conform to approved shop drawings or submittal data and that all required materials and/or equipment are on hand and comply with the contract requirements.
 2. Perform initial inspection as soon as work begins on a representative portion of the particular feature of work, and include examination of the quality of workmanship as well as review of control testing for compliance with control requirements.
 3. Perform follow-up inspections continuously as any particular feature of work progresses to ensure compliance with Contract requirements, including control testing, until completion of that feature of work.

3.06 TESTING

- A. The Contractor shall be responsible for all required testing, documentation, and corrective measures. The Contractor shall perform tests specified or required to verify that control measures are adequate to provide a product which conforms to contract requirements.

END OF SECTION

SECTION 01460

FIELD ENGINEERING AND SURVEY CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Established survey control points are available on site for construction purposes. The Contractor shall verify locations of survey control points prior to starting work. The Contractor shall safeguard all survey control points. Should any of these points be damaged or destroyed, the Contractor shall replace the control point at no cost to the Client. The Contractor shall assume the entire expense of rectifying work improperly constructed due to failure to maintain and protect such established survey control points.
- B. The Contractor shall be responsible for the layout of the proposed work as shown on the Drawings and any additional survey control points, grid coordinate locations, lines, grades, and levels necessary for the proper construction and testing of the work required in the Contract Documents. Survey control shall include, but not be limited to, maintaining appropriate slopes and specified thicknesses.
- C. The Contractor shall employ a surveyor using standard practices and datum for the State of Rhode Island to provide the surveying functions necessary for the proper execution of the work, and to document and record the completed work.
- D. The Contractor is responsible for scheduling the surveys to coincide with construction activities. If the survey documentation shows improper slopes, elevations, locations, or lift thicknesses, the Contractor shall correct the deficiency and re-survey the re-work. Phases of survey layout and documentation may include, but not be limited to:
 - 1. Initial field verification survey, see paragraph 1.06;
 - 2. Construction layout of limits of clearing, limits of grading and capping system, dredging depths and cap elevations, and other proposed features
 - 3. Measurement for material or work quantity calculations to support unit price contract payments.
 - 3. Subsurface location and elevation of monitoring wells, utilities, and storm drain features abandoned in place, installed, or re-located as part of the work;
 - 4. As-built topographic survey of surficial features, including all capped and restored areas associated with the Phase II, III and Parcel C remedial action to be incorporated into Project Record documentation.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01110: Summary of Work
- B. Section 01330: Submittal Procedures
- C. Section 01770: Project Closeout Procedures

1.03 SUBMITTALS

- A. Submit data demonstrating qualifications of persons providing field engineering and survey services.
- B. Submit documentation verifying accuracy of survey work.
- C. The Contractor shall perform and submit to the Engineer an initial conditions survey of all proposed work areas as part of the work prior to the start of construction activities to verify/establish current conditions. The Contractor shall then compare the existing condition information shown on the Contract Drawings to the current conditions determined during the field verification activities. The Contractor shall submit to the Engineer the results of the the comparison with the Contract Drawings. All discrepancies shall be resolved by the Engineer prior to initiation of construction activities affected by discrepancies.
- D. Maintain a complete and accurate log of control and survey work as it progresses. Submit Record Documents specified in Section 01770, "Project Closeout Procedures".

1.04 FIELD ENGINEERING AND SURVEY REQUIREMENTS

- A. Provide field engineering and survey services using appropriate construction practices. Use skilled persons, trained and experienced in the necessary tasks and techniques for the proper execution of the work. Locate and layout the work by survey instrumentation and similar appropriate means.
- B. The Contractor shall perform the layout and shall document completed construction on Record Drawings, including the features listed in this Specification.
- C. The Contractor shall sufficiently establish the existing ground elevations before earthwork is started. Survey constructed final grades subsequent to excavation and filling existing grades. The Contractor shall sufficiently survey to verify quantities included in requests for payment.
- D. Vertical and horizontal control shall be sufficient to assure work is constructed within 0.1 foot of proposed fill thickness requirements (or proposed grades as indicated where settlement is not a concern) and location.
- E. Verification surveys, surveys for measurement and payment, and Project Record documentation shall be provided in electronic file format compatible with AutoCAD Civil 3D 2014.

1.05 TECHNICAL REQUIREMENTS OF SURVEY

- A. Horizontal ground control shall originate and terminate on Rhode Island State Plane NAD 83. Vertical control shall be tied to Rhode Island State Plane NGVD 1929.
- B. Vertical Control: Permanent project benchmarks for vertical control have been set and are shown on the Drawings. Additional project benchmarks shall be based on the existing site benchmark.

- C. Horizontal Control: Several existing horizontal control points are shown on the Drawings.
- D. Spot Elevations: Survey shall be constructed to provide an accuracy of 0.1 feet vertically. No grade shots exceeding 500 feet shall be taken. Ninety percent of all spot elevations placed on the maps shall have an accuracy of at least 1 foot, and the remaining 10 percent shall not be in error by more than one-half (1/2) of the contour interval (0.5').
- E. Accuracy - Accuracies and accuracy tests apply to the stereo compilation scale of the original manuscript (i.e., if the manuscript is compiled at a scale of 1" = 100' and then reduced to 1"=200', then the accuracies will apply to the original 1"=100' scale). This is also true if the manuscript is enlarged to 1"=50' or some larger scale.

1.06 FIELD VERIFICATION SURVEY

- A. The existing conditions depicted on the Drawings are based on an existing survey prepared by CABCO Consult (2007) and as-built survey information prepared by E, T & L, Inc. (2012).

END OF SECTION

SECTION 01510

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included:

1. Provide such temporary enclosure facilities and controls as the work may warrant. General locations as depicted on the Contract Drawings may be modified as required by the Contractor upon approval of the Engineer and Client.
2. Required facilities include:
 - a. Contractor's office (construction trailer) and storage facilities. Include adequate facilities for the Engineer (in the Contractor's trailer or separate), which shall include lighting, one desk, one metal five-drawer file storage cabinet, 120-volt electrical power, a high-speed internet connection, phone service, and two padded folding chairs.
 - b. Sanitary facilities (self-contained toilet units) conforming to local codes and OSHA requirements.
 - b. Fire protection.
 - c. Safety equipment.
 - d. Site security fence (as required).
 - e. Soil stockpile areas (see Section 02300, "Earthwork", for information).
 - f. Decontamination pad.
 - g. construction laydown/staging/decontamination areas.
 - h. Temporary gravel access road.
3. Other facilities that may be necessary or provided, depending on the Contractor's approach to the work and the preference of the Contractor, include, but are not limited to:
 - a. Construction warning, protection, and control devices for maintenance and safety of vehicular and pedestrian traffic (if necessary).
4. Completely remove all temporary equipment and materials upon completion of the work and repair all damage caused by the installation of temporary utilities.
5. Make all necessary applications and arrangements for electric power, light, water and other utilities with the property owner and/or tenants. Notify the local electric power company if unusually heavy loads, such as welders, will be connected.

B. Other Requirements:

1. Obtain permits as required by local governmental authorities.
2. Obtain easements, when required, across private property other than that of the Owner for temporary power service.

3. Comply with the latest National Electrical Code.
4. Comply with all local, State and Federal codes, laws, and regulations.
5. Allow access to and use of facilities provided by the Contractor to the Engineer and Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Contractor's facilities shall be of size and content for adequate administration of the contract, storage of materials required, and provision for personnel shelter.
- B. Equipment required for personal safety of workmen shall be furnished in full compliance with specific safety requirements of local, state, and Federal agencies, including OSHA.
- C. Signs, barricades, warning lights, and all necessary equipment for the protection of the traveling public shall be furnished and maintained as specified in the Manual on Uniform Traffic Control Devices (Part VI).

PART 3 - EXECUTION

3.01 PERFORMANCE

- A. Field Office and Storage Trailers: Site in locations approved by the Engineer and properly set up for all anticipated weather conditions.
- B. All structures other than storage trailers installed under this Section shall be provided with, as a minimum, the following services:
 1. Fire Extinguisher: Non-toxic, dry chemical, fire extinguisher meeting Underwriters Laboratories, Inc. approval for Class A, Class B, and Class C fires with a minimum rating of 2A, 10B, 10C.
 2. One 36 unit industrial quality first aid kit
- C. Sanitary Conveniences for Project Personnel:
 1. Provide and maintain in sufficient numbers, for the use of all persons employed on the work, and properly screen from public observation, at suitable locations, in accordance with State and local ordinances.
 2. Rigorously enforce the use of the approved sanitary facilities provided.
 3. When no longer required, remove from the site and dispose of the contents in a satisfactory manner.
- D. Obey and enforce other local sanitary regulations and orders, taking such precautions against infectious diseases as may be deemed necessary.
- E. Provide sufficient drinking water for all employees from approved sources.
- F. Conduct operations in a manner which, with the use of proper equipment provides maximum safety for workmen and the traveling public.
- G. Vehicles leaving the Site shall be inspected by the Contractor to ensure that no soil adheres to its wheels, tracks, undercarriage, or bucket.
- H. Remove all soil using high pressure water, steam, or other appropriate method.

I. Decontamination Pad:

1. A decontamination (decon) pad will be constructed to facilitate the cleaning of equipment and trucks prior to leaving the Site.
2. The decon pad shall consist of an impermeable liner, a collection sump, and an aggregate (stone/gravel) working base.
 - a. The subgrade surface for the liner shall be free of stones, debris, or other objects greater than ½ inch in size.
3. Aqueous waste collected from the sump shall be collected in a portable storage tank adjacent to the decon pad.
4. Following characterization, the Contractor shall containerize and stage the liquids for the Client coordination of transportation and disposal in accordance with Section 02120, "Off-Site Transportation and Disposal".
5. Upon completion of the project, the Contractor shall demolish the decon pad and dispose off-site in accordance with all applicable regulations.

END OF SECTION

SECTION 01560
DUST AND ODOR CONTROL

PART 1 - GENERAL

Dust and odor control will be extremely important throughout the construction period due to the urban nature of the site and the surrounding receptors. The site is within close proximity to a Providence High School, a retail center and densely populated neighborhoods. The public is concerned about the project and dust and odor control has been considered a high priority among the surrounding community. The remediation work must take place with a sensitivity to dust and odor control.

1.01 DESCRIPTION

- A. The Contractor shall execute the work by methods that minimize the generation of dust and nuisance odors. The Contractor shall employ dust control measures to minimize the creation of airborne dust during execution of the work. At a minimum, standard dust control techniques shall be employed in areas of heavy equipment traffic such as watering down the site. The dust control measures will be such that, at a minimum, air quality is in compliance with applicable OSHA regulations.
- B. Real time air monitoring will be implemented by the Engineer during all excavation, filling, and regrading activities performed by the Contractor. All reports and data will be collected and analyzed hourly for potential exceedence of OSHA criteria. Client will, based on the Engineers recommendation, inform the Contractor of potential response actions and corrective measures.
- C. The Contractor shall provide an odor control system to control odors as necessary to address complaints from the adjacent properties (high school and retail buildings) and the local community. Odor control agents such as an odor-control foam, misting system, or other method selected by the Contractor and approved by the Engineer shall be available on site and shall be applied as needed to control nuisance odors. At a minimum, an approved odor control system shall be available on site for immediate use. Other systems may be required as necessary to meet the performance objectives; however, sufficient necessary equipment, materials, and personnel must be on-site at all times to enable rapid deployment of odor control methods.
- D. The performance objective for odor control will be to control, eliminate, or mask any odors that generate complaints, from neighboring residents, the public, state or local officials, or the Engineer.
- E. No additional payments will be made due to shutdowns as a result of dust or odor emissions whether exceeding standards or posing a nuisance. If the initial emission controls are found to be inadequate, the Contractor shall provide additional measures at no additional cost.
- F. Dust and odor control systems shall be implemented as necessary to meet local, state, and/or federal regulations for air emissions and dust and to control nuisance odors.
- G. Sufficient volumes of water, odor control foam, and other approved dust and odor control agents shall be readily available or stored on site to address continuous application as necessary.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01110: Summary of Work

1.03 SUBMITTALS

- A. Submit Dust and Odor control plan, including all proposed reagents, procedures for applying, and equipment and personnel necessary to deploy.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Water: Shall be free from oil, acid, and injurious alkali or vegetable matter, and other deleterious materials or contaminants. Water shall not be brackish. Water from Mashapaug Pond shall not be used.

2.02 EQUIPMENT

- A. Equipment for dust and odor control shall include appropriate measures (e.g., heat tape, tank heaters) to prevent freezing or impair operation due to temperatures below freezing.

PART 3 - EXECUTION

3.01 SPRINKLING WATER

- A. Apply by approved methods and with equipment including a tank with gauge-equipped pressure pump and a nozzle-equipped spray bar.
- B. Disperse through the nozzle under a minimum pressure of 20 pounds per square inch, gauge pressure.
- C. Apply water until the surface is wet, but avoid ponding, run off, or muddy conditions.

3.02 TESTING

- A. All equipment, if not in regular use, shall be tested as requested by the Engineer.

END OF SECTION

SECTION 01770
PROJECT CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Keep accurate record documents for all additions, substitutions of material, variations in work, and any other revisions to the Contract Documents.
- B. Provide a final survey of project site and as-built drawings of the completed work within 14 days of final completion.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01330: Submittal Procedures
- B. Section 01720: Field Engineering and Survey

1.03 PROJECT CLOSEOUT

- A. The Contractor shall comply with the procedures stated in the General Conditions of the Contract for issuance of Certificate of Substantial Completion.
- B. The Contractor shall submit written certification that that the Work is complete in accordance with Contract Documents and ready for the Engineer's inspection/review.
- C. Provide submittals as required by these Specifications.

1.04 FINAL CLEANING

- A. Execute final cleaning of Site prior to final project inspection.
 - 1. Clean and remove debris from drainage systems.
 - 2. Clean project site areas, including sweeping paved areas and raking landscaped surfaces.
 - 3. Remove waste and surplus materials, rubbish, and construction facilities from the Site.

1.05 WARRANTIES

- A. Provide duplicate notarized copies of all warranties associated with the work.
- B. Execute and assemble transferable warranty documents from sub-contractors, suppliers, and manufacturers.
- C. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within 14 business days after acceptance, listing the date of acceptance as start of warranty period.

1.06 MAINTENANCE OF RECORD DOCUMENTS

- A. Record documents shall be stored in a dry, safe place apart from construction documents, and be available for inspection by the Engineer. The record documents shall not be used for construction purposes.
- B. Clearly label each document "Project Record." During the execution of the work, keep record documents current.
- C. Provide files and racks for storage of documents.

- D. Maintain one copy of the following documents at the job site:
1. Drawings showing progress of work;
 2. Specifications;
 3. Addenda;
 4. Reviewed submittals;
 5. Change Orders;
 6. Other modifications to the Contract;
 7. Health and Safety Plan;
 8. Storm Water Pollution Prevention Plan
 9. Construction Quality Control Plan
 10. Work Plan(s);
 11. Applicable permit documents;
 12. Contractor's certifications;
 13. Shop drawings and product data;
 14. Daily reports, including:
 - a. Records of all site work;
 - b. Inspection records; and
 - c. Reports on any emergency response actions.
 15. Construction photographs;
 16. Deficiency reports;
 17. Sampling documentation and chain of custody forms;
 18. All analytical laboratory testing data;
 19. All geotechnical laboratory testing data and construction materials field/laboratory testing reports;
 20. Quality Control Project Summary, compiled upon project completion;
 21. Field notes and records of quantities for progress payments;
 22. All survey data required for measurement and payment; and
 23. As-Built Drawings: Legibly mark on Drawings to record actual construction during work.
 - a. Horizontal and vertical surveyed locations of buried features.
 - b. Field changes of dimension and detail;
 - c. Details not on original Drawings; and
 - d. Additional equipment installed.
- E. Specifications and addenda shall be legibly marked up to record changes made by Change Order or Field Order, or other method.

1.07 SUBMITTALS

- A. At the completion of construction, the Contractor shall deliver one electronic set (on DVD) of project record documents to the Engineer as a condition of final payment. Submit project record documents in accordance with Section 01330, "Submittal Procedures", and as specified herein.
- B. Accompany the project record documents with a transmittal letter containing the following:
1. Date;
 2. Project title and number;
 3. Contractor's name and address;
 4. Title and number of each record;
 5. Certification that each document as submitted is complete and accurate;
 6. Signature of the Contractor or his authorized representative.

- C. For each set of project record documents include a directory listing the names, addresses, and telephone numbers of the Contractor, sub-contractors, and major suppliers. Also, include operation and maintenance instructions for installed materials.

1.08 FINAL SURVEY

- A. The Contractor shall perform a topographic survey of the Site within the limit of disturbance at the completion of field operations as described in Section 01460 Field Engineering and Survey. The survey shall be performed by a Land Surveyor licensed in the State of Rhode Island. The survey shall consist of a ground control survey and shall include the following:
 - 1. Topographic elevations of final constructed grade on a 5 foot maximum horizontal grid pattern within the limit of disturbance, at all breaks in slope with sufficient frequency to established required 1-foot contours;
 - 2. Establish appropriate horizontal and vertical control at the site (i.e., locating existing/new benchmarks); and
 - 3. All constructed features.
- B. Provide electronic files of digital mapping data on CD. Data shall be compatible with AutoCAD Civil 3D 2014 computer software.

END OF SECTION

SECTION 02073
NONWOVEN GEOTEXTILE

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Furnish and install orange delineation nonwoven geotextile as shown on the Construction Contract Drawings and as specified in this Section.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01330: Submittal Procedures
- B. Section 02300: Earthwork

1.03 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

A. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

1. ASTM D 4354 Standard Practice for Sampling of Geosynthetics for Testing
2. ASTM D 4355 Standard Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light
3. ASTM D 4491 Standard Test Methods for Water Permeability of Geotextiles by Permittivity
4. ASTM D 4533 Standard Test Method for Trapezoid Tearing Strength of Geotextiles
5. ASTM D 4595 Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method
6. ASTM D 4632 Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
7. ASTM D 4751 Standard Test Method for Determining Apparent Open Size of a Geotextile
8. ASTM D 6241 Standard Test Method for Index Puncture Resistance of Geotextiles
9. ASTM D 4873 Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls
10. ASTM D 4884 Standard Test Method for Strength of Sewn or Thermally Bonded Seams of Geotextiles

1.04 SUBMITTALS

- A. Product Data: Submit geotextile manufacturer's specifications
- B. Manufacturer's Quality Control Certifications: Provide quality control certifications for the same lot of material and production (day and shift) as rolls provided to the project verifying conformance with these specifications.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Geotextile:

Geotextile shall be composed of synthetic fibers formed into nonwoven fabric. Fibers used in manufacture of the geotextiles shall consist of polypropylene. The fibers shall be formed into network such that the filaments or yarns retain dimensional stability relative to each other, including selvages. The geotextile shall contain stabilizers and/or inhibitors to make the fibers resistant to deterioration resulting from exposure to sunlight, water, or heat. The geotextile shall be free of defects or flaws which will affect the physical properties.

Provide a geotextile meeting the properties of Mirafi® Orange Delineation Nonwoven Geotextile (or approved equivalent) as listed in Table 02073-1:

Table 02073-1: Required Physical Properties of 6oz Nonwoven Geotextile

Property	Test Method	Nonwoven
Mass per Unit Area (oz/yd ³)	D 5261	6
Tensile Strength (lbs)	D 4632	175
Elongation (%)	D 4632	75
Puncture Strength (lbs)	D 4833	480
Trapezoid Tear (lbs)	D 4533	85
Permittivity (sec ⁻¹)	D 4491	1.5
Ultraviolet Stability (% for min. 500 hrs)	D 4355	80
Apparent Opening Size (AOS) (standard sieve)	D 4751	100

Table Notes:

1. All numerical values except AOS and ultraviolet stability represent minimum average roll values (MARV), in the weaker principal direction.
2. AOS value is a maximum average roll value or MaxARV.
3. Ultraviolet stability is measured as a minimum average percentage.

PART 3 - EXECUTION

3.01 APPLICATION

- A. Geotextile shall be installed as shown on the Contract Drawings.

3.02 SURFACE PREPARATION

- A. Surfaces on which the geotextile will be placed shall be prepared to a relatively smooth surface condition. Surfaces shall be free from obstruction, debris, depressions, erosion, or vegetation. Any irregularities shall be removed so as to ensure continuous, intimate contact of the geotextile with the surface. Any loose material, soft or low density pockets of material, will be removed, filled with suitable subgrade fill, and compacted. Erosion features such as rills and gullies must be graded out of the surface before geotextile placement.

3.03 INSTALLATION

A. Geotextile Fabrics:

1. Place in the manner and at the locations shown on the Construction Drawings.
2. Prior to installation, fabric delivered to the site not meeting the requirements outlined in section 2.01 of this Specification shall be rejected.
3. At the time of installation, fabric shall be rejected if it has defects, rips, holes, flaws, deterioration or damage incurred during manufacture, transportation or storage.
4. Place with the long dimension parallel to the centerline of the underdrain pipes and lay smooth and free of tension, stress, folds, wrinkles, or creases.
5. Provide a minimum width of 12 in. of overlap for all applications.
6. In the presence of wind, weight the materials with sandbags until final covers are installed.
7. Care shall be taken to assure that any underlying materials are not damaged during placement of geotextiles.
8. Care shall be taken to assure that stones, mud, and dirt are not entrapped in the geotextile during placement and seaming operations.
9. Overlap joints and seams shall be measured as a single layer of cloth.
10. The fabric shall be turned down and buried a minimum of 2 feet at all exterior limits or as indicated on the Construction Drawings.
11. Place so that the upstream strip of fabric will overlap the downstream strip.
12. Protection of Fabrics:
 - a. Exercise necessary care while transporting, storing and installing the fabric to prevent damaging it.
 - b. Protect from prolonged direct exposure to sunlight.
 - c. Repair all damaged areas of the fabric by placing another piece of fabric of sufficient size to extend a minimum of 1.0 foot beyond the limits of the damage in all directions over the damaged area. Sew repairs as described below.
 - d. Do not leave exposed more than 45 days without being covered by backfill.
 - e. When required, sew overlaps and repairs to damaged fabric using a portable machine to provide a seam strength of at least 90 percent of the filter fabric strength.
 - f. Geotextile shall not be exposed to precipitation prior to being installed. Wrappings protecting geotextile rolls shall be removed less than one hour prior to unrolling the geotextile.
 - g. In no case shall any type of equipment be allowed on an unprotected geotextile.
13. Bridging of fabric is not allowed.

END OF SECTION

SECTION 02110
WASTE EXCAVATION, REMOVAL, AND HANDLING

PART 1 GENERAL

1.01 SUMMARY

A. This section includes a description of responsibilities and project requirements for on-site management of wastes including removal, handling and storage. For the Former Gorham Manufacturing Facility, Phase II, III, and Parcel C Cap, these materials and wastes are identified as the following:

1. Clearing Debris;
2. Grubbings;
3. Solid Waste;
4. Impacted Soil;
5. Soil Boring/Well Installation Cuttings;
6. Remediation Waste;
7. Sanitary Waste;
8. Site Trash;
9. Decontamination Water; and
10. Construction and Demolition Debris

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01351 – Safety, Health, and Emergency Response
- B. Section 02120 – Off-Site Transportation and Disposal
- C. Section 02231 – Clearing and Grubbing
- D. Section 02300 – Earthwork
- E. Section 02522 – Groundwater Monitoring Wells
- F. Section 01500 – Temporary Facilities and Controls

1.03 SUBMITTALS

A. The Contractor shall include as a component of the Construction Work Plan (described in Section 01110 – Summary of Work) a description of planned means and methods for management of all waste materials removed or generated as a component of the Work.

1.04 DEFINITIONS

- A. Clearing Debris: refer to Section 02231 – Clearing and Grubbing for definition.
- B. Grubbings: refer to Section 02231 - Clearing and Grubbing for definition
- C. Solid Waste: typical municipal household and/or commercial/industrial waste in solid form and not classified as bulky waste or hazardous waste, including rubbish/trash, garbage, other miscellaneous discarded material/debris, demolition debris, soil, sediment, sludge, and/or ash.
- D. Impacted Soils: Contaminated soils adjacent to and within the surficial fill and debris areas within the limit of the proposed capping system.
- E. Leachate: waste generated from the percolation of liquids (usually stormwater)

through or contact of liquids with solid waste or contaminated soils, sediment, or sludge.

- F. Soil boring/well installation cuttings: Cuttings generated during drilling of groundwater monitoring wells
- G. Remediation Waste: Waste generated during remediation work as a result of environmental protections, worker protections and/or sampling procedures including disposable personal protective equipment (PPE), plastic sheeting, and sampling equipment.
- H. Sanitary Wastes: Wastes characterized as sanitary sewage. Refer to Section 01510 – Temporary Facilities and Controls.
- I. Site trash: Waste generated during the course of construction from site workers, equipment, and/or imported materials.

1.05 WASTE CONTAINERS

- A. The Contractor shall provide:
 - 1. Trucks or other equipment as required for handling grubblings and solid waste during excavation and on-site consolidation/grading.
 - 2. Portable, temporary storage tanks (e.g., FRAC tanks and/or 55-gallon drums.) for the storage of collected dewatering liquids.
 - 4. Containers (e.g., roll-off containers) for non-hazardous site trash collected during the course of the project and during final site cleanup activities.
 - 5. Plastic bags for disposable personnel protection equipment. Plastic bags shall have a minimum thickness of six (6) mils

1.06 ON-SITE MANAGEMENT AND STORAGE OF MATERIALS

- A. The Contractor shall be responsible for proper on-site management of wastes generated in compliance with all Federal, State and local regulations. Management shall include handling, segregating, testing, and storing, as required, for the wastes listed in Sub-Part 1.01A of this Section.
 - 1. Clearing Debris: manage and store as described in Section 02231 – Clearing and Grubbing
 - 2. Grubbings: manage and store as described in Section 02231 – Clearing and Grubbing
 - 3. Solid Waste: material excavated/removed from outside the capping system boundary shall be consolidated within the boundary.
 - 4. Impacted Soils: manage and consolidate within the capping system boundary.
 - 5. Soil Boring Cuttings: manage and store as described in Section 02522 – Groundwater Monitoring Wells.
 - 6. Remediation Waste: segregate and bag all remediation waste separately from other Site Trash and store in the on-site Site Trash container.
 - 7. Sanitary Wastes: manage as described in Section 01510 – Temporary Facilities and Controls.
 - 8. Site Trash: manage and store on-site during construction in a designated roll-off container or similar.
- B. The Contractor shall be responsible for movement of the containers, trucks, etc. into positions required for proper loading and management of material.

- C. The Contractor shall segregate hazardous from non-hazardous materials as required for proper off-site disposal.
- D. The Contractor shall be responsible for loading all waste containers, trucks, etc. with all removed waste, debris, and soil.
- E. The Contractor shall limit stockpiling of waste materials on-site.
- F. Solid waste for on-site waste consolidation, if stockpiled, shall be maintained inside the capping system boundary.
- F. The Contractor shall not load waste containers, trucks, etc. with non-contaminated materials prior to inspection and determination by the Engineer that decontamination of the waste containers has been achieved.
- G. The Contractor shall be responsible for coordinating the schedule for delivery and pick-up of supplied waste containers. The Contractor shall also be responsible for movement and storage of containers within the Site to allow the progress of the Work.
- H. The Contractor shall cover and line any material stockpiles with plastic sheeting and an anchoring system to prevent stormwater runoff from contacting the waste material. All covers shall be properly secured to prevent them from becoming windborne and potentially a hazard to Amtrak facilities (substation and rails) immediately adjacent to the site.

1.07 WASTE CHARACTERIZATION SAMPLING AND TESTING

- A. Engineer shall sample and test Client Managed wastes, in accordance with regulatory and receiving facility requirements, prior to off-site disposal.
- B. The Contractor shall be responsible for the sample collection and laboratory testing of the following classifications of wastes if required:
 - 1. Clearing Debris (as limited in Section 02231 – Clearing and Grubbing);
 - 2. Construction and Demolition Debris;
 - 3. Sanitary Waste; and
 - 4. Site Trash;
- C. Laboratory testing of wastes shall be performed by a certified laboratory as required by the selected disposal facility:
 - 1. Laboratory reports shall be prepared by the subcontracted laboratory to include all requirements of the State.
 - 2. All laboratory test methods and frequencies shall be in accordance with the RIDEM requirements.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

Not Applicable

END OF SECTION

SECTION 02111
SEDIMENT REMOVAL

PART 1 – GENERAL

1.1 SECTION INCLUDES:

- A. Submittals
- B. Summary
- C. References
- D. System Description
- E. Performance Requirements
- F. Closeout Submittals
- G. Quality Assurance
- H. Qualifications
- I. Sequencing
- J. Coordination

1.2 SUBMITTALS:

- A. SPECIFICATION SECTION 01330 SUBMITTAL PROCEDURES: Requirements for submittals.
- B. Submit the following information not less than 10 working days (2 calendar weeks) prior to commencing Work.
 - 1. Sediment Removal Plan including description of sediment removal (dry excavation) methods, procedures, and equipment that will be used by the Contractor to accomplish sediment removal in the Inner Cove.
 - a. Sequencing and scheduling of sediment removal activities, including preparation of access and work areas, sediment removal and delivery to the Temporary Dredge Material Staging and Processing Area.
 - b. Drawing of sediment management units (SMUs, discrete contiguous areas of the inner cove where sediment removal shall be completed before beginning sediment removal in another SMU) and plan for accessing SMUs. SMUs may be mapped for areas in which sediment removal is expected to be completed over a period of five (5) project days.
 - c. Expected hours of operation, crew sizes, and equipment types.
 - d. Sediment and water depth descriptions, target removal rates (expressed in terms of in situ volume removed per day), and expected sediment volumes at the Temporary Dredge Material Staging and Processing Area for each SMU.
 - e. Expected methods contractor will use to check and report volumes removed daily and weekly during operation.
 - 2. Description of methods, procedures, and equipment for any additional sediment sampling intended by the contractor for the Inner Cove.
 - 3. Description of methods, procedures and equipment used to transport sediments on site from SMUs to processing areas, to temporarily stage and

dewatering sediments, and to transport and place materials at the Dredge Materials Consolidation area.

4. Description of methods, procedures and equipment to amend sediments, if necessary, to meet performance objectives of long-term placement in the Dredge Materials Consolidation Area. Provide a list of potential amendments along with the MSDS/SDS information as applicable, and expected amendment rates and bulking factors of processed sediments. Provide methods of odor control including MSDS/SDS of odor control agents and manufacturer's recommended application.
5. Inner Cove Restoration Plan including description of equipment, methods and procedures to install Inner Cover Cap, Wetlands Perimeter Cap, and Wetlands Toe Cap, and sequencing with SMUs.
6. Description of equipment decontamination procedures to be used (see Specification Section 01354).

1.3 SUMMARY:

- A. Following dewatering of the Inner Cove, sediment removal by excavation is necessary to remove contaminated sediments, install a post-excavation cap, and increase water depths upon completion of work in the Inner Cove. The Engineer has developed an approved Remedial Action Work Plan (RAWP) which includes a sediment removal approach that includes excavation in the dry within the Inner Cove. Further, the RAWP includes the use of a temporary dam system (e.g., sheet piling, Port-a-Dam, Aquabarrier or approved equivalent, see Specification Section 02235 - Temporary Dam) to isolate the Inner Cove surface water from the Outer Cove and to reduce the volume of pond water removed by dewatering during dry excavation. The Contractor shall propose his own approach for accomplishing the removal of the sediment in accordance with the approved RAWP.

All activities conducted under this section shall be performed in accordance with the Contractor's approved Health and Safety Plan (HASP), other appropriate specification sections, and applicable local, state, and federal laws and regulations.

1.4 REFERENCES:

- A. Rhode Island Soil and Sediment Control Handbook

1.5 SYSTEM DESCRIPTION:

- A. Provide sediment removal (dry excavation) systems to permit Work to be completed in Inner Cove.

1.6 PERFORMANCE REQUIREMENTS:

- A. Design sediment removal (dry excavation systems to:
 1. Remove sediments from the Inner Cove according to the Drawings and Specifications.
 2. Deliver sediments to the Temporary Sediment Material Staging and Processing Area used to handle and dewater sediments prior to placement in the Consolidation Cell. Construction of sediment processing areas shall comply with design requirements outlined in RISESCH Section Six, Containment Areas for Earth Materials.
 3. Adapt methods, if necessary, to avoid hazards, protect property, and reduce impacts to surface water outside the Inner Cove.

- 1.7 CLOSEOUT SUBMITTALS:
 - A. Specification Section 01770 – Project Closeout Requirements: Requirements for submittals.
- 1.8 QUALITY ASSURANCE:
 - A. Comply with authorities having jurisdiction for the following:
 - 1. Sediment removal (dry excavation).
- 1.9 QUALIFICATIONS:
 - A. Not Used
- 1.10 SEQUENCING:
 - A. Specification Section 01110 – Summary of Work: Requirements for sequencing.
 - B. Sequence work to obtain required plan approvals before start of sediment removal operations.
 - C. Sequence work to allow dewatering before start of sediment removal operations. Maintain dewatering as necessary to complete all pre- and post-sediment removal verification activities.
 - D. Sequence work to allow time to perform post sediment removal verification activities, approval by the Engineer, and potential additional removal for each Sediment Management Unit (SMU) before applying post-excavation capping material.
 - E. Sequence post capping verification activities to allow time for the Engineer to verify and approve final elevations and Contractor to correct out of tolerance areas before fully demobilizing from SMU.
- 1.11 COORDINATION:
 - A. Coordinate work to provide reliable removal of sediments and delivery to the upland area set aside for managing excavated sediments.
 - 1. Temporary dam installation as specified in Section 02235, Temporary Dam and in accordance with Contractor's approved Temporary Dam Installation Plan.
 - 2. Sediment dewatering as specified in Section 02236 Sediment Dewatering. Rates of sediment removal must be properly coordinated such that the rates of sediments, water, and debris delivered to the Temporary Sediment Material Staging and Processing Area do not exceed practical limits (treatment capacity) for efficient management of sediments, water, and debris.
 - 3. Post-sediment removal cover material requirements as specified in Section 02300 Earthworks.
 - B. Coordinate work with HASP.

PART 2 – PRODUCTS

- 2.1 SECTION INCLUDES:
 - A. Removal Equipment
 - B. Temporary Storage Containers

- C. Boats or Other Vessels for Water Access
- D. Monitoring Equipment
- E. Accessories

2.2 REMOVAL EQUIPMENT

- A. The Contractor shall provide removal equipment capable of removing sediment and debris from the Inner Cove, and transferring sediment and debris to upland Temporary Sediment Material Staging and Processing Area.

2.3 TEMPORARY STORAGE CONTAINERS

- A. As needed, the Contractor shall provide roll-off boxes or other temporary storage containers for storage, treatment, or other management of sediments and debris.
- B. Roll-off boxes or other temporary storage containers can be used by the contractor; however, any leakage during transport from the SMUs to the Temporary Sediment Material Staging and Processing area should be eliminated.

2.4 BOATS OR OTHER VESSELS FOR WATER ACCESS

- A. As needed for construction or monitoring, the Contractor shall provide boats or other vessels needed for safe access to water.

2.5 MONITORING EQUIPMENT:

- A. As needed, Contractor shall provide equipment and materials to provide reportable quantities and rates of sediment, water, and debris removed from the Inner Cove.

2.6 ACCESSORIES:

- A. Contractor shall provide materials and accessories needed for equipment and sediment removal processes.

PART 3 – EXECUTION

3.1 SECTION INCLUDES:

- A. Examination
- B. Preparation
- C. Sediment Removal System
- D. Sediment Removal System Operation and Maintenance
- E. Debris Removal
- F. System Removal
- G. Field Quality Control

3.2 EXAMINATION:

- A. Verify existing conditions before starting work.
- B. Identify required lines, levels, contours, and datum.
- C. Verify that all underground utilities are located not less than five working days before beginning the Work.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.

2. Notify utility companies to remove or relocate utilities affected by the Work.
3. Protect utilities indicated to remain from damage.

3.3 PREPARATION:

- A. Protect plant and wildlife according to the Aquatic Wildlife Management Plan (Appendix C), and other features.
- B. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- C. Protect existing adjacent buildings, structures, and improvements from damage that may be caused by excavation operations.
- D. Identify and map debris that can be easily identified prior to sediment excavation.
- E. Maintain access road to Amtrak Electrical Substation on the Phase III Area throughout construction.
- F. Provide site marking, safety notifications, and work control zones specific to dry excavation process as needed in accordance with the approved HASP.

3.4 DRY EXCAVATION SYSTEM:

- A. Mobilize sediment removal system according to project schedule.
- B. Sediment removal is expected to be performed with dry excavation or mechanical dredging. Alternative methods for removal must meet approval of Engineer.
- C. Some sediment areas are expected to be soft and may be unable to support equipment loads. Contractor is expected to provide equipment and materials needed to support equipment with expected loadings. Usage of timber mats, Dura-Base mats or equivalent, spuds, or other methods to support equipment must be clean and are required to be removed following completion of all phases of Work to be conducted within the Inner Cove, including sediment removal, fringe wetland toe cap, perimeter wetlands cap, inner cove cap, and other restoration or ancillary activities.
- D. Provide markings or buoys, if needed, to demarcate SMUs. Using surveying targets in water, verify that GPS surveying system used for excavation is accurate to 1.0 foot horizontal and 0.1 foot vertical.
- E. Deliver excavated sediment to upland Temporary Dredge Material Staging and Processing Area.

3.5 SEDIMENT REMOVAL SYSTEM OPERATION AND MAINTENANCE:

- A. General requirements: Sediment removal within the SMUs shall not be permitted until Contractor has finalized all preconstruction submittals to the satisfaction of the Engineer. All necessary precautions shall be taken to adequately protect on-site personnel, the public, and both public and private property in and around the site. All Contractor (and sub-contractor) personnel shall comply fully with the requirements of the HASP.
- B. Operate sediment removal system as needed on a daily basis, in accordance with the allowable work hours schedule (7 a.m. to 5 p.m. Monday through Friday and

Saturdays pending approvals from RIDEM) until removal is complete to meet overall project schedule.

- C. Prior to sediment removal at each SMU, the Contractor shall complete a pre-removal survey to verify existing grades. The Engineer will review the updated survey and determine if adjustments to cut and final grade elevations are necessary to achieve project objectives. The Engineer may perform additional verification surveys or other activities as necessary to confirm project objectives are met.
- D. Targeted removal depths and elevations shall be based on the construction drawings and specifications as amended based upon the pre-construction survey; these removal depths and elevations will also be provided to the contractor in a digital format such as *.xml or other compatible earthworks/surface model file format. The Contractor shall notify the engineer of any discrepancies between the construction drawings/documents and the provided digital files prior to commencement of sediment removal operations.
- E. During sediment removal, the Contractor shall monitor sediment elevations during removal operations and provide these data to the engineer on a daily basis to track daily and cumulative volumes for purposes of tracking progress. Upon completion of each SMU, the Contractor shall provide a completed survey of the SMU for review and approval by the Engineer. Following approval of SMU subgrade elevations by the Engineer, final cap materials shall be placed by the Contractor.
- F. No sediment removal outside the approved SMUs is allowed.
- G. The following sediment removal objectives shall be met:
 - 1. Allowable removal depths of in situ sediment range from 1 to 2 feet over the entire 2.8 acres of the Inner Cove.
- H. Sediment removal is not considered complete until Engineer verifies that the targeted sediment elevations have been met, according to removal specifications.
- I. Surveys for sediment subgrade and final cap grades shall be completed using a grid system with a frequency of every 10 to 15 ft, as approved by the Engineer. All points shall indicate cuts depths of between one and two ft.
- J. For each SMU, Contractor shall take measurements of post-cover elevation at no less than 25 points, allowing Engineer to inspect measurements. Sand may densify upon placement, so sand volumes as delivered or stored on site will likely exceed as-placed volumes. In addition, because subgrade sediments may also consolidate after placement, the method of assuring placed thickness shall include coring or another Engineer-approved physical (destructive) methodology to determine placed thickness. For each SMU, core samples (or other equivalent approved method) can be used to estimate placed sand thickness at no less than 8 points.
- K. Engineer will review placed thickness and post-cover elevation measurements to verify placed thickness. The Target Cap thickness is one foot and must have an average placed thickness between 0.7 and 1.3 feet. All samples shall have a placed thickness greater than 0.7 ft. Measurements indicating under or over-placed sand (thickness less than 0.7 ft or greater than 1.3 ft) shall require additional placement or re-grading, as directed by the engineer.

- L. To reduce sediment dewatering requirements, sediment removal should be accomplished in a manner that reduces the bulking of sediment volumes and allows water drainage from the bucket. Sediment removal must be paused when notified by the Engineer. Removal will be paused by the Engineer if the capacity at the upland sediment dewatering management area is likely to be exceeded with the additional loadings of sediment.
- M. Notify the Engineer on any significant changes to the expected daily sediment removal production, within 48 hours of an expected change.
- N. Unforeseen contaminated or hazardous material: If the contractor encounters material, not otherwise identified as contaminated or hazardous, which may be immediately dangerous to human health or the environment if disturbed during construction operations, the Contractor shall stop that portion of the work and take measures to avoid contact with the material. The Contractor shall immediately notify the Engineer concerning the possible existence of such material. The Engineer may perform testing to characterize the material. If the material is not contaminated and is not considered dangerous, the Engineer will direct the Contractor to proceed without change. If the material is hazardous and must be disturbed or handled to accomplish the work, the Engineer will direct a change order pursuant to the Contract Agreement.
- O. Jobsite or neighborhood complaints of excessive dust, noise, vibration, or odors must be communicated to Engineer immediately (i.e., as soon as is practicable following notification) upon receipt of first complaint in a project day. Contractor must have contingency plans for excessive dust, noise and odors.

3.6 DEBRIS REMOVAL:

- A. Debris and trash encountered in the Inner Cove should be removed and managed according to the plan for solid waste management. Debris should be considered as non-sediment materials, such as broken concrete, timbers, and trash. Vegetation, roots, and tree limbs may be handled separately.
- B. Inner Cove sediments include particle sizes less than 3 inches. If encountered, metallic or stone particles with diameters greater than 3 inches may be considered as debris. Clean stone may be reused on the site with Engineer's approval.

3.7 SYSTEM REMOVAL:

- A. Remove sediment removal equipment and systems after removal operations are completed (Section 3.5 G), or if explicitly instructed to do so by Engineer.
- B. System removal may be coordinated with other site restoration activities, such as placement of post-excavation cover, if system components meet specifications for the applicable project phase.

3.8 FIELD QUALITY CONTROL:

- A. Specification Section 01770 – Project Closeout Requirements: Field inspecting, testing, adjusting, balancing, and final post-construction bathymetric survey.
- B. Submit initial installation reports including the following:
 - 1. Site mobilization for sediment removal equipment.
 - 2. Summary of initial conditions, signage or site markings, and survey benchmarks that will be used for Contractor's verification of sediment removal.

- C. Submit weekly monitoring reports including the following:
1. In situ volume and average depths of sediment removed from each SMU.
 2. Quantities of sediment as delivered to upland sediment management (dewatering) area, in terms of wet and dry tons of sediment delivered to the sediment management area.
 3. Actual or projected date that sediment removal activities is considered complete, for each SMU.
 4. Maintenance records for sediment removal systems.
 5. Unexpected conditions that are not immediately hazardous: The Contractor shall notify the Engineer upon encountering unexpected conditions that might reasonably be expected to delay the successful completion of the project or any task therein.
 6. Inspection of completed sediment removal: Upon completing removal of sediments in each SMU, the Engineer will inspect the area to verify completion. The Engineer may specify additional sediment removal based on that inspection.

END OF SECTION

SECTION 02120

OFF-SITE TRANSPORTATION AND DISPOSAL

PART 1 GENERAL

1.01 SUMMARY

- A. This section includes a description of requirements and responsibilities for proper staging and loading of waste materials removed and identified for off-site disposal by the Client including the following materials:
 - 1. Grubbings (as limited in Section 02331 – Clearing and Grubbing);
 - 2. Excess impacted soils from on-site consolidation (exceeds the available on-site capacity);
 - 3. Excess decontamination liquid (unable to discharge on-site); and
 - 4. Solid waste.
 - 5. Hazardous waste, if encountered.
- B. This section includes a description of requirements and responsibilities for proper staging, transportation and disposal of waste materials removed and identified for off-site disposal by the Contractor including the following materials:
 - 1. Clearing Debris (as limited in Section 02231 – Clearing and Grubbing);
 - 2. Construction and Demolition Debris;
 - 3. Sanitary Waste; and
 - 4. Site Trash;
- C. Work not covered by this specification includes the on-site transportation of wastes/wastes materials and on-site disposal within the cap boundaries. These wastes/waste materials including the following:
 - 1. Existing solid waste including excess soil from waste consolidation and subgrade excavations;
 - 2. Soil boring cuttings; and
 - 3. Sediment collected and removed from erosion and sedimentation control measures.
- D. The Contractor shall be responsible for all characterization requirements and submitting all documents to Client for off-site disposal.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01110 – Summary of Work
- B. Section 01330 – Submittal Procedures
- C. Section 01352 – Environmental Protection Procedures
- D. Section 02110 – Waste Removal, Handling, and Storage

1.03 REFERENCES

- A. The publications listed below are pertinent in whole or part to the Work. The publications are referred to within the text by basic designation only.
 - 1. Code of Federal Regulations (CFR)
 - a. 40 CFR 262: Standards Applicable to Generators of Hazardous Waste
 - b. 49 CFR 172: Tables, Hazardous Material Communication Requirements, and Emergency Response Information

Requirements

2. State of Rhode Island and Providence Plantations Department of Environmental Management (RIDEM) Rule and Regulations for Hazardous Waste Management Section 6.0 Transporters.
- B. The Contractor shall comply with all applicable Federal, State, and local requirements regarding transportation and disposal of hazardous and nonhazardous material.

1.04 SUBMITTALS

- A. The Contractor shall include as a component of the Construction Work Plan (described in Section 01110 – Summary of Work) a description of planned means and methods for staging, characterizing and loading of all waste materials to be removed from the Site by the Client or generated as a component of the Work.

1.05 DEFINITIONS

- A. Refer to the definitions for classifications of wastes in Section 02110 – Waste Excavation, Removal, and Handling.

1.06 WASTE CONTAINERS

- A. The Contractor shall provide waste containers specific to the individual waste as described in Section 02110 – Waste Excavation, Removal, and Handling.

1.07 TRANSPORTATION OF WASTES

- A. Client shall be responsible for the off-site transportation of all wastes specified per Section 1.01 A.
- B. The Contractor shall be responsible for the off-site transportation of all wastes specified per Section 1.01 B.
- C. The Client shall be responsible for coordinating the number and schedule of vehicles required for off-site transportation of waste materials generated during the execution of the specified work.
- D. The Contractor shall provide the necessary labor and materials to insure all trucks, containers, etc. are lined with plastic prior to filling, as required; foamed or stabilized with an agent, if necessary; and covered prior to departure.
- E. Contractor shall comply with the Rhode Island Diesel Emissions Reduction Act (DERA) when using heavy duty vehicles, as described in Section 01352 – Environmental Protection Procedures.

1.08 DISPOSAL OF WASTES

- A. The Contractor shall be responsible for the proper disposal of the wastes identified under Section 1.01 B of this Specification as a component of the Work or that are generated during the execution of the Work in conformance with all Federal, State, and local regulations and requirements. Proper disposal requires that the facility accepting the waste be a state licensed disposal/recycling facility that is approved for acceptance of the waste based on the results of the characterization testing and analysis.
- B. The disposal facilities shall be approved by the Engineer/RIDEM prior to the transporting of waste. The Contractor shall not change facilities without prior consent of the Engineer/RIDEM.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

Not Applicable

END OF SECTION

SELECT SITE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. 00700 – General Conditions
- B. 02120 – Off-Site Disposal
- C. 02300 - Earthwork

1.2 SUMMARY

A. This Section includes the following:

- 1. Demolition and removal of selected portions of a building or structure.
- 2. Demolition and removal of selected site elements, including chainlink fence and gates, pavement, stormwater spreader, miscellaneous concrete block walls, utility poles and one monitoring well.

B. Related Sections include the following:

- 1. 01100 - Summary of Work
- 2. 01500 - Temporary Facilities and Controls
- 3. 01560 – Dust and Odor Control submittal requirements

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Detach items from existing construction and deliver them to Client.
- C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

- A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Client's property, demolished materials shall become Contractor's property and shall be removed from Project site.
- B. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Client that may be encountered during selective demolition remain Client's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Client.

1.5 SUBMITTALS

- A. 01560 – Dust and Odor Control submittal requirements

B. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Client's on-site operations are uninterrupted.

C. Inventory: After selective demolition is complete, submit a list of items that have been removed and salvaged.

1.6 QUALITY ASSURANCE

A. Professional Engineer Qualifications: Comply with 01450 Contractor Quality Assurance / Quality Control

B. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Standards: Comply with ANSI A10.6 and NFPA 241.

1.7 PROJECT CONDITIONS

A. Not Used (Site is vacant)

B. Client assumes no responsibility for condition of areas to be selectively demolished.

1. Conditions existing at time of inspection for bidding purpose will be maintained by Client as far as practical.

C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Engineer and Client. Hazardous materials will be removed by Client under a separate contract.

D. Storage or sale of removed items or materials on-site will not be permitted.

PART 2 - PRODUCTS

2.1 REPAIR MATERIALS

Not Used

PART 3 - EXECUTION

3.1 EXAMINATION

A. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required. Contact Engineer if any discrepancies are identified.

B. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

3.2 UTILITY SERVICES

Not Used

3.3 PREPARATION

- A. Dangerous Materials: Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Client and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
 - 2. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
 - 3. Protect existing site improvements, appurtenances, and landscaping to remain.
- C. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

3.4 POLLUTION CONTROLS

- A. Dust Control: Use water mist, temporary enclosures, and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations.
 - 1. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
- B. Disposal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- C. Cleaning: Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.5 SELECTIVE DEMOLITION

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces.
 - 3. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - 4. Dispose of demolished items and materials promptly.
 - 5. Return elements of construction and surfaces that are to remain to condition existing before selective demolition operations began.

- B. Removed and Salvaged Items: Comply with the following:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to Client.
 - 4. Protect items from damage during transport and storage.
- C. Removed and Reinstalled Items: Comply with the following:
 - 1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
 - 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 - 3. Protect items from damage during transport and storage.
 - 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- D. Concrete: Demolish in small sections. Cut concrete to a depth of at least 3/4 inch (19 mm) at junctures with construction to remain, using power-driven saw. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete indicated for selective demolition. Neatly trim openings to dimensions indicated.
- E. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and leave in place.
- F. Asphalt Pavement: Saw-cut perimeter of area to be demolished, break up, and leave in place.

3.6 REPAIRS

- A. General: Promptly repair damage to adjacent construction caused by selective demolition operations.

3.7 DISPOSAL OF DEMOLITION DEBRIS

- A. Burning: Do not burn demolished materials.
- B. Disposal: Dispose of demolished materials in accordance with Section 02120 – Off-Site Transportation and Disposal and Section 02300 - Earthwork.

END OF SECTION

SECTION 02231
CLEARING AND GRUBBING

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Work Included:
 - 1. Clearing includes cutting at the ground surface trees and general woody growth including shrubs, bushes, vines, and general brush.
 - 2. Grubbing includes removal of vegetative cover (grass) with root systems, stumps with root systems, and other organic matter surficial or buried within the top 1 foot of soil (topsoil).
- B. Limit of Work:
 - 1. Perform clearing within the Proposed Limit of Trees as shown on the Construction Contract Drawings.
 - 2. Prior to beginning remediation construction, perform grubbing within the limit of grading (as shown through contouring within the Contract Drawings) and additional areas as required to install the construction temporary facilities and controls.
 - 3. Contractor shall not remove and shall protect from damage trees designated by the Engineer to be saved.
- C. Clearing performed outside the defined limit of clearing shall not be permitted without permission of the Engineer.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02300 – Earthwork
- B. Section 02370 – Erosion and Sedimentation Control

1.03 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies:
 - 1. Burning of combustible debris is not permitted onsite.
- B. Remove and dispose of non-salvageable structures and material in accordance with all applicable local and state laws, ordinances, and code requirements.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Wrapping materials:
 - 1. Burlap, in accordance with AASHTO M182.
 - 2. Polyethylene film, in accordance with ASTM D 2103.
- B. Herbicides: Used only for treating poison ivy.

PART 3 – EXECUTION

3.01 PROTECTION

- A. Streets, Roads, Adjacent Property, Existing Facilities, and Other Works to Remain:
 - 1. Protect throughout the work and exercise care to avoid unnecessary damage.
 - 2. Clearing and grubbing operations shall be conducted such that existing facilities or structures indicated to remain are not damaged. Existing features or structures that are indicated or made known prior to the start of clearing and grubbing operations shall be repaired in the event of any damage during such operations.
 - 3. Keep streets and roads accessible to emergency vehicles, patrols, and construction vehicles at all times.
- B. Utility Lines:
 - 1. Protect existing utility lines that are indicated to remain from damage.
 - 2. When utility lines to be removed or relocated are encountered within the area of clearing and grubbing operations, the Contractor shall notify the associated utility company with sufficient lead time to minimize interruption of the service.
 - 3. The Contractor shall notify the Engineer immediately of damage to or an encounter with an unknown existing utility line.
 - 4. The Contractor shall be responsible for the repairs of damage to existing utility lines that are indicated or made known to the Contractor prior to start of clearing and grubbing operations.

3.02 PERFORMANCE

- A. Layout and Marking:
 - 1. Flag the clearing limit as delineated on the Contract Drawing.
- B. Clearing:
 - 1. Remove trees, shrubs, and brush above the ground surface within the Limit of Disturbance.
 - 2. Cleared material may be stockpiled within the Construction Staging/Laydown/Decontamination areas in accordance with Section 02300 Earthwork and the General Notes on Sheet G-002 of the Contract Drawings as shown on the Contract Drawings.
 - 3. Off-site hauling and disposal of cleared material is the responsibility of the Contractor.
- C. Grubbing:
 - 1. Remove all stumps, roots over 2 inches in diameter, matted roots, and vegetative matter including grasses and weeds within the limit of grading. Removed stumps shall be mechanically shaken with heavy equipment to removal loose soil and rocks adhering to the root mass, as practicable to minimize quantity transported off-site.
 - 2. Grubbings shall be reduced in size via slicing or cutting and stockpiled and covered if necessary to prevent wind-blown dust until off-site disposal

is arranged or placed directly in roll-off container (or equivalent) to be provided by Client.

3. Off-site hauling and disposal of grubbed material, including stumps, is the responsibility of the Client. The Contractor shall load all grubbed material for off-site disposal.

D. Disposal:

1. Cleared vegetation shall be considered non-impacted waste and shall be removed from the Site and legally disposed.
2. Grubbed materials are considered impacted wastes unsuitable for on-site disposal and shall be disposed off-site as solid waste to be coordinated and completed by the Client.
3. Burning of Materials: Burning is not permitted.
4. Removal: Should the Contractor be allowed to continue work beyond normal working hours, do not allow material to accumulate for more than 48 hours.

3.03 RESTORATION

- A. Restore any items damaged by this work to their original condition.

END OF SECTION

SECTION 02235
TEMPORARY DAM

PART 1 – GENERAL

1.01 SECTION INCLUDES:

- A. Submittals
- B. References
- C. Closeout Submittals
- D. Quality Assurance

1.02 SUBMITTALS:

- A. Specification Section 01330 Submittal Procedures; Requirements for submittals.
- B. The term “temporary dam” is used for simplification and refers to the cofferdam to be installed across the mouth of Mashapaug Pond Inner Cover to enable dewatering for subsequent dewatered excavation. Temporary dam design may be metal sheet pile or may include materials such as wood, metal, or PVC or other containment options. Approved products other than metal sheet piling may include temporary dam products such as Aqua Dam®, Portadam® or equivalent. Contractor shall propose a temporary dam system for approval by the Engineer.
- C. Objectives of the temporary dam are to isolate the Inner Cove from the Outer Cove of Mashapaug Pond, to allow efficient dewatering of the Inner Cove, enable excavation of Inner Cove sediments efficiently, placement of Inner Cove and Wetlands caps, and surveying and verification activities to be conducted by the Contractor and Engineer. The temporary dam is an integral part of the overall project and shall be properly designed to enable the efficient completion of the project objectives for the Inner Cove which include: excavation of one to two ft of in-situ sediments, dewatering of sediments, addition of necessary amendments, and acceptable consolidation within limited areas available on-site; placement of the nominal one foot thick Inner Cove cap; bulking of sediment and consolidation volume considerations; managing upland logistics related to available space on site to handle sediment volumes while managing capacity of the infiltration gallery and water treatment system; and meeting overall project schedule objectives which include substantial completion and final completion in accordance with the dates provided in Specification Section 00200 – Instructions to Bidders.
- D. Submit a complete Temporary Dam Design and Installation Plan, signed and sealed by a professional engineer licensed in the State of Rhode Island, not less than 14 days prior to commencing Work. Said licensed professional shall be experienced in shoring design and temporary dam design. Plan shall including:
 - 1. Design Calculations, including geotechnical subsurface data or assumptions on which the design calculations are based.
 - 2. Design Drawings.
 - 3. Manufacturer’s Shop Drawings and Literature for selected products.
 - 4. The following details (plus additional details depending on the Contractor-selected temporary dam method) shall also be provided in the Plan, in sufficient detail to allow the Engineer to fully evaluate the plan:

- a) Indicate location, details and extent of temporary dam on engineering drawings depicting plan views, profiles, and cross section as necessary.
 - b) Include fabrication drawings including complete dimensions and details.
 - c) Include sequence of driving or installation if required and detailed drawings of templates or other temporary guide structures
 - d) Submit proposed procedures for removing the temporary dam.
 - e) Submit detailed procedures and features for protection of existing structures or other installations.
 - f) Include details of storage and handling procedures of temporary dam materials.
 - g) Include details for monitoring the performance of the temporary dam and corrective actions that would be necessary. Include measures to be taken in the event of temporary dam system failure, potential overtopping of the temporary dam system, including controlled overflow, partial dismantling, and protection of work.
 - h) Include details for removal of the temporary system, decontamination of its components and demobilization off-site.
 - i) Equipment List. Submit list and size of proposed equipment including cranes, driving equipment, extractors, protection caps, and other installation and removal accessories, as relevant to the type of temporary dam installed.
 - j) Submit material certification, details of metal sheet piling, mill test reports, piling driving equipment certification and interlocking joint strength test procedure or other relevant equipment and materials details based upon the Contractor's proposed temporary dam system.
 - k) Operator Certifications.
- E. Limited geotechnical subsurface information at the site of the proposed installation is available. If necessary for the temporary dam design, the Contractor shall identify as soon as is practicable upon award of Contract that Contractor may have to collect additional subsurface geotechnical data. Provide plan to collect relevant geotechnical data.

1.03 REFERENCES:

- A. ASTM International
 - 1. ASTM A 328/A 328M - Standard Specification for Steel Sheet Piling
 - 2. ASTM D25 – Standard Specification for Round Timber Piles
- B. Occupational Safety and Health Administration (OSHA)
 - 1. 29 CFR 1926.652 – Requirements for Protective Systems
- C. American Welding Society:
 - 1. AWS D1.1 - Structural Welding Code - Steel.
 - 2. AWS D1.5 - Bridge Welding Code.

1.04 CLOSEOUT SUBMITTALS:

- A. Project Record Documents:
 - 1. Record actual locations of temporary dam and top and bottom elevations, if used.
 - 2. Provide driving records, if conducted.

1.05 QUALITY ASSURANCE:

- A. Perform welding in accordance with AWS D1.1 and AWS D1.5.
- B. Furnish each type of sheet piling from a single source.

PART 2 - PRODUCTS

2.01 TEMPORARY DAM MATERIALS:

- A. Temporary dam shall be designed in conformance with all federal, state and local regulations.
- B. General Requirements: Sheet piling, or other contractor selected method, shall be installed to segregate the Inner Cove from the Outer Cove for dewatering purposes as shown in the Drawings. Temporary dam shall be designed and shall function properly to enable dewatering and the efficient excavation of Inner Cove sediments. Temporary dam shall be designed to limit underflow to the maximum extent practicable to minimize the amount of water requiring dewatering and treatment from the Inner Cove. Temporary Dam shall be adjusted, replaced, repaired or otherwise modified as necessary to meet these requirements.

2.02 FABRICATION:

- A. Fabricate sheet piling to full length required for the dewatering of the Inner Cove as indicated on Drawings.

PART 3 - EXECUTION

3.01 PREPARATION:

- A. Verify equipment on site conforms to the approved Submittal.
- B. Verify that all underground utilities are located not less than five working days before beginning the Work.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.
 - 2. Notify utility companies to remove or relocate utilities affected by the Work.
 - 3. Protect utilities indicated to remain from damage.
- C. Identify required lines, levels, contours, and datum.
- D. Protect plant life, lawns, and other features remaining as portion of final landscaping.
- E. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- F. Any excavation required within the area where temporary dam is to be installed shall be completed prior to placing temporary dam. Perform in accordance with specification Section 02300 Earthwork

3.02 INSTALLATION:

- A. Installation of the temporary dam shall be done in accordance with manufacturer's requirements, current best management practices, and engineering direction per the submitted design.

3.03 REMOVAL:

- A. The removal of the temporary dam components shall consist of pulling, dismantling, removing, sorting, decontaminating, inventorying and storing previously installed dam components in accordance with the approved plan.

The subsurface soil at the project site may be impacted. After removing dam components, each component shall be cleaned using steam and/or pressure washers prior to removal from the "Secure Zone" as defined in Section 01354 - Decontamination. Follow approved HAZWOPR procedures in Specification Section 01351 - Safety, Health, and Emergency Response Requirements and/or Specification Section 01510 - Temporary Facilities and Controls and/or Specification Section 01354 - Decontamination for decontamination, cleaning, and recovery and disposal of rinsate.

END OF SECTION

SECTION 02236

DEWATERING

PART 1 – GENERAL

1.1 SECTION INCLUDES:

- A. Submittals
- B. Summary
- C. References
- D. System Description
- E. Performance Requirements
- F. Closeout Submittals
- G. Quality Assurance
- H. Qualifications
- I. Sequencing
- J. Coordination

1.2 SUBMITTALS:

- A. SPECIFICATION SECTION 01330 SUBMITTAL PROCEDURES: Requirements for submittals.
- B. Submit the following information not less than 10 working days (2 calendar weeks) prior to commencing Work.
 - 1. Design Data: Signed and sealed by Professional Engineer licensed in RI.
 - a. Indicate design basis including values, analyses, and calculations to support design.
 - b. Include description and profile of geology, soil, and pond water conditions.
 - 2. Geotechnical subsurface information at the site of the proposed installation is not available.
 - 3. The Contractor should expect to have to conduct drilling to determine subsurface geotechnical data.
 - 4. Shop Drawings: Signed and sealed by Professional Engineer licensed in RI.
 - a. Indicate dewatering system layout, dewatering pump locations, pipe sizes and capacities, grades, filter sand gradations, surface water control devices, valves, daily work hours (may be different from other site activities and may be 24 hours per day 7 days per week), and water disposal method and location.
 - b. Indicate primary and standby power system location and capacity.
 - c. Indicate types of pumps (e.g., diesel, electric, submersible, dry prime etc.) to be used, general purpose for each, and backup power or pump systems.
 - d. Indicate layout and depth of flow measuring devices for system performance measurement.

- e. Include detailed description of dewatering system installation procedures and maintenance of equipment.
- f. Include description of emergency procedures to follow when problems arise.
5. Product Data: Submit data for Dewatering Pumps: Indicate sizes, capacities, priming method, engine motor characteristics.
6. Field Reports: Test and monitoring reports as specified in Field Quality Control article (3.12).

1.3 SUMMARY:

- A. Dewatering of the Inner Cove is required to implement the Remedial Action Plan approved approach for excavation of Inner Cove Sediments and installation of the Inner Cove Cap for the locations indicated on the Drawings. A cofferdam or temporary dam system (Specification Section 02235 – Temporary Dam) shall be used to reduce the volume of pond water entering the Inner Cove from Mashapaug Pond and allow complete dewatering of the Inner Cove. Divert surface water within work areas into sumps and pump the storm and pond water back into the pond, within the limits of the t and proposed turbidity curtains.

1.4 REFERENCES:

- A. Not used.

1.5 SYSTEM DESCRIPTION:

- A. Provide dewatering and surface water control systems to permit Work to be completed on dewatered and stable subgrade.
- B. Furnish standby equipment stored at Project Site and ready for immediate use upon failure of dewatering equipment.

1.6 PERFORMANCE REQUIREMENTS:

- A. Design dewatering systems to:
 1. Collect and remove pond water and seepage entering dredging area within the Inner Cover, including seepage around and beneath temporary dam.
 2. Minimize amount of sediments entrained in seepage water as a result of the dewatering process by constructing sumps using stone and geotextile as applicable (see RISESCH Section Six, "Pump Intake Protection").
 3. Sufficiently dewater Inner Cove sediments to allow for the efficient dry excavation and transport of sediments. The Inner Cove shall be sufficiently dewatered to reduce time required to gravity dewater sediments and minimize bulking of excavated sediments to meet the overall objectives of project schedule and minimizing the volume of amended sediments for transport and final placement. Flow rates of dewatering must be balanced with the design and operation of the infiltration gallery to prevent excessive ponding, overflow, or other operational concerns at the site.

1.7 CLOSEOUT SUBMITTALS:

- A. Specification Section 01770 – Project Closeout Requirements: Requirements for submittals.

1.8 QUALITY ASSURANCE:

- A. Comply with authorities having jurisdiction for the following:
 - 1. Water discharge and disposal from pumping operations, specifically comply with the requirements of the Temporary Surface Water Discharge Permit issued by RIDEM Water Resources.

1.9 QUALIFICATIONS:

- A. Design, install, and monitor operation of dewatering system under direct supervision of Contractor's Professional Engineer experienced in design of this Work and licensed in the State of Rhode Island.

1.10 SEQUENCING:

- A. Specification Section 0110 – Summary of Work: Requirements for sequencing.
- B. Sequence work to obtain required permits before start of dewatering operations.
- C. Sequence work to install and test systems a minimum seven (7) days before operating dewatering systems.

1.11 COORDINATION:

- A. Coordinate work to permit the following construction operations to be completed on dry stable substrate.
 - 1. Shoring as specified in Section 02235 Temporary Dam.
 - 2. All capping system preparation and installation specified in specification Section 02300 Earthwork.

PART 2 – PRODUCTS

2.1 SECTION INCLUDES:

- A. Monitoring Equipment
- B. Accessories

2.2 MONITORING EQUIPMENT:

- A. Turbidity monitoring equipment
- B. Flow monitoring equipment

2.3 ACCESSORIES:

- A. NOT USED

PART 3 – EXECUTION

3.1 SECTION INCLUDES:

- A. Examination
- B. Preparation
- C. Dewatering System
- D. Surface Water Control System
- E. Dewatering System Operation and Maintenance
- F. Backup Dewatering Requirements
- G. System Removal

- H. Field Quality Control
- 3.2 EXAMINATION:
- A. Verify existing conditions before starting work.
 - B. Identify required lines, levels, contours, and datum.
 - C. Verify that all underground utilities are located not less than five working days before beginning the Work.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.
 - 2. Notify utility companies to remove or relocate utilities affected by the Work.
 - 3. Protect utilities indicated to remain from damage.
- 3.3 PREPARATION:
- A. Protect plant and wildlife according to the Aquatic Wildlife Management Plan (Appendix C).
 - B. Protect benchmarks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
 - C. Protect existing adjacent buildings, structures, and improvements from damage caused by dewatering operations.
- 3.4 DEWATERING SYSTEM:
- A. Install dewatering system in accordance with approved submittals/shop drawings.
 - B. Locate system components to allow continuous dewatering operations without interfering with installation of permanent Work and adjacent buildings, structures, and improvements.
- 3.5 SURFACE WATER CONTROL SYSTEM:
- A. Provide ditches, berms, and other devices to divert and drain surface water away from work area.
 - B. Divert surface water within work areas into sumps and pump the storm and pond water back into the pond, within the limits of the existing and proposed turbidity curtains.
 - C. Control and remove unanticipated water seepage into the work area.
 - D. Divert existing stormwater detention pond discharge water to temporarily discharge to the Outer Pond as shown on the Contract Drawings.
- 3.6 DEWATERING SYSTEM OPERATION AND MAINTENANCE:
- A. Operate dewatering system as needed on a daily basis until cap installation is complete and approved by the Engineer.
 - B. Conduct daily observation of dewatering system. Make required repairs and perform scheduled maintenance.
- 3.7 WATER DISPOSAL:
- A. Inner Cove Discharge to within 1-foot of Cove Bottom Elevation: In general, and in accordance with the Surface Water Discharge Permit criteria, pond and

stormwater pumped from the Inner Cove from locations greater than 1-foot above the pond bottom, shall be disposed of back into Mashapaug pond between the temporary dam and the turbidity curtain, provided that precautions are taken to minimize entrainment of fines. Pump intakes shall be set a minimum of one foot above the sediment surface at all times to minimize potential for sediment disturbance and entrainment of fines in the pumped water. The Contractor shall take all necessary precautions to minimize turbidity in accordance with the RAP and permit requirements.

- B. The Contractor shall provide an anti-scour pad within the discharge area to protect the pond and limit erosion within the turbidity curtain.
- C. Inner Cove Discharge from 1-foot of Cove Bottom Elevation: All pond and stormwater removed from the Inner Cove within 1-foot of the pond bottom elevation shall be disposed of within temporary infiltration galleries or frac tanks located within the temporary staging area of Phase III.
- D. Inner Cove Construction Dewatering and Sediment Dewatering: All dewatering water generated from active construction dewatering and sediment dewatering shall be treated to meet the requirements of the temporary permit for emergency discharge to be issued by RIDEM before discharge to Mashapaug Pond (location between temporary dam and turbidity curtain).

3.8 BACKUP DEWATERING REQUIREMENTS:

- A. Backup systems shall be provided to ensure a dry work area at all times during the dredging and installation of the Phase II cap installation.

3.9 SYSTEM REMOVAL:

- A. Remove dewatering and surface water control systems after dewatering operations are discontinued and the Phase II cap installation is complete. Removal of systems shall be performed in a controlled manner to protect the completed work and minimize disturbance to recently placed cap materials.
- B. Turbidity measurements shall be performed such that permit limits are not exceeded during pond restoration.

3.10 FIELD QUALITY CONTROL:

- A. Specification Section 01770 – Project Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Submit initial installation reports including the following:
 - 1. Installation and development reports for pumps.
 - 2. Initial dewatering flow rates.
- C. Submit weekly monitoring reports including the following:
 - 1. Dewatering flow rates.
 - 2. Maintenance records for dewatering and surface water control systems.

END OF SECTION

SECTION 02300

EARTHWORK

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall furnish all labor, equipment, and materials necessary for excavation, filling/backfilling, compaction, testing, and grading. The Work shall be as shown on the Drawings, and as specified herein. Work includes, but is not limited to the following:
 - 1. Grading and compacting existing fill to establish subgrade;
 - 2. Placing, grading, and compacting cap soil layers including the following materials:
 - a. Common Borrow
 - b. Crushed Stone
 - c. 10% Organic Soil Mix
 - d. 20% Organic Soil Mix
 - e. Loam
 - 3. Borrow Source testing, field testing, and contractor quality control testing; and
 - 4. General Excavation
- B. In preparation for earthwork, clearing shall occur in accordance with Section 02231 – Clearing and Grubbing.
- C. Control of surface water run-off during construction shall be in accordance with Section 02370 - Erosion and Sedimentation Control and Section 02236 Dewatering.
- D. Excavation of sediments shall be in accordance with Section 02111 – Sediment Removal.
- E. Removal of larger waste debris including concrete and metal shall occur in accordance with Sections 02110 – Waste Excavation, Removal, and Handling and Section 02120 – Off-Site Transportation and Disposal.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 00330: Existing Conditions
- B. Section 01110: Summary of Work
- C. Section 01330: Submittals Procedures
- D. Section 02110: Waste Excavation, Removal, and Handling
- E. Section 02120: Off-Site Transportation and Disposal
- F. Section 02231: Clearing and Grubbing
- G. Section 02370: Erosion and Sedimentation Control
- H. Section 02073: Nonwoven Geotextile
- I. Section 02921: Seeding and Soil Supplements

1.03 REFERENCES

- A. The publications listed below form a part of this Specification to the extent referenced. The current version/edition of the publication is referenced, unless

otherwise noted. The publications are referred to in the text by basic designation only.

- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM C 33 - Standard Specification for Concrete Aggregates;
 - 2. ASTM C 88 - Standard Test for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate;
 - 3. ASTM C 127 - Test Method for Specific Gravity and Absorption of Coarse Aggregate;
 - 4. ASTM C 136 - Sieve Analysis of Fine and Coarse Aggregates;
 - 5. ASTM D 422 - Standard Test Method for Particle-Size Analysis of Soils;
 - 6. ASTM C 535 - Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine;
 - 7. ASTM D 698 - Standard Test Methods for Laboratory Compaction of Soil Using Standard Effort (12,400 ft-lbf/ft³);
 - 8. ASTM D 854 - Test Method for Specific Gravity of Soils;
 - 9. ASTM D 1140 - Amount of Material in Soils Finer than the No. 200 (75-micrometer) Sieve;
 - 10. ASTM D 2216 - Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soils and Rock by Mass;
 - 11. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System);
 - 12. ASTM D 2974 - Standard Test Method for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils;
 - 13. ASTM D 3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction;
 - 14. ASTM D 4318 - Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils;
 - 15. ASTM D 6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
- C. Standards Specifications for Road and Bridge Construction, 2004, by the Rhode Island State Department of Transportation (RIDOT).
- D. "Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases", (Remediation Regulations) by the Rhode Island Department of Environmental Management (RIDEM), Office of Waste Management, as amended November 2011.
- E. Quarried Stone for Erosion and Sediment Control, by the National Stone Association, dated 1978.

1.04 DEFINITIONS

- A. Satisfactory Soils:
 - 1. Satisfactory Soils shall meet the requirements specified in Part 2 of this Section and shall be used in areas as shown on the Drawings and as approved by the Engineer. In addition, Satisfactory Soils shall satisfy the following conditions:
 - a. Satisfactory Soils shall be free of all Unsatisfactory Soils/Materials listed below; and

- b. Satisfactory Soils shall be free of material greater than 6 inches in any dimension, unless otherwise specified or approved by the Engineer. Furthermore, the maximum particle size shall not exceed one half of the specified maximum lift thickness, unless otherwise specified.

B. Unsatisfactory Soils/Materials:

1. Unsatisfactory Soils/Materials include but are not limited to highly plastic/fat silt and clay, organic soils, and/or peat (classified as MH, CH, OL, OH, or PT per ASTM D 2487), stumps/brush, trash, refuse, debris, frozen soils, soils containing materials greater than the allowable size (see above), saturated soils, fine-grained soils above their liquid limit at the time of compaction, and soils that are either too wet or too dry to compact.

C. Cohesionless and Cohesive Soils:

1. Cohesionless soils include gravels, sand-gravel mixtures, sands, and gravelly-sands, classified as GW, GP, SW, or SP by the Unified Soil Classification System (ASTM D 2487).
2. Cohesive soils include clayey gravels, sand-clay mixtures, clayey sands, clays, and silts, classified as GC, SC, CL, CH, ML, or MH by the Unified Soil Classification System (ASTM D 2487).
3. Soils classified as GM and SM will be identified as cohesionless only when the "fines" are determined to be non-plastic.
4. Testing required for the classification of soil shall be in accordance with ASTM D 4318, ASTM C 136, ASTM D 422, and ASTM D 1140.

D. Percent Compaction:

1. Degree of compaction (percent compaction) required is expressed as a percentage of the maximum dry density, at the optimum moisture content.
2. Obtain maximum dry density and optimum moisture content by the test procedure presented in ASTM D 698, unless otherwise specified.

1.05 QUALITY ASSURANCE

A. Codes and Standards:

1. Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

1.06 SUBMITTALS

Submit to the Engineer for approval (unless otherwise specified) the following in accordance with Section 01340, "Submittals":

A. Borrow Source(s):

1. The Contractor shall provide the proposed source(s) of borrow materials prior to initiation of work. Any available/previous geotechnical laboratory testing data shall be provided.
2. Provide certification that borrow soil is free of environmental contamination per the RIDEM Remediation Regulations definition of clean soil, Section 3.12.

C. Contractor's Quality Control Testing Laboratory (QCTL):

1. The name and qualifications of an independent third-party geotechnical testing laboratory to be used for borrow source testing and field quality control testing shall be submitted within 7 days following notice to proceed.
 - a. The Contractor's QCTL shall meet the requirements of ASTM D 3740, at a minimum.

D. Test Reports:

1. The Contractor's QCTL shall submit 2 copies of the following test reports directly to the Engineer, with at least 1 copy to the Contractor:
 - a. All test reports for borrow source materials; and
 - b. Field quality control test reports.

1.07 SITE CONDITIONS

- A. Known existing site conditions are described in Section 00330 – Existing Conditions and Subsurface Information.
- B. Protection of Persons and Property:
 1. Open excavations shall be barricaded and marked or backfilled when unattended, or continuously monitored by Contractor personnel as part of this Work in accordance with applicable or relevant standards (OSHA and other laws relevant to the protection of the general public).
 2. Protect structures, utilities, pavements, sidewalks, fences, and other facilities designated to remain from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations and heavy truck/equipment traffic.

PART 2 - PRODUCTS

2.01 REGRADED FILL

- A. Location/Use: Use Regraded Fill, as necessary, to achieve the subgrade elevations required for the installation of the capping systems as indicated on the Drawings.
- B. Regraded Fill shall consist of Satisfactory Soils suitable for embankment construction. It shall be free from frozen materials, perishable rubbish, peat, and other Unsatisfactory Soils/Materials. It shall be of such a nature and character that it can be compacted to the specified density (see Part 3 of this Section).
- C. Regraded Fill shall have a maximum nominal particle size of 6 inches or less. Furthermore, the maximum particle size shall not exceed one half of the specified maximum lift thickness, unless otherwise specified.
- D. The moisture content shall be sufficient to provide the required compaction and a stable embankment and/or subgrade. In no case shall the moisture content exceed 3% above or below optimum as determined by ASTM D 698.
- E. Satisfactory Soils obtained from on-site excavations of existing fill and/or subgrade preparations may be re-used on-site as Regraded Fill, as approved by the Engineer.

2.02 CRUSHED STONE

- A. Location/Use: Construction Entrance.
- B. Crushed Stone shall consist of 100 percent crushed durable rock. It shall be free

of soft, friable particles, degradable material, or any Unsatisfactory Soils/Material.

- C. Gradation shall meet the requirements of RIDOT Type II Crushed Stone as specified in RIDOT Specification Table 1, Subsection M.01.09 and shown in Table 02300-1.
- D. See the Drawings for additional criteria for crushed stone to be used for temporary access road construction.

Table 02300-1: Crushed Stone Gradation Requirements

Sieve Size	Percent Passing
2-1/4"	100%
2"	90 – 100%
1-1/2"	30 - 55%
1-1/4"	0 - 25%
1"	0 - 5 %

2.03 LOAM

- A. As defined in Section M.18.02 of the RIDOT Specifications.
- B. Loose, friable topsoil, free of refuse, brush, stumps, roots, rocks, cobbles, stones, noxious weeds, litter and any other materials that are longer than 1 inch in any dimension and which will prevent the formation of a suitable seed bed.
- C. Organic matter shall not constitute less than 4 percent or more than 20 percent as determined by loss-on-ignition testing of oven dried samples.
- D. A pH between 5.5 and 7.5.
- E. Loam shall meet the Rhode Island Residential Direct Exposure Criteria for Volatile Organic Compounds (VOCs), Semi-Volatile Compounds (SVOCs), Total Metals (RCRA 18), Total Petroleum Hydrocarbons (TPH) as compared to Table 1 of the RIDEM "Remediation Regulations".

2.04 COMMON BORROW

- A. Location/Use: Upland Soil Cap, General Filling
- B. Common Borrow shall consist of Satisfactory Soils suitable for embankment construction. It shall be free from frozen materials, perishable rubbish, peat, and other Unsatisfactory Soils/Materials. It shall be of such a nature and character that it can be compacted to the specified density (see Part 3 of this Section).
- C. Common Borrow shall have a maximum nominal particle size of 3 inches or less. Furthermore, the maximum particle size shall not exceed one half of the specified maximum lift thickness, unless otherwise specified.

2.05 10% ORGANIC SOIL MIX

- A. Location/Use: Inner Cove Cap

- B. 10% Organic Soil Mix shall consist of Satisfactory Soils with an organic content equal to 10% mass weight. It shall be free from frozen materials, perishable rubbish, and other Unsatisfactory Soils/Materials. It shall be of such a nature and character that it can be compacted to the specified density (see Part 3 of this Section).
- C. 10% Organic Soil Mix shall have a maximum nominal particle size of 3 inches or less, shall have less than 80% passing the No. 10 sieve, less than 40% passing the No. 4 sieve, and less than 10% passing the No. 200 sieve. Furthermore, the maximum particle size shall not exceed one half of the specified maximum lift thickness, unless otherwise specified.

2.06 20% ORGANIC SOIL MIX

- A. Location/Use: Fringe and Perimeter Wetland Caps
- B. 20% Organic Soil Mix shall consist of Satisfactory Soils with an organic content equal to 20% mass weight. It shall be free from frozen materials, perishable rubbish, and other Unsatisfactory Soils/Materials. It shall be of such a nature and character that it can be compacted to the specified density (see Part 3 of this Section).
- C. 20% Organic Soil Mix shall have a maximum nominal particle size of 3 inches or less, shall have less than 80% passing the No. 10 sieve, less than 40% passing the No. 4 sieve, and less than 10% passing the No. 200 sieve. Furthermore, the maximum particle size shall not exceed one half of the specified maximum lift thickness, unless otherwise specified.

2.07 BORROW SOURCE TESTING

- A. Borrow source testing, including geotechnical characterization requirements, shall be conducted on all soil materials proposed for construction. Acceptance criteria for chemical analyses are listed in Table 1, Direct Exposure Criteria, of the RIDEM Remediation Regulations. Minimum third-party geotechnical laboratory testing requirements and frequency for materials are listed as follows:

1.	Crushed Stone:		
	<u>Test</u>	<u>Methodology</u> ¹	<u>Frequency</u> ²
	Sieve Analysis	ASTM C 136	1 test/source/material
2.	Loam, 10% Organic Soil Mix, 20% Organic Soil Mix		
	<u>Test</u>	<u>Methodology</u> ¹	<u>Frequency</u> ²
	Particle-Size Analysis	ASTM D 422	1 test/500 cy
	Organic Content	ASTM D 2974	1 test/500 cy
	pH	ASTM D 4972	1 test/500 cy
	VOCs	EPA 8250B	1 test/500 cy
	SVOCs	EPA 8270C	1 test/500 cy
	TPH	EPA 8100M	1 test/500 cy
	RCRA Metals (total only)	EPA 6010B	1 test/500 cy
3.	Common Borrow		

<u>Test</u>	<u>Methodology¹</u>	<u>Frequency²</u>
Particle-Size Analysis	ASTM D 422	1 test/500 cy
Standard Proctor	ASTM D 698	1 test/source/material
VOCs	EPA 8250B	1 test/500 cy
SVOCs	EPA 8270C	1 test/500 cy
TPH	EPA 8100M	1 test/500 cy
RCRA Metals (total only)	EPA 6010B	1 test/500 cy

Borrow Source Testing Notes:

1. Other testing methods may be considered acceptable, based on prior approval of the Engineer.
2. Testing frequency shall be as listed, at any change in borrow source, or at any discernable change in material delivered to the site (as determined by the Engineer).

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine the areas and conditions under which excavating, filling, and grading are to be performed and notify the Engineer, in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in an acceptable manner.

3.02 EXCAVATION DEWATERING

- A. General:
 1. Dewatering to be provided per Specification 02236 – Dewatering

3.03 STABILITY OF EXCAVATIONS

- A. General:
 1. Slope sides of excavations to comply with applicable codes and ordinances.
 2. Shore and brace excavations where sloping is not possible because of space restrictions or stability of material excavated.
 3. Maintain excavations in a safe condition until completion of backfilling, or longer if specified or directed by the Engineer.
- B. Shoring, Sheet piling, and Bracing:
 1. Shoring is not anticipated for general excavation
 2. See Specification 02235 – Sheet Piling for Inner Cove shoring requirements.

3.04 COLD WEATHER PROTECTION

- A. Protect exposed subgrade surfaces against freezing when atmospheric temperature is less than 35°F.
- B. Fill materials shall not be placed atop frozen subgrade surfaces.

3.05 EXCAVATION

- A. General:
 1. Excavation consists of removal of material encountered when establishing required subgrade.

2. During construction, excavation and fill shall be performed in a manner and sequence that will provide proper drainage at all times.
- B. Subgrade Excavation:
1. Concrete or metal debris exceeding two ft in diameter encountered during excavation shall be removed from the Site as described in Section 02221 – Select Site Demolition.
 2. Establish slopes within a maximum 33.33 percent (3 horizontal to 1 vertical (3H:1V)) and a minimum 5.00 percent (20H:1V).
 3. Conform to grades within a tolerance of one inch deviation over 50 feet of slope.

3.06 SUBGRADE PREPARATION

- A. General:
1. Remove vegetation, debris, Unsatisfactory Soils/Materials, obstructions, and deleterious materials from subgrade surfaces prior to placement of fills.
 2. Bench, plow, strip, scarify, or break-up sloped surfaces steeper than 4H:1V so that fill material will bond with existing surface.
- B. Regraded Fill Placement
1. Obtain regraded Fill soil from cut areas within the limit of disturbance.
 2. Place regraded Fill in areas where fill is required to achieve subgrade elevations.
 3. Place regraded Fill in compacted lifts no greater than 12 inches in depth.
 4. Compaction of Regraded Fill shall be as specified in Sub-Part 3.11
 5. Prior to placing Regraded Fill, the surface shall be relatively smooth/even, free of loose soil, ponded water, and debris. Any loose, soft, wet, frozen, or otherwise unsuitable/unsatisfactory soils or materials observed should either be re-compacted or undercut to a suitable subgrade, as approved by the Engineer.
 6. Any undercut/excavated material should be replaced/backfilled with Regraded Fill or Cover Soil, as approved by the Engineer.
 - a. Fill materials shall be placed and compacted as specified herein.
 7. Prior to placing Regraded Fill, the exposed subgrade shall be benched, plowed, or scarified such that fill material will bond with existing subgrade surface.
 - a. Limit extent of disturbance, as indicated on the Construction Drawings and/or approved by the Engineer.

3.07 HANDLING AND TEMPORARY ON-SITE STORAGE OF EXCAVATED MATERIALS

- A. General:
1. During daily excavation activities, locate and retain excavated soils/materials away from the edge of excavations.
 - a. Temporary/daily stockpiles shall be maintained a sufficient distance from the top of the bank to prevent loading of the slope and to provide for stability of the slope and located per Engineer's approval.

- B. Satisfactory Soils:
1. Satisfactory Soils obtained from on-site excavations and/or subgrade preparations shall be re-used as Regraded Fill, and used insofar as practical for backfill within the cap limits to establish subgrade, as specified herein.
 2. Excess amounts of Satisfactory Soils shall be stockpiled and staged within the proposed limits of the capping system, and as approved by Client and the Engineer.
 - a. Stockpiles shall be constructed in accordance with Section 02110 - Waste Excavation, Removal, and Handling.
 - b. Soils suspected to be hazardous waste based on visual examination shall be segregated from those suspected to be non-hazardous.
 - 1) Final determination of hazardous versus non-hazardous shall be based on sampling, analysis, and characterization to be performed by Others.

- C. Unsatisfactory Soils/Materials:
1. Unsatisfactory Soils/Materials obtained from on-site excavations and/or subgrade preparations that can be improved or modified (i.e., thawed, screened, and/or moisture-conditioned) to meet the definition of Satisfactory Soils, may be re-used as Subgrade Fill, as approved by the Engineer.
 2. Unsatisfactory Soils/Materials that cannot be improved or modified to meet the definition of Satisfactory Soils shall be transported to the Contractor Staging Area as shown on the Drawings, as approved by Client and the Engineer.
 - a. Stockpiles shall be constructed in accordance with Section 02110 - Waste Excavation, Removal, and Handling.
 - b. Soils suspected to be hazardous waste based on visual examination shall be segregated from those suspected to be non-hazardous.
 - 1) Final determination of hazardous versus non-hazardous shall be based on sampling, analysis, and characterization.

3.08 SAMPLING, ANALYSIS, AND CHARACTERIZATION

- A. Shall be coordinated per Section 02120 – Off-Site Transportation and Disposal

3.09 TRANSPORTATION AND DISPOSAL

- A. Satisfactory Soils:

1. Not Applicable.

- B. Unsatisfactory Soils/Materials:

1. Transportation and/or disposal shall be in accordance with Section 02120 – Off-Site Transportation and Disposal.

3.10 PLACEMENT OF FILL/BACKFILL MATERIALS

- A. General:
1. Place specified fill/backfill materials in lifts as specified herein as required to achieve specified subgrade elevations.
 2. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
 3. Backfill excavations as promptly as work permits, but not until completion of the following:
 - a. Acceptance by Engineer of subgrade.
 - b. Inspection, testing, approval, and recording locations of underground utilities.
 - c. Removal of trash and debris.

- B. Fill/Backfill Placement:
1. Place fill/backfill materials in layers not more than 12 inches (prior to compaction) for material to be compacted by heavy compaction equipment (i.e., vibratory roller), unless otherwise specified.
 2. Place fill/backfill materials in layers not more than 8 inches (prior to compaction) for material to be compacted by hand-operated tampers or hydraulic equipment, unless otherwise specified.
 3. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content (within +/- 3% of the optimum moisture content as determined by the standard Proctor test, ASTM D 698). Compact each layer to required percentage of maximum dry density (Sub-Part 3.11).
 4. Place fill/backfill materials evenly around/adjacent to structures, to the required elevations.
 - a. Take care to prevent wedging action of backfill against structures by carrying the material uniformly around structure to approximately same elevation in each lift.

3.11 COMPACTION

- A. General:
1. Provide soil compaction during construction as necessary to achieve minimum percent/degree of compaction, as specified herein.
 2. Maximum dry density and optimum moisture content shall be determined in accordance with ASTM D 698 (or Engineer-approved equivalent).
- B. Percent Compaction Requirements:
1. Cap Areas:
 - a. Fill/backfill materials shall be compacted to at least 90% of maximum Standard Proctor dry density, unless otherwise specified or approved by the Engineer.
 2. Sediment Consolidation Areas:

- a. Excavated sediments shall be compacted to at least 93% of the maximum dry density as determined by the Standard Proctor test when placed within 20 ft laterally of the face of a slope. Otherwise, sediments shall be compacted to 90% of maximum dry density.

C. Moisture Control:

1. Where the subgrade or a layer of fill/backfill must be moisture-conditioned before compaction, uniformly apply water to the surface, in proper quantities to prevent free water appearing on surface during or subsequent to compaction operations.
2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
3. Soil material that has been removed because it is too wet to permit compaction may be stockpiled as specified herein or spread and allowed to dry. Assist drying by dicing, harrowing, or pulverizing until moisture content is reduced to a satisfactory level.

3.12 GRADING

A. General:

1. The Contractor shall uniformly grade areas within the Limits of Disturbance. Smooth finished surface within specified tolerances, with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.
2. Establish finished grades within a maximum 33.33 percent (3H:1V) and a minimum 5 percent (20H:1V).
3. Conform to grades within a tolerance of one inch deviation over 50 feet of slope.
4. Subgrade elevations shall be met using available on-site Satisfactory Soil to the extent practical. Excess material shall be placed within the cap limits and compacted as subgrade for cap installation as shown on the Drawings. Areas with insufficient quantities of Satisfactory Soil to achieve the defined subgrade elevations shall be graded flatter than the maximum allowable condition but steeper than the minimum allowable condition in accordance with grading revisions to be provided by the Engineer. Off-site soil shall not be imported to achieve the defined subgrade elevations shown on the Drawings.

3.13 VEGETATION STABILIZATION

- A. Refer to Section 02921 – Seeding and Soil Supplements.
- B. Refer to Section 02370 – Erosion and Sedimentation Control.

3.14 FIELD QUALITY CONTROL TESTING

A. Quality Control Testing During Construction:

1. Allow testing service (subcontracted by Contractor) to examine and test subgrade surfaces and fill/backfill layers. Test results meeting the

requirements of Sub-Part 3.11 of this Section shall be obtained before further construction work is performed.

2. Perform field density tests in accordance with ASTM D6938 (nuclear method), or other Engineer approved methods, as applicable.
 - a. Existing Pavement Areas:
 - 1) For each layer of fill/backfill placed, conduct at least 1 compaction test for every 2,500 square feet, but in no case less than 3 tests per lift.
 - b. Cap Areas and Sediment Consolidation Area:
 - 1) For each layer of fill placed, conduct at least 1 compaction test for every 8,000 square feet, but in no case less than 3 tests per lift.
 - 2) For every 4,000 square feet of cover soils placed, conduct at least 1 thickness test. Additional fill shall be placed in areas that do not meet minimum thickness requirements.
 - c. Dewatered and Amended Sediment
 - 1) Place and compact one "test strip," a one foot lift minimum 8 feet by 50 feet in size, and compact in same manner as proposed to verify material properties (compacted unit weight and gradation). Perform one grain size analysis (ASTM D422) and 3 density tests (ASTM D6938) to confirm consistency with placement assumptions (unit weight of 83 to 120 pcf and classification as a sand or silty sand).
 - 2) Test each layer of sediment fill placed; conduct at least 1 compaction test for every 8,000 square feet, but in no case less than 3 tests per lift. Verify that density of sediment fill is within unit weight criteria.
 - 3) Place fine-grained sediment material or material not meeting the unit weight criteria a minimum of 20 ft away from sideslopes, as directed by the Engineer.
3. If in opinion of Engineer, based on testing service reports and inspection, subgrade soils or fill/backfill materials that have been placed are below specified density, the Contractor shall provide additional compaction and testing at no additional expense to the Client.

3.15 MAINTENANCE

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- B. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.

END OF SECTION

SECTION 02370

EROSION AND SEDIMENTATION CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work Included: At a minimum, provide and install all materials, equipment, and labor necessary for the diversion and removal of stormwater runoff/surface water and to install erosion and sedimentation control measures in accordance with the applicable erosion and sediment control regulatory requirements and standards (see Rhode Island Soil Erosion and Sediment Control Handbook, RISESCH), as shown on the Contract Drawings and specified herein. Depending on actual conditions encountered, additional erosion and sediment controls measures shall be implemented by the Contractor to ensure compliance with all applicable regulations. At the completion of the construction, provide all materials, equipment, and labor necessary for the removal, transport and disposal of temporary erosion and sediment control structures not specified to remain. Downgradient from disturbed areas, remove, transport, and dispose of sediment resulting from erosion control measures in a manner consistent with overall intent of this specification and which does not result in additional erosion.
- B. Provide and install all erosion and sediment control measures in accordance with the applicable erosion and sediment control regulatory requirements (RISESCH), standards and specifications and as required by field conditions during the execution of the Work.
- C. Temporary erosion and sediment control measures shall be installed as the first step in construction, shall be regularly inspected and continuously maintained, and shall not be removed until permanent surface stabilization of all disturbed areas is to the Engineer's satisfaction.
- D. Permanent controls or surface stabilization shall commence as soon as practicable but in no case more than 14 days after completion of filling and grading activities. Areas which are not to final grade but will not be reworked for 14 days must be temporarily seeded and mulched as soon as it is known with reasonable certainty that work will be stopped for at least 14 calendar days.
- E. Not all erosion and sedimentation control measures described in this specification are shown or referenced on the Construction Contract Drawings. Conducting the Work in accordance with the control measures shown on the Construction Contract Drawings does not relieve the Contractor of responsibility for completing the Work in a manner that minimizes erosion. Other measures as described and specified herein may be used to augment the proposed measures referenced on the Construction Contract Drawings based on actual field conditions encountered.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01110 – Summary of Work.
- B. Section 01330 – Submittal Procedures.
- C. Section 01352 – Environmental Protection Procedures.

D. Section 02300 – Earthwork.

1.03 REFERENCES AND GUIDELINES

- A. Rhode Island Soil Erosion and Sediment Control Handbook (RISESCH), 1989 (Revised 2014) by the Rhode Island Department of Environmental Management, USDA-Natural Resources Conservation Service (formerly the Soil Conservation Service), and Rhode Island State Conservation Committee.
- B. Rhode Island Stormwater Design and Installation Standards Manual, December 2010 by the RIDEM and Coastal Resources Management Council.

1.04 REVIEW AND/OR INSPECTION OF SEDIMENTATION CONTROL MEASURES

All construction under this project shall be subject to review and/or inspection by the appropriate local, State, and Federal agencies responsible for ensuring the adequacy of sedimentation control measures.

1.05 SUBMITTALS

- A. The Engineer will prepare a Stormwater Pollution Prevention Plan (SWPPP) prior to construction activities.
- B. The Contractor shall include a description of their proposed means and methods to control erosion and sedimentation in the Construction Work Plan to be submitted per the requirements of Section 01110 – Summary of Work.
- C. The Contractor shall submit to the Engineer the following information:
 - 1. Manufacturer’s data for products
 - 2. Data for materials incorporated into the Work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Silt Fence:

- 1. Fabric – Silt fence geotextile shall meet the following properties:

<u>Fabric Properties</u>	<u>Minimum Value</u>	<u>Test Method</u>
Grab Tensile Strength (lbs)	90	ASTM D1682
Elongation at Failure (%)	50	ASTM D1682
Mullen Burst Strength (psi)	190	ASTM D3786
Puncture Strength (lbs)	40	ASTM D751
Slurry Flow Rate (gal/min/sf)	0.3	---
Equivalent Opening Size	40-80	US Standard Sieve
Ultraviolet Stability (%)	90	ASTM G26

- 2. Fence Posts – The length shall be a minimum of 54 inches long. Wood posts will be of sound quality hardwood with a cross sectional area of 3.0 square inches.

3. Wire fence for reinforced silt fence (fabricated units) – Wire fencing shall be a minimum 14 gauge with a maximum 6 inch mesh opening.
 4. Prefabricated reinforced silt fence – Envirofence or approved equal may be used for reinforced silt fence in lieu of reinforced fence fabricated with wire fence.
- B. Mulch: For protection of newly seeded areas where erosion control blanket is not used.
1. Straw or hay free from primary noxious weed seeds and rough or woody materials and having not more than 15% moisture content. Provide hay or straw meeting the requirements of Chapter 5 of the RISESCH.
 2. Wood chips used for mulch or erosion control shall not exceed 3 inches in the greatest dimension and shall meet the requirements of Chapter 5 of the RISESCH.
 3. Wood fiber for use as mulch in conjunction with establishment of vegetation, shall meet the requirements of Chapter 5 of the RISESCH.
- C. Hay Bales: Hay bales shall consist of rectangular-shaped bales of hay or straw weighing approximately 40 pounds per bale and shall be free from primary noxious weed seeds and rough or woody materials.
- D. Temporary Protective Sheeting: Temporary sheeting material shall consist of minimum 6-mil polyethylene sheeting or a suitable approved alternative and of sufficient size to minimize seams.
- E. Seed for Erosion Control:
1. Temporary Control: Annual or perennial ryegrass or winter rye (cereal rye). Use winter rye if seeding in October or later.
- F. Erosion Control Matting: For protection of slopes greater than 10H:1V. Rolled erosion control product (RECP) shall be 100 percent biodegradable manufactured from long lasting natural fibers mechanically attached to or woven into two (2) continuous biodegradable netting structures. The RECP shall meet the following performance criteria:
1. Under the installed conditions of an unvegetated, maximum 80 foot long 3:1 slope consisting of sandy loam, soil loss shall be restricted to under 0.25 inches at the bottom 10 percent of the slope.
 2. Functional longevity shall be a minimum of 24 months.
 3. North American Green C125BN or approved equal may be used.
- G. Erosion Control Matting Staples: Provide manufacturer recommended number and size to accommodate the application. In general, provide “U” shaped 11 gauge wire staples with a minimum top width of 1 inch and minimum length of 6 inches.
- H. Construction Entrance: provide a construction entrance at all ingress and egress points within the work area per Detail 4 on Sheet C-501 of the Construction Drawings.
- I. Filter Fabric Basin for Pumped Dewatering Discharge: provide a temporary filter fabric basin into which discharge from excavation dewatering liquid is discharged in conformance with RISESCH if dewatering is required.

- J. Scour Pad: provide a scour pad in conformance with RISESCH if conditions warrant and/or required by the Engineer.

PART 3 - EXECUTION

3.01 PERFORMANCE

- A. It is the Contractor's responsibility to implement and maintain erosion and sedimentation control measures which effectively prevent accelerated erosion and sedimentation.
- B. Earth moving activities shall be conducted in such a manner as to prevent accelerated erosion and sedimentation.
- C. Land disturbance shall be kept to a minimum. Stabilization activities shall be scheduled immediately after any disturbance
- D. Diverting Surface Water:
 - 1. Build, maintain, and operate any temporary berms, swales, channels, flumes, sumps, and other temporary diversion and protection works needed to divert surface water through or around the work area and away from Work until surface stabilization has occurred.
 - 2. Storm runoff from disturbed areas must discharge through temporary erosion control measures shown on the Contract Drawings prior to discharge from the Site.
- E. Erosion Control Provisions (as necessary):
 - 1. Protect areas where existing banks are to be disturbed by constructing earth dikes at the top of slope to divert storm runoff from the disturbed area or by installed straw/hay bales at the toe of the slope to retain sediments, as conditions permit.
 - 2. All discharge from any necessary pumping operations during dewatering operations shall be conveyed back into the Pond within the protection of the turbidity curtain.
 - 3. Prior to removal of sediment barriers, remove retained silt or other materials at no additional cost to the Owner.
- E. Silt Fence: Install silt fence if required as a supplementary measure. The silt fence shall be installed on a level line (parallel to contours) to avoid concentrated flow areas along the fence. The area below the fence must be undisturbed or stabilized.
- F. Temporary Protective Sheeting: Soil stockpiles shall be protected with sheeting prior to forecasted significant rain events (0.5 inches or more) or as conditions require based on observed slope conditions. Overlap adjacent sheets by a minimum of 12 inches and securely anchor sheeting with sand bags and/or soil pegs, staples or stakes.
- I. Mulch: Conduct mulching immediately following seeding. For the mulching type used, apply mulch materials at the rate specified in RISESCH.
- J. Seed for Erosion Control:

1. Temporary Seeding: Minimum application rate of ryegrass (annual or perennial) shall be 60 pounds per acre and minimum application rate for winter rye shall be 100 pounds per acre.

3.02 MAINTENANCE

- A. The Contractor shall be held responsible for the implementation and maintenance of all erosion control measures on the Site.
- B. Throughout construction and until the Site has been stabilized upon completion of the Work, all erosion and sediment control measures will require periodic inspection and maintenance to ensure that such measures are providing effective service. At a minimum, the following inspection and maintenance shall be required during execution of this project:
 1. All erosion and sediment control will be inspected at least once a week and after rain events of 0.25" or greater during a 24-hour period, and/or after a significant amount of runoff. Conduct required repairs to installed measures immediately to ensure continued effective operation.
 2. Remove sediment that has accumulated in the filter bag of any installed catch basin inlet filters when it has reached the capacity limit recommended by the manufacturer.
 3. Remove sediment that has accumulated behind the sedimentation fencing when it has reached a depth of approximately ½ the height of the barrier or remove as needed when bulges develop in the fence. The sedimentation fence shall be repaired as necessary to maintain the barrier as intended.
 4. Sediment removed from control measures shall be collected and segregated as waste to be characterized, and properly disposed of off-site. No sediment shall be disposed of on-site.
 5. All seeded areas must be protected from traffic and shall receive appropriate watering during germination and growth establishment. Areas that do not establish a vigorous, dense vegetative cover (at least 80% surface coverage) shall be reseeded and mulched.
- C. Maintain the integrity of all erosion control measures throughout construction period.

3.03 SPECIAL CONDITIONS

- A. Prohibited Construction Practices - Prohibited construction practices include but shall not be limited to the following:
 1. Dumping of spoil material into any stream corridor, any wetlands, any surface waters, stormdrain system, or at any other unspecified locations.
 2. Indiscriminate, arbitrary or capricious operation of equipment in any stream corridors, any wetlands or any surface waters.
 3. Pumping of silt-laden water from trenches or other excavations into any surface waters, any stream corridors, any wetlands, or any stormdrain system.
 4. Disposal of trees, brush and other debris in any stream corridors, any wetlands, any surface water or at unspecified locations.
 5. Permanent or unspecified alteration of the flow line of any stream.
 6. Open burning of construction debris.

B. Winter Stabilization – Beyond October 1, (when temporary seeding is not likely to germinate) mulch shall be used as a temporary soil stabilization measure.

1. Applicability and method to be approved by the Engineer.

3.04 ADJUSTMENT OF PRACTICES

A. If the planned measures do not result in effective control of erosion and sediment runoff to the satisfaction of the Engineer or regulatory agencies having jurisdiction over the project, the Contractor shall immediately adjust their program and/or institute additional measures so as to eliminate excessive erosion and sediment runoff.

B. If the Contractor fails or refuses to comply promptly, the Client may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No 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 Contractor.

3.05 REMOVAL OF TEMPORARY WORKS

A. Remove or level and grade to the extent required to present a sightly appearance and to prevent any obstruction of the flow of water or any other interference with the operation of or access to the permanent works.

END OF SECTION

SECTION 02522
GROUNDWATER MONITORING WELLS

PART 1 – GENERAL

1.01 DESCRIPTION

- A. The Contractor shall provide all necessary personnel, equipment, and materials required to perform drilling, well installation, and well development services associated with the remedial action at the Former Gorham Manufacturing Plant located in Providence, Rhode Island for the purpose of:
 - 1. Completing one (1) groundwater monitoring well to an approximate depth of 20 feet below ground surface.
- B. The Contractor shall obtain approval for the well locations from the Engineer prior to drilling.
- C. The wells should be installed in accordance with American Society for Testing and Materials (ASTM), the United States Environmental Protection Agency (USEPA), The Rhode Island Department of Environmental Management (RIDEM), and generally accepted industry standards and requirements for well installation.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01330 – Submittal Procedures.
- B. Section 02110 – Waste Removal, Handling, and Storage.
- C. Section 02120 – Off-Site Transportation and Disposal.

1.03 REFERENCES

- A. American Petroleum Institute (API)
 - 1. API Specification 13A (2008) Specification for Drilling-Fluid Materials, Seventeenth Edition.
- B. American National Standards Institute (ANSI)
 - 1. ANSI/ASME B 1.20.1-1983 (R2006) Pipe Threads, General Purpose (Inch)
- C. American Society for Testing and Materials (ASTM):
 - 1. ASTM A 312 / A 312M (2009) Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.
 - 2. ASTM A 403 / A 403M (2010a). Standard Specification for Wrought Austenitic Stainless Steel Piping Fittings.
 - 3. ASTM A 778-01 (2009e1) Standard Specification for Welded, Unannealed Austenitic Stainless Steel Tubular Products.
 - 4. ASTM D 422 (1998) Standard Test Method for Particle-Size Analysis of Soils.
 - 5. ASTM D 1785 (2006) Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedule 40, 80, and 120.
- D. American Water Works Association
 - 1. AWWA C206-11, AWWA Standard for Field Welding of Steel Water Pipe.

1.04 SUBMITTALS

- A. Submit the following in accordance with Section 01330 – Submittal Procedures:
 - 1. Statements:
 - a. Groundwater monitoring well borehole drilling and well installation methodology;
 - b. Water treatment plan and justification;
 - c. The type and size of drilling and sampling equipment to be used at each location;
 - d. Recommended material for well housing and justification;
 - e. Number of personnel to be deployed during the work and the proposed schedule/logistics for completing the work.
 - B. Field Test Reports:
 - 1. Submit the following field test reports:
 - a. Written assurance each well meets the requirements specified herein for materials, depths, plumbness, and alignment.
 - b. Drilling records including casings, cement-bentonite grout, well screens, penetration, and filter pack.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver screen, casing, and all materials in an undamaged condition. Materials must be approved by the Engineer prior to use. Store materials off the ground to provide protection against oxidation caused by ground contact. Replace defective or damaged materials with new materials.

1.06 SITE MAINTENANCE

- A. The site will be maintained in a neat and orderly condition, free from trash and waste construction materials at all times. Unattended construction materials, equipment, and trash shall be left in a manner such that they do not constitute fire hazards, or become or cause nuisance or danger due to forces of nature, such as rain or wind. All vehicles shall be loaded in a manner which shall prevent spillage, dripping, or loss of materials and debris.
- B. Provide, maintain, and remove upon completion of work all temporary rigging, scaffolding, hoisting, equipment, barricades, ladders, fences, staging, treatment, containment, decontamination, and all other temporary facilities. All temporary facilities shall conform to the requirements of the Engineer, and Federal, State, and local authorities.

1.07 NUISANCE WATER

- A. Nuisance water, such as rain or snow fall or surface water run-off may be encountered within the work site during the period of performance. Precautions shall be taken to assure that potentially contaminated soil and surface waters do not enter the boreholes or migrate away from the work area. Work shall be protected from damage by such waters, and measures to prevent delays in progress of work caused by such water shall be undertaken at all times.

PART 2 – PRODUCTS

2.01 EQUIPMENT, MATERIAL, TOOLS, CONTAINERS

- A. Equipment, materials and tools shall conform to the respective specifications and other requirements as specified herein.
 - 1. Monitoring Well
 - a. Drill Rig and Tools: to be used for completion of one, six-inch borehole for installation of the overburden monitoring well referenced in Sub-Part 1.01.A.1 shall be capable of reaching depths of at least 20 feet. Drill rig and tools that are not adequate, in the opinion of the Engineer, will not be permitted. The drill rig and chosen methods shall be capable of creating sufficient annular space to install the monitoring well as shown on the Construction Contract Drawings and as directed by the Engineer.
- B. Well Materials:
 - 1. Monitoring Well:
 - a. Monitoring well riser and well screen shall be flush-threaded 2-inch diameter, Schedule 40 PVC.
 - b. Well screen shall be machine-slotted 0.010-inch screen openings and shall be assembled in five-foot sections.
- C. Filter Pack and Grout:
 - 1. Monitoring Well:
 - a. Filter pack shall be placed around the well screens, extending a minimum of two feet above the top of the screen slots or to a depth specified by the Engineer. The Contractor shall supply the particle size and uniformity specifications of the filter pack prior to mobilization and the filter pack shall be reviewed and approved by the Engineer prior to placement.
 - b. Bentonite chips or pellets shall fill the annular space above the filter pack for a 2-foot depth. The bentonite shall be hydrated if placed above the water table.
 - c. Cement/bentonite grout shall fill the annular space above the bentonite chip/pellet layer to the bottom of the crushed stone base of the stick-up well cover. Provide neat cement grout, Type I or II Portland cement conforming to ASTM C 150, and water. The mixed grout shall contain no more than 7 gallons of water per bag (1.0 cubic foot or 94 pounds) of cement. Add commercially available bentonite designed for well sealing. Mixture to be 20 parts cement and 1 part bentonite. The method of grout placement shall be reviewed by the Engineer. If grout is placed below the water table it shall be tremied to the desired depth.
- D. Protective Well Covers:
 - 1. Overburden Monitoring Wells:
 - a. Provide a removable, water-tight expansion well cap to seal the top of each monitoring well riser.
 - b. Provide protective steel casing set a minimum of 2 feet below grade and 2 feet above grade.

- c. Set protective casing in-place with a concrete seal. The space between the protective casing and the well riser shall be filled as shown on the Drawings.
 - d. Provide a 12-inch diameter lockable steel well cover.
- E. Identification Tags:
 - 1. Monitoring Wells:
 - a. Provide durable weather-resistant well identification tags with legible well identification numbers on the new well.
 - b. Attach tags at least 24 inches above ground level using one of the following methods:
 - i. Strap the tag to the well casing using stainless steel bands or large hose clamps designed for exterior applications.
 - ii. Strap the tag to the well casing using ultra violet resistant nylon straps designed for exterior applications.
 - iii. Rivet or bolt the tag to the well casing using stainless steel rivets or bolts.
- F. Locks and Keys:
 - 1. Monitoring Wells:
 - a. Provide durable weather-resistant exterior grade padlocks for each (1 total) new well cover. Style of padlock shall be inset flush with the top of the cover.
 - b. A minimum of two (2) sets of keys shall be provided to the Client.

2.02 QUALITY CONTROL

- A. Well materials shall be new and undamaged and where possible factory cleaned and wrapped. Materials which are damaged or determined to be not in accordance with desired specifications will be rejected. Equipment and materials will be decontaminated and stored in a fashion that will adequately protect them from contamination or degradation.

PART 3 – EXECUTION

3.01 BORING LOGS

- A. During the progress of each boring, the Contractor shall keep a continuous and accurate log of drilling technique, sample blow counts, downhole equipment, and materials used.
- B. Data to be provided:
 - 1. Names of driller and inspector.
 - 2. Dates and times of beginning and completion of work.
 - 3. Identifying number and location of boring.
 - 4. Diameter and description of drilling equipment.
 - 5. Total length and size of drilling equipment and/or casing.
 - 6. Length of drilling equipment or casing extending below ground surface at the completion of the boring.
 - 7. Depth to top of each different material penetrated, as noted by drilling performance or observation of drill cuttings.
 - 8. Depth to water surface in borehole at completion and at end of each major work stoppage.

9. Loss or gain of drilling water or mud if used during the advancement of the borings to install the monitoring wells.
10. Any sudden dropping of drill rods or other abnormal behavior.

3.02 CONSTRUCTION

- A. **Monitoring Well Borehole:** The borehole completed for installation of the monitoring well shall be completed using hollow-stem auger or other method to be approved by the Engineer that will advance the boring to the required depths in a timely manner, limit production of waste soil and water, and allow for appropriate construction of the well and surrounding material.

3.03 PERMITS, REGULATIONS, AND PUBLIC RELATIONS

- A. All wells shall be installed in accordance with RIDEM Rules and Regulations for Groundwater Quality.
- B. Permits and licenses of a temporary nature necessary for the execution of the Contractor's work shall be secured and paid for by the Contractor. The Contractor shall give all notices and comply with all laws, ordinances, rules, and public regulations bearing on the conduct of the work as described in the scope of work specified.
- C. If the Contractor performs any Work without giving notice to the Engineer and does not receive written notification from the Engineer to proceed with Work, which is later determined to be contrary to any laws, ordinances, or regulations, the Contractor proceeds at their own risk, and shall bear all penalties and costs arising from such actions.
- D. The Contractor shall be solely responsible for compliance with laws, ordinances, and regulations during the course of Work, including those relating to safety to personnel and property and the handling of wastes and/or hazardous material. No off-site shipment of wastes will be allowed without authorization from the Engineer. Copies of all permits, manifests, and other documentation shall be forwarded in a timely manner to the Engineer.

3.04 PROTECTION OF WORK, PUBLIC AND PROPERTY

- A. The means, methods, procedures, and techniques to be used by the Contractor are the responsibility of the Contractor, and shall be designed to meet the intent of the Specifications.
- B. The Contractor shall continuously protect its work from damage and protect adjacent property as provided by law. The Contractor shall maintain lights and other safety devices as required. The Contractor shall promptly repair all damages caused by its operations. When using internal combustion equipment, the Contractor shall have available at the work site emergency fire extinguishers or other approved fire fighting apparatus at all times.
- C. During its operations, the Contractor may occupy only those portions of the public right-of-way for which the required permits have been obtained by the Contractor. If the Contractor desires to use additional areas outside of those required for the borings, it shall arrange for such areas at its own coordination and expense.

- D. Fill all drill holes, ruts, low spots, and areas of disturbed grade created as a result of the work. Grade disturbed areas smooth, seed, and mulch. Any property which is damaged as the result of the Contractor's operations shall be repaired at the Contractor's expense to the satisfaction of the Engineer. Remove and properly dispose of all unused or wasted construction materials and equipment.
- E. All drilling casings shall be withdrawn from the drill holes unless directed to be left in place by the Engineer.
- F. The Contractor shall secure the work site and any other potential hazards over night.

3.05 DISPOSAL OF CUTTINGS AND WELL DEVELOPMENT WATER

- A. Temporarily store soil boring cuttings in a container or temporary stockpile until transfer for on-site disposal within the capping system boundary. Temporary stockpiling to be performed in accordance with Section 02110.
- B. Collect, handle, and store all well development water and decontamination fluids in accordance to Section 01354 - Decontamination and Section 02120 – Off-Site Transportation and Disposal.

3.06 DECONTAMINATION

- A. Clean and decontaminate all equipment at the designated decontamination pad. All water will be containerized and sampled for contamination by the Contractor as specified in Section 01354 - Decontamination and Section 02120 – Off-Site Transportation and Disposal, and as described above.
- B. Decontaminate all rigs and equipment upon arrival at site, between each borehole, and upon completion of work. All down-hole sampling equipment shall be decontaminated between sample locations using a steam cleaner or high pressure wash, clean water, laboratory-grade detergent, or alconox or similar means. All drilling equipment shall be rinsed thoroughly with tap water. All sampling equipment shall be rinsed with de-ionized water.

END OF SECTION

SECTION 02526
WELL ABANDONMENT

PART 1 – GENERAL

1.01 DESCRIPTION

- A. This specification establishes the requirements for monitoring well abandonment. Wells to be abandoned must be fully sealed in a manner appropriate for the geologic conditions to prevent contaminant migration through the borehole.
- B. Existing wells within the limits of work to be abandoned are shown on Drawings C-002 through C-004.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01330 – Submittal Procedures
- B. Section 02110 – Waste Removal, Handling, and Storage
- C. Section 02120 – Off-Site Transportation and Disposal

1.03 REFERENCES AND GUIDELINES

- A. RIDEM Rules and Regulations for Groundwater Quality

1.04 SUBMITTALS

- A. Submit the following in accordance with Section 01330 – Submittal Procedures.
 - 1. Well Abandonment Completion Form:
Upon completion of abandonment of each well a Well Abandonment Completion Form must be completed and submitted. The Abandonment Form shall detail the material types, quantities, and methods used and any components of the well removed.

PART 2 – PRODUCTS

2.01 WELL PLUGGING MATERIALS

- A. Type 1 cement/bentonite grout:
 - 1. Type 1 cement/bentonite grout with 4% (by weight) powdered bentonite shall be used in the riser pipe interval of screen and riser pipe wells.
- B. Microfine cement grout:
 - 1. Microfine cement grout shall be used for screened sections of wells and may be used for riser sections. The microfine cement should be similar or equal to MC-500 microfine cement distributed by Geochemical Corporation, Ridgewood, New Jersey.

PART 3 – EXECUTION

3.01 WELL PLUGGING AND ABANDONMENT REQUIREMENTS

- A. Monitoring wells shall be abandoned according to the requirements of RIDEM and these Specifications.

- B. The Contractor shall maintain a well abandonment record. Groundwater levels shall be measured in all wells prior to abandonment. These water levels shall be included in the well abandonment records.
- C. Overbore or remove the casing to the greatest extent possible. All casing and well installations within five feet of the proposed final grade must be removed. Perforate casing left in place.
- D. Seal by pressure injection with Type 1 cement/bentonite grout (riser sections only) or microfine cement grout (screened or riser sections) using a tremie pipe or other method acceptable to RIDEM. Grout must extend the entire length of the boring, from the bottom of the well to five feet below the proposed final grade. The screened interval of the borehole must be sealed separately and tested to ensure its adequacy before sealing the remainder of the borehole. Where the surrounding geologic deposits are highly permeable, alternate methods of sealing may be required to prevent the migration of the grout into the surrounding geologic formation. Grout shall continue to be added to fill gaps created by settlement until the plugging material sets.
- E. Backfill and compact the upper five feet with subgrade fill as specified in Section 02300 – Earthwork.
- F. Restore the site to a safe condition. The site must be inspected periodically after sealing for settlement or other conditions which require remediation.
- G. Locations of abandoned wells shall be surveyed as a requirement of the Record Drawing submission.

3.01 WASTE DISPOSAL

- A. Waste materials derived from well abandonment may include removed casing, removed riser pipe and excess grout.
- B. Waste materials may be disposed of within the capping system boundary provided waste consolidation and grading activities are ongoing.
- C. Well casing and pipe shall be disposed of off-site in conformance with Section 02120 Off-Site Transportation and Disposal.
- D. If waste consolidation and grading activities on-site are complete, the Contractor shall dispose of well abandonment derived waste materials off-site in accordance with Section 02120 – Off-Site Transportation and Disposal.

END OF SECTION

**SECTION 02921
PLANTING, SEEDING AND SOIL SUPPLEMENTS**

PART 1 – GENERAL

1.01 DESCRIPTION

- A. For restored areas to be vegetated as indicated on the Construction Contract Drawings, provide seed as specified herein.
- B. Furnish and place topsoil, lime, fertilizer, seed, and mulch or erosion control matting in the areas indicated, and maintain new seeding through the contract maintenance period.
- C. Disturbed areas outside the limit of grading but inside the limit of disturbance may be seeded and mulched without the addition of Loam.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01330 – Submittal Procedures
- B. Section 02300 – Earthwork
- C. Section 02370 – Erosion and Sedimentation Control

1.03 REFERENCES AND GUIDELINES

- A. Rhode Island Soil Erosion and Sediment Control Handbook (RISESCH), 1989 by the Rhode Island Department of Environmental Management (RIDEM), USDA Soil Conservation Service, and the Rhode Island State Conservation Committee.
- B. Rhode Island Stormwater Design and Installation Standards Manual, December 2010 by RIDEM and Coastal Resources Management Council.

1.04 SUBMITTALS

Submit the following in accordance with Section 01330 – Submittal Procedures.

- A. Grass Seed Vendor's Certificate:
Subcontractor shall submit the seed vendor's certified statement for the grass seed mixture required, showing common name, percentage of seed mix by weight, percentages of purity and germination, year of production, date of packaging, and location of packaging.
- B. Fertilizer:
Subcontractor shall submit the fertilizer manufacturer's product data showing chemical analysis and percent composition.
- C. Hydraulic Seeding Method:
If the Hydraulic Seeding Method is used, submit a certified statement as to the number of pounds of materials to be used per 100 gallons of water, and specify the number of square feet of seeding that can be covered with the quantity of solution in the hydroseeder.

1.05 DEFINITIONS

- A. Limit of Disturbance:

Seeding shall be performed on all disturbed areas within the limit of disturbance as delineated on the Contract Drawings and on additional areas unexpectedly disturbed by Contractor requiring restoration to original condition.

B. Limit of Grading:

Loam, seeding, and mulching shall be performed within the outermost limit of grading as delineated on the Contract Drawings.

C. The exception to these requirements is for those areas that require alternate stabilization with erosion control matting, or riprap as shown on the Contract Drawings or described in Section 02370 - Erosion and Sedimentation Control.

PART 2 – PRODUCTS

2.01 MATERIALS

A. General:

Obtain and retain as part of the project records, certifications, and/or labels of materials supplied.

B. Loam:

Refer to Section 02300 - Earthwork.

C. Fertilizer:

Supply fertilizer meeting the recommendation of the testing laboratory nutrient analysis for the Loam. At a minimum provide a standard commercial 10-20-20 grade containing at least 10 percent available nitrogen, 20 percent readily available phosphoric acid and 20 percent total available potash in conformity with soil tests such as those offered by the University of Rhode Island Soil Testing Laboratory. Supply in unopened bags with the weight, contents and guaranteed analysis shown thereon or on a securely attached tag.

D. Lime:

1. Apply ground limestone (equivalent to 50% calcium plus magnesium oxide) at a rate recommended by the testing laboratory based on the results of their nutrient analysis of the Loam. At a minimum apply 3 tons per acre (135 pounds per 1,000 square feet).

E. Seed for Permanent Vegetation:

Shall meet the following minimum requirements:

1. The grass seed mixture shall include no "primary noxious weed seeds."
2. Furnish in fully-labeled, standard sealed containers.
3. Percentage and germination of each seed type in the mixture, purity, and weed seed content of the mixture shall be clearly stated on the label.
4. The weight of pure live seed (PLS) is computed by the labeled purity percent times the labeled germination percent times the weight. To illustrate the method of computing to PLS from the tag basis, the following example is given: Required: 20 pounds PLS of a particular variety—stock available is 99.41% pure and 92% germination—20 divided by the product of 0.9941 and 0.92 equals 21.8 pounds on the tag basis to furnish 20 pounds of PLS.

5. Subject to the testing provisions of the Association of Official Seed Analysis, with the month and year of test clearly stated on the label.
 6. Seed which has become wet, moldy, or otherwise damaged will not be acceptable.
 7. All seed shall be certified as to mixture, germination, purity, and live seed as follows:
 - Percent germination > 80%
 - Pure Live Seed (PLS) > 85%
 - Percent Purity > 85%
 - Weed Seed < 1%
 All seed shall be from the current year's crop unless recent tests by an approved testing agency demonstrate that older seed meets the above requirements.
 8. Fringe Wetland Cap:
 - Use the New England Wetland Plants "Wetmix" or approved equal.
 9. Perimeter Wetland Cap:
 - Use the New England Wetland Plants "New England Erosion Control/Restoration Mix for Dry Sites" mix or approved equal.
 10. Upland Cap:
 - Use the seed mix specified as General Purpose of Table 4.2, "Permanent Seedings" of the RISESCH or approved equal.
 11. Other suitable seed mixtures may be used if approved by the Engineer.
 12. For temporary seeding requirements see Section 02370 - Erosion and Sedimentation Control.
- F. Plantings:
Refer to Appendix E – Wetland Restoration Plan for planting requirements.
- G. Mulch:
Refer to Section 02370 - Erosion and Sedimentation Control for mulching requirements.
- H. Erosion Control Matting:
Refer to Section 02370 - Erosion and Sedimentation Control for erosion control matting requirements.

PART 3 – EXECUTION

3.01 PREPARATION

- A. All areas to be seeded:
 1. Shall be worked as necessary to provide a reasonably firm but friable seedbed.
 2. Shall meet the specified grades and are free of growth and debris.
 3. Take care to prevent the formation of low places and pockets where water will stand.
- B. Depth of tillage:
 1. Two (2) inches or as directed by the Engineer.
 2. On slopes steeper than 3:1, reduce depth of tillage as directed.

3. Where ryegrass has been planted for temporary erosion control and has not been eliminated prior to the completion of the Work, disk at least 4 inches deep and seed to permanent grasses.

3.02 APPLICATION

A. Loam:

Loam shall be placed using earth moving equipment. The soil shall be spread and tracked to a uniform depth as indicated on the Contract Drawings. The soil surface shall be left free of ruts or channels. Remove all large stiff clods, lumps, brush, roots, stumps, litter, and other foreign material and stones over 3-inch in size. See Section 02300 - Earthwork for additional requirements.

B. Fertilizer and Lime:

1. Apply by means of a mechanical spreader or other acceptable method which is capable of maintaining a uniform rate of application.
2. Conduct when the soil is in a moist condition and at least 24 hours before sowing the seed.
3. Fertilizer shall be applied at the rate based on the results of a nutrient analysis to be performed by Contractor. If the default 10-20-20 fertilizer is utilized, apply at a rate of 500 pounds per 1 acre.

C. Seeding:

1. Perform erosion control items of work such as seeding and mulching as soon as practical for areas of suspended work or areas of completed work.
2. When seeding is required on areas of the project where work is not complete but will be suspended for an extended period, use the appropriate temporary seed mix specified in Section 02370 – Erosion and Sedimentation Control.
3. When seeding is required on areas of the project where grading is complete, use the specified permanent seed mixture.
4. Apply permanent seed mix between April 1 to June 15 (Spring Seeding) or August 15 to September 30 (Fall Seeding) at a rate of:
 - Fringe Wetland Cap: 1 pound per 2,500 square feet applied by hand
 - Perimeter Wetland Cap: 1 pound per 1,250 square feet applied using hydromulch with tackifier
 - Upland Soil Cap: 1 pound per 1,000 square feet applied using hydromulch with tackifier
5. Planting between October 1 and April 1 shall be considered Winter Seeding and shall be approved by the Engineer prior to initiation.
6. Special care must be taken if seeding must occur during the generally hot, dry period from June to August.
7. Seeding Restrictions:

Do not seed during windy weather or when the ground is excessively wet, or otherwise untillable.

D. Mulch:

1. Undertake immediately after each area has been properly prepared and seeded.

2. Apply the selected mulch type at the rates noted in Chapter 5 of the RISESCH on all seeded areas not otherwise protected with erosion control matting.
3. Blowing chopped mulch shall be permitted provided mulch anchoring is performed.
4. Hay or straw mulch should cover the ground enough to shade it, but the mulch should not be so thick that a person standing cannot see ground through the mulch.
5. Remove matted mulch or bunches.
6. Collect and dispose of all baling wire or rope off-site.

3.03 SEEDING METHODS

A. General:

Fertilizer, limestone, mulch material if required, and seed of the type specified may be placed at the locations shown or ordered by one of the following methods, provided an even distribution is obtained. The maximum seeding depth shall be 1/4-inch when using methods other than hydroseeding.

B. Dry Method:

1. **Power Equipment:** Use mechanical seeders, seed drills, landscape seeders, cultipacker seeders, fertilizer spreaders, or other approved mechanical seeding equipment or attachments when seed, limestone, and fertilizer are to be applied in dry form.
2. **Manual Equipment:** On areas which are inaccessible to power equipment, permission may be given to use hand-operated mechanical equipment when the materials are to be applied in dry form. The use of hand shovels to spread the materials will not be allowed.
3. Do not mix limestone and fertilizer together prior to their application, but work into the soil together to the specified depth.
4. After seeding, compact the entire area by a suitable roller weighing 60 to 90 lbs. per linear foot.
5. Allow at least 24 hours between fertilizing and seeding.
6. Unless otherwise ordered, mulch areas covered with seed.

C. Hydraulic Method:

1. The application of grass, seed, fertilizer, limestone, and suitable mulch, if approved, may be accomplished in one operation by the use of an approved spraying machine.
2. Mix materials with water in the machine and keep in an agitated state in order that the materials may be uniformly suspended in the water.
3. The spraying equipment shall be so designed that when the solution is sprayed over an area, the resulting deposits of limestone, fertilizer, and grass seed are equal in quantity to the required rates.
4. Flush and clean hydraulic seeding and fertilizing machine each day before seeding is to be started, and thoroughly flush of all residue after the completion of application or every 10 acres.
5. If the results of the spray operations are unsatisfactory, abandon this method and apply the materials by the dry method.
6. When inoculum is required, mix with the seed and spray.
7. Compaction or rolling not required.

8. If mulch material is not applied during the seeding operation apply mulch within 1/2 hour following the seeding operation.

3.04 WINTER (DORMANT) SEEDING

Applies to seeding that occurs between October 1 and April 1 when ground temperatures are generally unfavorable for seed germination.

- A. To be coordinated and approved by the Engineer prior to initiation.

3.05 CARE AFTER SEEDING

- A. Watering:

Contractor shall ensure that adequate water is applied to the seeded area to establish a uniform stand of vegetation within the restored area of concern. If the restored area is seeded during a drought condition, the Contractor shall water with proper means through either a portable watering tank or other means approved by the Engineer.

- B. Acceptance:

To be acceptable, grass shall show a reasonably thick, uniform stand, free from sizable areas of thin or bare spots, with a minimum coverage of 80 percent as agreed by the Contractor and Engineer and/or Client.

- C. Repair:

Reseed any seeded areas which fail to show a uniform stand until all areas are covered with acceptable grass growth.

- D. Maintenance Period:

Inspections for the SWPPP and other permitting obligations shall continue until the required 80% vegetation cover is established within the restored area.

- E. Warranty:

The contractor shall provide the Owner and Client with a 1 year vegetation warranty. If after 1 year the vegetation has not been established to 80% cover, the Contractor shall reseed the areas out of compliance and provide continued maintenance until the 80% vegetation cover is met.

END OF SECTION

DRAWINGS

APPENDIX A
SEDIMENT SOIL BORING, MONITORING WELL, AND TEST PIT LOGS

APPENDIX A-1
INNER-OUTER COVE LOGS



Prepared/Date: BJR 12/06/12
 Checked/Date: MJM 12/06/12

333 Adelaide Avenue Site
 Providence, Rhode Island



Surface Water and Sediment Sample
 Locations 2005-2012
 Project 3650-11-0222

Figure 3.3

APPENDIX C

Field Data Records and Chains of Custody for 2006 Soil, Surface Water and Sediment Sampling



MACTEC

Boring Location: SED10

Page 1 of 1

Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Project Name: Gorham

Geologist: Phil Muller

Date Started: 6-22-06

Drilling Company: Aqua Survey

Date Completed: 6-22-06

Drilling Method: V. bra core

Total Depth: 8.5

Depth of Water:

Comments: recovery = 6.0

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	2" Black SILT and Organic Grey med. to coarse SAND, trace fine Gravel, trace organic		0.2		SED1001 @ 6-12" (0945)
2	6 pm				
3	2.3 2.5 Brown Organic Peat				SED1003 @ 2.5-3' (0955)
4	Grey fine to coarse SAND, some organics, little silt		0.2		
5	Grey SILT and CLAY dense		0.1		
6	5.1 DK. grey fine SAND and SILT		0.0		
7					

Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Project Name: **Gorham**

Geologist: **Phil Muller**

Date Started: **6.22.06**

Drilling Company: **Aqua Survey**

Date Completed: **6.22.06**

Drilling Method: **Vibra Core**

Total Depth: **8.5**

Depth of Water:

Comments: **recovery = 4.4**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	Black SILT, trace organics, soft		0.3		SED1101 @ 0-1' (1015)
2					
2.5					
3	Grey silt fine to med. SAND, some Black silt, med. dense		0.2		SED1103 @ 2.5-3' (1030)
4	Black SILT, some clay organic odor, soft		0.2		
4.4					
5					

MACTEC

Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Boring Location: SED12 Page 1 of 1

Project Name: Gorham Geologist: Phil Muller


Date Started: 6-22-06 Drilling Company: Aqua Survey

Date Completed: 6-22-06 Drilling Method: Vibracore

Total Depth: 8.5 Depth of Water:

Comments: recovery = 4.9'

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	Grey and black coarse SAND, ^{so} little gravel trace organic		0.2		SED1201 @ 6'-12" (1101)
2	1-7 Black/grey coarse SAND and CLAY soft		0.1		
3	2-3 2.5 grey fine SAND and SILT, dense		0.2		SED1203 @ 2.5'-3" (1115)
4					
5					

 <p>MACTEC</p> <p>Sediment Core Log</p> <p>MACTEC 107 Audubon Road Wakefield, MA</p>	Boring Location: SED 13		Page <u>1</u> of <u>1</u>	
	Project Name: GORHAM		Geologist: Phil Muller	
	Date Started: 6.22.06		Drilling Company: Aqua Survey	
	Date Completed: 6.22.06		Drilling Method: Vibracore	
	Total Depth: 8.5'		Depth of Water:	
	Comments: recovery = 5.0'			

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0.5	Black med. to coarse SAND, some silt, little Gravel		0.2		SED1301 @ 0-6" (1130)
	orange/brown coarse				
2	SAND, little Gravel, little silt		0.2		
3					SED1303 @ 2-25' (1150)
	Grey fine SAND and SILT, dense		0.2		
5	Grey fine to med. SAND, soft		0.1		
6					



Boring Location: SED 14

Page 1 of 1

Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Project Name: Gorham

Geologist: Phil Muller

Date Started: 6.22.06

Drilling Company: Agun Survey

Date Completed: 6.22.06

Drilling Method: Vibracore

Total Depth: 8.5'

Depth of Water:

Comments: recovery = 6.0'

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	Black SILT, some organics, soft		0.2		SED 1401 @ 0-1' (1210)
2	Grey med. to coarse black SAND, little silt and organics.		0.2		SED 1403 @ 2.5-3' (1215)
3					
4					
5					
6					

Black silt & organics →

2.2

Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Project Name: **Gorham**

Geologist: **Phil Muller**

Date Started: **6-22-06**

Drilling Company: **AGNA Survey**

Date Completed: **6-22-06**

Drilling Method: **Vibra core**

Total Depth: **8.5**

Depth of Water:

Comments: **recovery = 4.0'**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0.3	Grey fine SAND and Gravel				SED1501 @ 0-1' (1230)
0.4	Grey med. to coarse SAND, some Gravel, 1 clay stringer, grey	Black SILT and Organics	48		
1					
2			1.1		
3					SED1503 @ 2-3' (1255)
3.1	Grey CLAY CLAY and fine SAND		1.5		
3.6	Same as 0.4 - 3.1 ft		0.9		
4					
5					
6					

Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Project Name: **Gorham**

Geologist: **Phil Muller**

Date Started: **6-22-06**

Drilling Company: **Agua Survey**

Date Completed: **6-22-06**

Drilling Method: **Vibracore**

Total Depth: **8.5**

Depth of Water:

Comments: **recovery = 5.6**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	Black, SILT, and some organics		0.2		SED 16 01 @ 0-1' (1315)
2					
2.1	Grey/Brown med. to coarse SAND, some Gravel		0.3		SED 16 03 @ 2.5-3' (1315) pm
3	↑ more gravel				1330
4					
5					
5.1	v. dense v. fine SAND med				
5.6	SILT, grey, some sand		0.2		
6					

Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Project Name: **Gorham**

Geologist: **Phil Miller pm**

Date Started: **6.22.06**

Drilling Company: **Aqua Survey**

Date Completed: **6.22.06**

Drilling Method: **Vibra core**

Total Depth: **8.5'**

Depth of Water:

Comments: **recovery = 5.7**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0.5	Black SILT and organics, soft	0.2 pm	0.2		SEDI701 @ 6"-12" (0915)
	Grey med. to coarse				
2.6	SAND, little Black soft clay	0.4 pm	0.4		
	Grey med. to coarse SAND, trace fine gravel				
3.8					SEDI704 @ 3-3.8' (0930)
	Brown med to coarse SAND, trace gravel		0.2		

MACTEC Sediment Core Log MACTEC 107 Audubon Road Wakefield, MA		Boring Location: SED 18			Page <u>1</u> of <u>1</u>	
		Project Name: Gorham		Geologist: Phil Muller		
		Date Started: 6.22.06		Drilling Company: Aqua Survey		
		Date Completed: 6.22.06		Drilling Method: Vibra core		
		Total Depth: 8.5'		Depth of Water:		
		Comments: recovery = 5.5				
Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID	
1	Black SILT, some organic, sheen (organic) on ponding water	0.2 pm	0.2		SED 1801 @ 0-1' (1415) pm (1400)	
2						
3						
3.5						
4	tan CLAY and Organic		0.2		SED 1804 @ 35-4' (1420)	
4.2						
5	grey SILT, some fine pm SAND, dense Sand		0.3			
5.5						
6						

Boring Location: SED 19Page 1 of 1

Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MAProject Name: GorhamGeologist: Phil MullerDate Started: 6-22-06Drilling Company: 6-22-06Date Completed: 6-22-06Drilling Method: VibracoreTotal Depth: 8.5

Depth of Water:

Comments: recovery = 6.6

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	Black SILT, some organic, organic odor		0.2		SED1901 @ 0-1' ^{pm} 6-1' (1435)
2	1.7 Black SILT and		5.0 ^{pm}		
3	Organics Decomposing wood Peat-like		5.0		SED1903 @ 2-3' (1450)
4			2.2		
5	4.6 Grey CLAY, some SILT and Sand, soft				
6	5.1 orange stained med. to course SAND		1.5		
7	6.6				



Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Boring Location: SED 20

Page 1 of 1

Project Name: Gorham

Geologist: Phil Miller

Date Started: 6.22.06

Drilling Company: Aqua Survey

Date Completed: 6.22.06

Drilling Method: Vibra Core

Total Depth: 8.5

Depth of Water:

Comments: recovery = 7.2'

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	Black SAND and SILT Some Organics, Leaf litter top 2"	0.2 pm	0.2		SED2001 @ 6"-12" (0810)
	Black SILT, Some Organics organic odor				
2	Black, soft clay				
	Black, SILT and Organics decomposing sticks, brands, little clay, slight organic odor				
3	Tan/olive CLAY, some organics, slight odor	0.2 pm	0.2		SED2003 @ 2.5'-3' (1855) pm 0855
4					
5					
6					
7					



Boring Location: SEDZ1

Page 1 of 1

Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Project Name: Gorham

Geologist: Phil Muller

Date Started: 6.22.06

Drilling Company: AQUA Survey

Date Completed: 6.22.06

Drilling Method: Vibra Core

Total Depth: 8.5

Depth of Water:

Comments: recovery = 5.5

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	Black/Grey fine to coarse SAND, some Black silt, some organics		0.2		SEDZ101 @ 0-1' (1500)
1.3					
2	Brown/Grey med. to coarse SAND, some Gravel				
	little organics		0.2		
3					SEDZ103 @ 2.5-3' (1510)
3.5					
3.8	Grey CLAY, med. dense, some fine sand				
4					
5	Grey med. to coarse SAND, some tan staining		0.1		
5.3					
6					



Boring Location: SED 22

Page 1 of 1

Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Project Name: GORHAM

Geologist: TEH

Date Started: 6 22 06

Drilling Company: NARA Survey

Date Completed: 6 22 06

Drilling Method: VIBRACORE

Total Depth: 8.5

Depth of Water:

Comments: recovery =


Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	Black organic mat.		<1.0		SED-22 01 0-1' (1700)
2	Brown to Dark Brown silt and organic mat.		<1.0		
3	Dark Brown silt and organics to Brown/TAN sand fine and coarse.		<1.0		SED 22 03 @ 2-3 1710
3.8	Brown Tan sand to grey sand a fine dark brown deposit present. in tan CLAY and organic soft		<1.0		
4	Grey sand to fine sand and silt		<1.0		
5	Grey silt and clay, dense grading up to grey - some coarse sand (fine sand @ 5.5) (5.8 - coarse sand)		<1.0		
6.3					

Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Project Name: <u>Gurham</u>	Geologist: <u>TRH</u>
Date Started: <u>6 22 06</u>	Drilling Company: <u>Agri Survey</u>
Date Completed: <u>6 22 06</u>	Drilling Method: <u>Vibracore</u>
Total Depth: <u>8.5</u>	Depth of Water:
Comments: <u>Recovery 4.5</u>	

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	0-1' fine sand Brown TAN TRACE Gravel		<1.0 ppm		SED 23-01 6 22 06 0-1' 1530
2	Fine sand and silt TAN 1.5-2 Sand becomes more coarse TRACE ORGANIS				
3	TAN COARSE SAND SUBANGULAR MORE FINES PRESENT TOWARD 3'		<1.0 ppm		SED 23-03 @ 2-3' (1540)
4	FINE and COARSE sand becoming more greyish in TONE				
5	SAME as above w/ more subangular gravel present		<1.0 ppm		

 <p>Sediment Core Log</p> <p>MACTEC 107 Audubon Road Wakefield, MA</p>		Boring Location: <u>SE 24</u>			Page <u>1</u> of <u>1</u>	
		Project Name: <u>Gorham</u>		Geologist: <u>TRH</u>		
		Date Started: <u>6 22 06</u>		Drilling Company: <u>Aqua Survey</u>		
		Date Completed: <u>SAME</u>		Drilling Method: <u>Vibracore</u>		
		Total Depth: <u>8.5</u>		Depth of Water:		
		Comments: <u>Recovery 6'</u>				
Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID	
1	DARK ORGANIC MAT. SOME SILT.		< 1.0		SED 24 01 @ 1635 0-1'	
2	DARK ORGANIC MAT. SOME INDISTINGUISHABLE ^{TAN} SILT (black)		< 1.0			
3	DARK ORGANIC MAT. SOME TAN SILT.		< 1.0		SED 24 03 2-3' 1650	
4	TAN SILT WITH TRACE ORGANICS.		< 1.0			
5	TAN SILT CHANGING OVER TO GREY SAND (COARSE) AND GREY SILT. WHITE SILT OR CLAY		< 1.0			
6	COARSE AND FINE GREY SAND SUB-ROUND.					

Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Boring Location: **SED25**

Page 1 of 1

Project Name: **Gorham**

Geologist: **Phil Muller**

Date Started: **6.22.06**

Drilling Company: **Aqua Survey**

Date Completed: **6.22.06**

Drilling Method: **Vibracore**

Total Depth: **8.5**

Depth of Water:

Comments: **recovery = 7.1'**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	Black SILT, some organic soft organic odor			0.2	SED2501 @ 0-1' (1845)
1.6				4.1	
2					
3	Black SILT and Organic (Peat-like) soft			0.5	SED2503 @ 2.5-3' (1853)
4				Sampled 6.23.06	{ SED2503D (1005) SED2503MS (1010) SED2503MSD (1015)
5	OLIVE CLAY and Organic soft				
6					
7				Sampled 6.23.06	{ SED2507 @ 6-7' (1030) SED2507D (1035) SED2507MS (1040) SED2507MSD (1050)



Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Boring Location: SED 26

Page 1 of 1

Project Name: Gorham

Geologist: Phil Muller

Date Started: 6-22-06

Drilling Company: AQUA Survey

Date Completed: 6-22-06

Drilling Method: Vibra core

Total Depth:

Depth of Water:

Comments: recovery = 6.9

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	med. to Black coarse SAND and mix of shells, const debris (> 75 μm) and (angular particles) slag particles most likely organic, + gravel-like size particles		0.2		SED2601 @ 0-1' (1810)
2	2 clinker-like pieces - 2" size (placed in jar for further analysis) Black fine to coarse SAND				SED2602 @ 1.5-2' (1820)
2.4					
3	Black SILT, some organics				
3.3					
4	Peat, red/brown, little black silt				
5					SED2605 @ 4-5' (1830) (PAH, METALS) only
6					
7					



Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Boring Location: **SED27**

Page 1 of 1

Project Name: **Gorham**

Geologist: **Phil Muller**

Date Started: **6.22.06**

Drilling Company: **Aqua Survey**

Date Completed: **6.22.06**

Drilling Method: **Vibracore**

Total Depth: **8.5**

Depth of Water:

Comments: **recovery = 4.5**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	Black SILT, some Organic, organic odor, soft				SED2701 @ 0-1' (1735)
1.4					
2	Black SILT and Organic decaying vegetation peat-like		0.5		
2.3					
3	Med. to coarse, gray SAND, some Gravel little organic		1.2		SED2703 @ 2.5-3' (1746)
3.4					
4	Grey, med. to coarse SAND, little Gravel		0.4		
4.5					
5					
6					
7					



Boring Location: SED 28

Page ___ of ___

Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Project Name: Gorham

Geologist: Phil Muller

Date Started: 6-21-06

Drilling Company: Aqua Survey

Date Completed: 6-21-06

Drilling Method: Vibra Core

Total Depth: 6-5'

Depth of Water:

Comments: Recovery = 5.7'

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	Black SILT and organic, organic - Peat. organic odor soft		0		SED 2801 @ 6" - 12"
1.7	Small branch @ 2.2'		0		
2	Black Peat/organic, Some silt Branches, decayed wood		0		
3					SED 2803 @ 2.5 - 3.0'
4					
5	olive/Tan SILT and CLAY, Soft, some organic		0		
6					
7					

Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Project Name: **Grorham**

Geologist: **Phil Muller**

Date Started: **6-21-06**

Drilling Company: **Aqua Survey**

Date Completed: **6-21-06**

Drilling Method: **Vibracore**

Total Depth: **8.5'**

Depth of Water:

Comments: **recovery = 7.2'**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	Black SILT, soft and organic organic odor		0		SED 29 01 @ 6" - 12"
2					
3	Black Peat/organic Some Silt slight organic odor		0		
4	Olive/tan SILT and CLAY, some Organic Soft slight organic odor		0		SED 29 04 @ 3 - 4'
5					
6					
7					

7.2



Boring Location: SED-30

Page 1 of 1

Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Project Name: Gorham

Geologist: Phil Muller

Date Started: 6-21-06

Drilling Company: Aqua Survey

Date Completed:

Drilling Method: Vibra Core

Total Depth: 8.5'

Depth of Water:

Comments: recovery = 7.2'

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	.2" leave Leaf Litter pm				
	Black SILT and Organic		0		SED3001 @ 0.5' - 1'
1.7'	Some Sand, little fine Gravel, Organic odor little leaf litter				
2					
3	Black SILT and Organic 1 piece of Slag Slight organic odor		0		
3.6'					
4					SED3004 3.6' to 4'
5	Tan SILT and CLAY Soft, ^{some} little organic pm		0		
6					
7	Grey med. to coarse SAND pm mixed w/ olive soft CLAY		0		

MACTEC

Mark Padover
Henry Jenkinson
Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Boring Location: SED 31

Page 1 of 1

Project Name: Garham

Geologist: Phil Muller

Date Started: 6.21.06

Drilling Company: Aqua Survey

Date Completed: 6.21.06

Drilling Method: Vibracore

Total Depth: ~~6.0'~~ 8.5'

Depth of Water:

Comments: recovery = 6.0'

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	0.3 organic leaf litter	-	< 1.0 ppm 1.9 ppm @ 0.9'	-	SED 3101 @ 6" - 12" deep
	Black SILT and Organic Some Slag (1 chunk or piece) @ 1.5', some leaf litter				
2					
3	2.9				
4	3.6 DK. brown, med. to coarse SAND, little fine Gravel	-	1-2 ppm 1.8 ppm @ 3.3'	-	SED 3104 @ 3 - 3.6' deep
5	Grey fine to coarse SAND, little fine Gravel Some brown golden SAND	-	< 1 ppm	-	
6	little black Sand speckles little grey clay lenses		1.9 ppm @ 5.2'		
7	4" grey + orange CLAY, some fine Sand				

Notes: NO petroleum odor, some organic odor 0 - 2.9'

Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Project Name: **Gorham**

Geologist: **Phil Muller**

Date Started: **6.21.06**

Drilling Company: **Aqua Survey**

Date Completed: **6.21.06**

Drilling Method: **Vibra core**

Total Depth:

Depth of Water:

Comments: **recovery = 5.6'**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	2" Leaf litter grey fine to med SAND little some organic pm odor, not petroleum or organic (not recognizable)		0.2		SED 32 01 @ 6" - 12"
1.1 1.4	Black f. to coarse SAND, some red particles (probably sand), or shells, some organics Black SILT and organics piece of Stagh		0.5		
2	Soft				
2.5					
3	med Grey + orange stained fine to coarse SAND pm pm not well sorted		0		SED 32 04 @ 2.5 - 4' 3.5 1"
4					
5					
6					



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: **SED - 33** Page 1 of 1

Project Name: **Textron, Gorham** Geologist: **DLC**

Project Number: **3650110222** Drilling Company: **TG + B**

Date Completed: **12-19-11** Drilling Method: **vib racore**

Total Depth: **37.4'** Depth to Water: **/**

Comments: **/**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0-1	Mostly brown-tan, poorly graded, coarse-med sand, some gravel	1.0/0.9	20.1 4.2 53.3	/	SED-33-01 Dioxin/Furans pp-13 metals, AVG: 924. TOC, grain size, % solid @ 14100
0-6.6	Mostly dark brown-brown-tan, poorly graded, coarse-med sand, wet, some gravel	8.9/6.6	0.5 1.1 0.2 0.3	/	SED-33-18 TOC, % solid, grain size @ 14115
8					



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Walesfield, MA

Boring Location: SED-34 Page 1 of 1

Project Name: Textron, Gorham Geologist: MLC

Project Number: 3650110222 Drilling Company: TG+B

Date Completed: 12-20 Drilling Method: Vibracore

Total Depth: 44.7' Depth to Water: /

Comments: Lack of recovery on 0-8' due to loose urban fill

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 ↓ 2	0-1: Mostly brown-dark brown coarse sand, some med sand, some gravel/cobble	1.0/1.0	0.2 0.4 0.7	/	SED- 34 -48-01 34 DRAINAGE/FUNCTIONS PP-13 METALS, AVG: SBM, TAC, GRAIN SIZE NO SOLIDS @ 10:50
0 ↓ 8	0-1.5: Mostly same as above, but brick frags/urban fill	8.0/1.5	0.1 0.1 0.2	/	SED- 34 -18 34 TAC, % SOLIDS, GRAIN @ 11:00



Boring Location: SED-35

Page 1 of 1

Project Name: Terran Gorham

Geologist: DLG

Project Number: 3650110222

Drilling Company: TCB

Date Completed: 12-16-11

Drilling Method: vibracore

Total Depth: 8'

Depth to Water: /

Comments: /

Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 8 inches	Sample ID
0 - 1	Mostly brown, dark brown poorly graded gravelly coarse sand, some med sand fine	1.0 / 0.9	0.2 0.2 0.3	/	SED-35-01 for Diagnostics / Fuels AN: SBM, PP-13 metals, TOC, grain size, % solids; @ 11:26
2 - 4.1	0 - 1: Mostly tan-gray med sand, some fines, well graded	8.0 / 4.1	9.7		SED-40-10 grain size, TOC, % solid @ 11:45
	1 - 1.7: Same as above but more coarse, some gravel, well graded		12.6		
	1.7 - 4.1: Same as above, but transitioning to cobbles (rounded)		15.2		
8			6.3		



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: SED-36 Page 1 of 1

Project Name: Textron, Gorham Geologist: DLL

Project Number: 3690110222 Drilling Company: TG-8

Date Completed: 12-14-11 Drilling Method: Vibracore

Total Depth: 8 Depth to Water: /

Comments: /

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 1 1	0-1.0: Mostly dark brown, black organics and silt; some sand, loose. No odor	1.0/1.0	0.1 0.3 0.2		SED-36-01 / SED-36-01 DUP for: Dioxins, Furans pp-13 metals, AQS/ SEM, % Solids, TOC, grain size Sample # E1140
1 	0-1.9: Gray-tan coarse sand, some fine, poorly graded 1.9-7.0: Mostly dark brown, brown organics, some fine sand	2.0/7.0	0.1 0.2 0.2		SED-36-12 for % Solids grain size, TOC Sample # E1150
	Some silt, some small wood fragments / plant matter				
8					



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: SED-³47

Page 1 of 1

Project Name: Textron,
Gorham

Geologist: DL

Project Number: 3650110222

Drilling Company: TG + B

Date Completed: 12-15-11

Drilling Method: vibracore

Total Depth: 2'

Depth to Water:

Comments:

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 - 1	0 - 1: Mostly gray-tan poorly graded, med-coarse sand, some gravel, some cobble.	1.0/1.0	0.9 1.2 2.4 0.3	/	Sample ID 3 SED-37-01 for: Diatoms, Furans, PD-13 metals, TOC, AUS: SEM, grain size @ 14:45 % solids
1 - 3	0 - 3: Mostly gray-tan med-coarse uniform sand, some fines, 3 - 3.6: Gray-tan sub-rounded poorly graded sandy gravel	2.0/5.9	2.2 12.6 17.3 6.3		SED-37-10 % solids, grain size, TOC @ 14:55
3.6 - 5.3	3.6 - 5.3: Same as 0.3' above, but small lenses of silt throughout				
2					



Boring Location: SED-38

Page 1 of 1

Project Name: Textron
Gorham

Geologist: DLK

Project Number: 265011022

Drilling Company: TC+B

Date Completed: 12-13-11

Drilling Method: Vibracore

Total Depth: 8'

Depth to Water: /

Comments: /

Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 1 1	0-0.3: Mostly med. coarse, brown, tan sand, some cobbles 0.3-1.0: Same as above but bands of gray-brown respectively, at 0.7 and 0.9'	1.0/1.0	CO.1	/	SED-38-01 PP-13 metals Dioxin, Furans, AUS, SBM, grain size, TOC, % Solids @ 15:20
1	1-4': Same as above, but well graded from med. coarse @ gray 4-5.1: Brown tan fine-med sand, well graded, no odor	2.0/3.5	CO.1	/	SED-38-18 % Solids TOC, grain size @ 15:30
	5.1-5.5: Same as above, but uniform, some silt, no odor			/	
8					



Boring Location: SED-39. #14 @

Page 1 of 1

Project Name: Textron
Garham

Geologist: DLK

Project Number: 3650110222

Drilling Company: TG + B

Date Completed: 12-14-11

Drilling Method: v. b. 600000

Total Depth: 8'

Depth to Water: /

Comments: /

Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 Inches	Sample ID
0 1 1	0-1: Mostly dark brown, black organic silt mixture, saturated	1.0 / 1.0	0.2	/	SED-39-01 for Di.oxin/ Furans, PP-18 metals, AUS/SEM, TOC, % Solids, grain size @ 12:10
2 2 2	0-2.2: Mostly gray-tan fine-med sand, poorly graded 2.2-7.0: Same as above, med-coarse sand	8.0 / 7.6	0.3 0.2 13.2		SED-39-1B for % Solids, grain size, TOC @ 12:30
8					



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: SED. 40

Page 1 of 1

Project Name: Textron,
Gorham

Geologist: DLG

Project Number: 3650110222

Drilling Company: TG + B

Date Completed: 12-16-11

Drilling Method: VIBROCORP

Total Depth: 9'

Depth to Water: /

Comments:

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 1 2	0-1: Mostly brown-tan gravelly coarse sand, poorly graded	1.0 / 1.0	0.2 0.1 0.1	/	SED-40-01 DISSOLV FURANS, PP-13 METALS, AUS: SBM. % SOLIDS, GRAIN SIZE, TOC @ 12:00
2	0-1: Mostly brown silt, some fine sand, med dense, wet 1-2: Mostly fine-med sand, poorly graded, some silt.	8.0 / 6.6	0.2 0.2 0.2	/	SED-40-18 % SOLIDS, GRAIN SIZE, TOC @ 12:15
	2-3: Mostly gravelly sand, some gravel, loose 3-5: Brown sandy silt, some fine sand		0.1 0.1 0.1		
	5-6.6: Brown med sand, some fine sand, poorly graded				



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: **SED-41** Page 1 of 1

Project Name: **Tetron, Gorham** Geologist: **DW**

Project Number: **3650110222** Drilling Company: **TC-B**

Date Completed: **12-15-11** Drilling Method: **vibracore**

Total Depth: **8'** Depth to Water: **/**

Comments: **/**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 1 1	Mostly dark brown-black organic/silt mixture, some fine sand, saturated	1.0/1.0	0.2 0.4 2.1 0.9		SED-41-01 for: Diatom/ Furan, Pb-Pb metals, Avg: SEM % Solids, Toc, grain size
2 ↓	0-1: Mostly same as above, more fines 1-2: Gray-tan med to coarse sand, poorly graded, some fines	8.0/5.3	0.3 0.4 10.1 40.2 32.6		@ 10:20 SED-41-1B % Solids, Toc, grain size @ 10:40
	2 & 5.3: Same as above				
8 ↓					



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: SED - 42

Page 1 of 1

Project Name: Tetron
Gorham

Geologist: DUC

Project Number: 3650110222

Drilling Company: TQ + B

Date Completed: 12-11-11

Drilling Method: VIBROCORE

Total Depth: 8'

Depth to Water: /

Comments:

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 1 2	Mostly brown - tan gray gravelly sand, poorly graded, some cobbles	1.0/1.0	0.4 13.9 3.5	/	SED-42-01 for diatoms/ FUSONS, AUST/ SEM, PP-13 metals TOC, % Solids, Grain Size @ 10:00
2 	0 - 0.4: Black to gray cobbles and med. coarse, poorly graded sand, black material throughout	2.0/4.1	30.6 2.0/4.1 10.2 58.6 0.6	(2)	
8	0.4 - 3.8: Mostly tan, poorly graded med. coarse sand, some fines. 3.8 - 4.1: same as above, more fines, brown		0.5 0.4 0.3		SED-42-18 (2) for: diatoms FUSONS, AUST SEM, PP-15 metals, TOC, % Solids, Grain Size @ 10:15



Boring Location: SED-430 Page 1 of 1

Project Name: Textron Gorham Geologist: DLC

Project Number: 3650110222 Drilling Company: TG+B

Date Completed: 12-19-11 Drilling Method: VIBROCORE

Total Depth: 8' Depth to Water: /

Comments: /

Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 1	0 - 1: Mostly dark brown - black organic/ silt mixture, saturated	1.0/1.0	0.2 0.2 0.3	/	SED-43-01 SED-43-01 DUP DROU/ FURANS PP-13 metals, AMS:SEM. % solids, @ 14:46 grain si
1 2	0 - 1.2: Mostly same as above, but sandy 1.2 - 6.4: Dark brown, black black med sand.	8.0/ 6.4	0.1 0.2 0.3	/	SEP-43-1B % solids, grain size, TOC @ 15:10 16:09
	some silt, some organics				
8					



Boring Location: SED-44

Page 1 of 1

Project Name: Textron, Gorham

Geologist: DLG

Project Number: 365011022

Drilling Company: TCB

Date Completed: 12-15-11

Drilling Method: vibracore

Total Depth: 8'

Depth to Water: /

Comments: /

Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 1 2	0-1: Mostly dark brown - black organic silt mixture, saturated, loose	1.0/1.0	0.2 0.3 0.3	/	SED-44-01 for: Dioxins/ Furans, PP-13 metals, TOC, A SEM, % solids, grain size @ 11:30
1 	0-4.3: Mostly same as above: lighter brown, less saturated 4.3-7.4: Same as above w/ lenses of gray - tan med to coarse sand	2.0/7.4	0.3 13.6 32.6 64.8 17.3		SED-44-1B for: TOC, grain size % solids @ 11:45
8					



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: SED-45 Page 1 of 1

Project Name: Textron, Gorham Geologist: DLK

Project Number: 3650110222 Drilling Company: TG + B

Date Completed: 12-14-11 Drilling Method: vibracore

Total Depth: 8' Depth to Water: /

Comments: /

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 Inches	Sample ID
0 1 1	0-1: Mostly beach dark brown - black organics + silt saturated	1.0 / 1.0	0.2 0.3 30.2 78.1	/	SED-45-01 for: Dioxins, Furans, AUSAEM PP-13, 70 solids grain size, TC @ 15:30
1 1 7	0-0.6: Same as above, some sand poorly graded 0.6-5.0: Gray-tan poorly graded, cobby coarse sand, some gravel	2.0 / 5.0	0.1 0.3 0.2	/	SED-45-1B 70 solids, grain size, TOC @ 15:20



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: **SBD - 46** Page 1 of 1

Project Name: **TETRON, Gorham** Geologist: **DLC**

Project Number: **3650110222** Drilling Company: **TG + B**

Date Completed: **12-20-11** Drilling Method: **TG + B**

Total Depth: **2'** Depth to Water: **/**

Comments: **/**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 ↓ 1	Mostly dark brown - black organic / silt mixture, saturated	1.0 / 1.0	40.1 0.2	/	SBD-46-01 Dioxins / Furans PP-13 metals, AUS; SBM, TOC. % Solids, grain size @ 15:05
0 ↓ 2	Mostly dark brown - black organic / silt mixture, saturated		8.01 7.1	/	SBD-46-18 % Solids / grain size, TOC @ 15:25



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: **SED-47** Page 1 of 1

Project Name: **Tetron, Gorham** Geologist: **DL**

Project Number: **3650110222** Drilling Company: **TC+B**

Date Completed: **12-15-11** Drilling Method: **vibracore**

Total Depth: **8'** Depth to Water: **/**

Comments: **/**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 1 1	Mostly dark brown/black organic / silt mixture saturated	1.0 / 1.0	0.2 0.4 0.6	/	SED-47-01 Dioxin/ Furans, AUS: SEM, TOC PP-13 metals grain size, % soil @ 15:05
1 ↓ 8	a- 7.2: Mostly same as above, but lighter brown, less saturated	8.0 / 7.2	0.3 2.1 17.6 13.7		SED-47-18 % solids, grain size, TOC @ 15:20



Boring Location: SED-48

Page 1 of 1

Project Name: TETRON

Geologist: DLG

Project Number: 3650110222

Drilling Company: TCB

Date Completed: 12-14-11

Drilling Method: VIBROCORE

Total Depth: 2'

Depth to Water: /

Comments: /

Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Walesfield, MA

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 1 1	0-1: Mostly dark brown, black organics and silt, uniform, saturated, no odor	1.0/1.0	0.2 0.2 0.3	/	<u>SED-48-01</u> for Diatoms/ Furans, PP-13 Metals, AV9/SBM TOC, % Solids, Grain Size @ 14:15
1 1 2	0-70: Same as above but transitioning to brown, more organics	2.0/7.0	2.1		<u>SED-48-18</u> for: TOC, % Solids, Grain Size @ 14:30



Boring Location: SED - 49

Page 1 of 1

Project Name: TETRON, Gorham

Geologist: DLK

Project Number: 3650110222

Drilling Company: T C + B

Date Completed: 12-13-11

Drilling Method: Vibracore

Total Depth: 8.01

Depth to Water: /

Comments:

Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0	0 - 3.3 Mostly dark brown, loose, organic silt, some roots/leaves saturated No odor	8.0/7.2	< 0.1	/	SED-49-08 for 70 solid, grain size, TOC @ 11:50
	3.3 - 5.2: Brown, tan med sand, some what graded, wet No odor				
	5.2 - 7.2: Same as above, tan, coarse grained				
8					



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: SRD-50 Page 1 of 1

Project Name: Textron, Gorham Geologist: DLC

Project Number: 3650110222 Drilling Company: TA + B

Date Completed: 12-13-11 Drilling Method: vibracore

Total Depth: 8.0' Depth to Water: /

Comments: /

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0	0 - 3.5 : Mostly dark brown organic silt, some leaves, some roots, saturated, loose no odor	8.0/7.1	20.1	/	SRD-50-08 for 70 solids, TOC, grain size @ 10:30
	3.5 - 7.1 : Mostly tan-brown coarse grained sand, poorly graded, wet, no odor				
8	End of boring: <u>8.0'</u>				



Boring Location: **SED - 50 51**

Page 1 of 1

Project Name: **Textron, Gorham**

Geologist: **DLC**

Project Number: **3650110222**

Drilling Company: **TC + B**

Date Completed: **12-13-11**

Drilling Method: **vibracore**

Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Total Depth: **8'**

Depth to Water: **/**

Comments: **/**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0	0 - 2.0 : Mostly dark brown, loose, organic silt, some roots, leaves, saturated no odor	8.0 / 5.3	20.1 0.1 0.5		SED-51-08 for: grain size, % Solids, TOC @ 12:10
	2.0 - 5.3 : Mostly brown, tan med. coarse sand, some fines, band of darker material from 3.8 - 4.0, wet, no odor		1.0 1.9 0.9 1.0 0.3 0.4		
8					



Boring Location: SED-52

Page 1 of 1

Project Name: TETRON, Gorham

Geologist: DLK

Project Number: 3650110222

Drilling Company: TG + B

Date Completed: 12-16-11

Drilling Method: VIBROCORE

Total Depth: 41'

Depth to Water: /

Comments: /

Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0	0-4: Mostly dark brown - black organic silt mixture, saturation uniform	4.0/4.0	1.7 2.2 1.3	/	SED-52-01 Dioxins / Furans, PP-13 metals, ANALYSEM, TOC, % solids, grain size @ 13:15
4					



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: SED-53 Page 1 of 1

Project Name: Textron, Garham Geologist: DLK

Project Number: 3650110222 Drilling Company: TG+B

Date Completed: 12-16-11 Drilling Method: Vibracore

Total Depth: 4' Depth to Water: /

Comments: /

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0	0-1.5: mostly dark brown - black organic silt mixture, saturated	4.0 / 4.0	0.2	/	SED-53-01 Dioxins, Furans PP-13 metals, AUS: SEM, % solids grain size, TOC @ 3:35
	1.5-3.4: same as above, denser, browner		0.3		
	3.4-4.0: gray-tan med-fine sand, poorly graded		0.5		
4					



Boring Location: SED. 54.01

Page ___ of ___

Project Name: Textron, Gorham

Geologist: DLK

Project Number: 3650110222

Drilling Company: TG+B

Date Completed: 12-16-11

Drilling Method: vibracore

Total Depth: 4'

Depth to Water: /

Comments: /

Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0	0 - 2.5: Mostly brown-black organic / silt mixture, some fine sand 2.5 - 2.8: Tan med sand, some fines, poorly graded, some gravel	4.0139	CO.1 CO.1	/	SED. 54.01 Dioxins / Furans, AUS: SEM, PP-13 metals, TOC, grain size, % 3:45 salinity
	2.8 - 3.0: same as 0.2.5 above				
4					



Boring Location: SED-55

Page 1 of 1

Project Name: Tectron, Gorham

Geologist: DLG

Project Number: 3650110222

Drilling Company: TG+B

Date Completed: 12-16-11

Drilling Method: vibrocore

Total Depth: 4'

Depth to Water: /

Comments: /

Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ Inches	Sample ID
0	0-3.2 mostly brown-dark brown organic, silt mixture, loose, saturated	4.0/3.2	20.1 20.1 0.2	/	SED-55-01 DIOMING / FURAM, PP-13 METALS, AUS: SEM. % solids, TOC, GRAIN SIZE @ 14:30
4					



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: **SED-56** Page 1 of 1

Project Name: **Textron, Gorham** Geologist: **DLL**

Project Number: **3650110332** Drilling Company: **TG+B**

Date Completed: **12-16-11** Drilling Method: **Vibracore**

Total Depth: **4'** Depth to Water: **/**

Comments: **/**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 ↓ 1	0-4: Mostly dark brown-black organics, silt mixture, some fine sand 3.3	4.0/3.3	20.1 0.2 0.2	/	SED-56-01 Diethyls/Furans, PP-13 metals AUS, SBM, % solids, grain size, TOC @ 14:45



Boring Location: SED-57

Page 1 of 1

Project Name: Textron, Gorham

Geologist: DLC

Project Number: 3650110222

Drilling Company: TG+B

Date Completed: 12-16-11

Drilling Method: vibracore

Total Depth: 4'

Depth to Water:

Comments:

Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0	0 - 1.5 : Mostly brown-dark brown-black organics/ silt mix, some fine sand, saturated 1.5 - 2.0: Gray-tan med-coarse, poorly graded sand	4.0 / 3.5	0.1 0.2 0.4 0.2	/	SED-57-01 for: Dioning/ Furans, PP-13 metals, ANS, SEM grain size, % sand TOC @ 14:55
1	2.0 - 3.5: same as 0-1.5, but less saturated				



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: SED-58

Page 1 of 1

Project Name: TETRON

Geologist: DLK

Project Number: 3650110222

Drilling Company: TC+B

Date Completed: 12-16-11

Drilling Method: VIBROCORE

Total Depth: 4'

Depth to Water: /

Comments: /

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0	0 - 0.5: Dark brown - black med. coarse sand 0.5 - 3.6: Gray-tan coarse sand, some gravel, some sub-rounded cobble, loose, poorly graded	4.0 / 3.6	201 0.2 0.1	/	SED-58 Dioxins/Furans, ANS; SEM, PP-13 metals, TCL, % solids, grain @ 15:10 size
4					



Boring Location: SBD-59

Page 1 of 1

Project Name: Tetxon, Gorham

Geologist: DLG

Project Number: 365M10222

Drilling Company: TG+B

Soil Boring Log

Date Completed: 12-20-11

Drilling Method: Vibracore

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Total Depth: 8'

Depth to Water: /

Comments: /

Depth (feet)	Stratigraphy Description	Penetration/Recovery (feet)	Headspace (ppm)	Blows/8 inches	Sample ID
0 ↓ 1	Mostly brown-tan coarse sand, poorly graded, some gravel, some cobbles	1.0/0.9	40.1 40.1	/	SBD-59-01 Dioxins / Furans ANIS: SEM, PP-19, Metals, % Solids, Grain Size, TOC @ 14140
c 2	Mostly brown-tan coarse-med poorly graded sand, some rounded cobbles	8.0/6.3	0.2 0.2	/	SBD-59-19 % Solids, Grain Size, TOC @ 14150



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: **SB-60**

Page **1** of **1**

Project Name: **TETRON,
Gorham**

Geologist: **DLC**

Project Number: **3650110222**

Drilling Company: **TG + B**

Date Completed: **12-20-11**

Drilling Method: **vibracore**

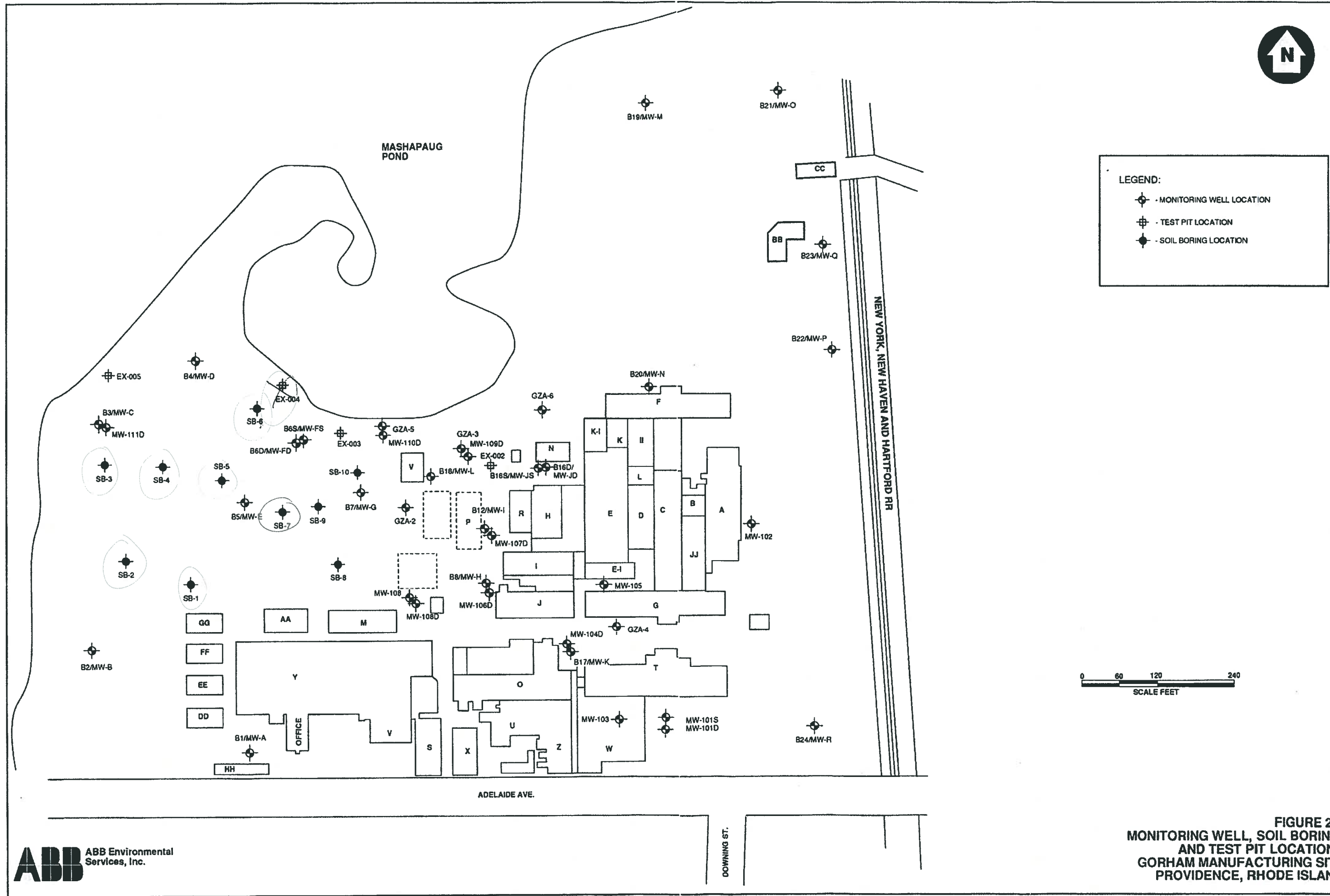
Total Depth: **8'**

Depth to Water: **/**

Comments: **/**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 8 inches	Sample ID
0 ↓ 2	Mostly brown-tan coarse sand, some med some gravel / cobble	1.0/1.0	0.1 0.1 0.2	/	SB0-60-01 Dioxin/Furans, PP-13 metals, Avg: SEM, TOC, % solids, grain size @ 12:05
2	1-2.5: Mostly brown-tan coarse-med sand well graded, some gravel 2.5-7.8: Gray-tan fine sandy silt-clay / silt mixture, semi-plastic, wet	8.0/7.8	0.1 0.2 0.1	/	SB0-60-10 % solid, grain size, TOC @ 14:00
8					

APPENDIX A - 2.1
Parcel C Soil Boring-MW Logs



LEGEND:

- ⊕ - MONITORING WELL LOCATION
- ⊕ - TEST PIT LOCATION
- ● - SOIL BORING LOCATION



FIGURE 2-3
MONITORING WELL, SOIL BORING,
AND TEST PIT LOCATIONS
GORHAM MANUFACTURING SITE
PROVIDENCE, RHODE ISLAND



ABB ENVIRONMENTAL SERVICES, INC.

FIELD BORING LOG

BORING NO.: SB-1

PROJECT NO.: 9111-11

PROJECT NAME: TEXTRON / GORHAM

PAGE 1 OF 1

CONTRACTOR: GEOLOGIC

DRILLER: R. EASTWOOD

DATE STARTED: 10/24/94

COMPLETED: 10/24/94

METHOD: HSA

CASING SIZE: 4 3/4"

PID: OVM

PROTECTION LEVEL: D

GROUND ELEV.

SOIL DRILLED: 30'

WATER LEVEL:

TOTAL DEPTH: 32'

LOGGED BY: K. DONOVAN

CHECKED BY:

DATE:

SAMPLE NO.	DEPTH IN FEET	BLOWS PER 6 INCHES	PEN REC	JAR HEADSPACE (ppm)	DESCRIPTION	NOTES
					0-2": Asphalt.	
S1	0-2	6,6,8,4	2.0/2.0	0	0-1.5': Sand, 94% fine, 5% medium, 1% silt, dark brown. 1.6-2': SAND, fine, 10% medium, 2% coarse, brown grading to tan.	Fill
S2	5-7	16,17,19,20	2.0/2.0	0	SAND, fine, 15% medium, 5% coarse, grey brown, asphalt.	Fill
S3	10-12	22,22,13,9	2.0/2.0	0	SAND, fine, 15% medium, 10% coarse, quartz, iron staining.	Fill
S4	15-17	24,20,22,18	2.0/2.0	0	SAND, fine, 20% medium, 10% coarse, similar to S3.	Fill
S5	20-22	7,8,8,9	2.0/2.0	0	SAND, fine, grading to 30% medium at 21-22', gray, dry.	
S6	25-27	14,11,11,18	2.0/2.0	0	0-1.4': SAND, fine, 20% medium, dry to damp. 1.5-2.0': SAND, fine, gray, wet.	Native material
S7	30-32	25,28,26,23	2.0/2.0	0	SAND, fine 90% coarse, 20% medium, brown.	Native material
					Bottom of borehole at 32' b.g.s.	



ABB ENVIRONMENTAL SERVICES, INC.

FIELD BORING LOG

BORING NO.: SB-2

PROJECT NO.: 9111-11		PROJECT NAME: TEXTRON / GORHAM		PAGE 1 OF 1	
CONTRACTOR: GEOLOGIC		DRILLER: R. EASTWOOD	DATE STARTED: 10/25/94	COMPLETED: 10/25/94	
METHOD: HSA		CASING SIZE: 4 3/4"	PID: OVM	PROTECTION LEVEL: D	
GROUND ELEV.		SOIL DRILLED: 30'	WATER LEVEL:	TOTAL DEPTH: 32'	
LOGGED BY: K. DONOVAN		CHECKED BY:	DATE:		

SAMPLE NO.	DEPTH IN FEET	BLOWS PER 6 INCHES	PEN REC	JAR HEADSPACE (ppm)	DESCRIPTION	NOTES
					0-2": Asphalt.	
S1	0-2		2.0/1.5	0	Top 2": SAND, fine, 10% coarse. Next 0.5': SAND, fine sand with cloth, red staining, pieces of iron, very weathered, brick, green.	Fill
S2	5-7		2.0/2.0	0	Top 1': SAND, fine, brown, wood chips, weathered iron slag, layers of clean sand. Next 0.5': SAND, 40% medium, 60% fine, dark brown. Last 0.5': SAND, fine, red-brown.	Fill
S3	10-12	7,8,8,9	2.0/1.5	0	SAND, 80% fine, 15% medium, 5% coarse, brown, dry.	
S4	15-17		2.0/1.5	0	SAND, interbedded layers (4" thick) of sand, fine, 20% medium and sand, fine, 40% medium.	
S5	20-22	85,21,18,17	2.0/2.0	0	SAND, fine, 30% coarse, gray, dry.	
S6	25-27	3,5,5,5	2.0/2.0	0	SAND, fine, 10% silt, interbedded (1/16" layers of dark gray and red-brown) gray, wet.	
S7	30-32	20,15,24,23	2.0/2.0	0	Similar to S6, more layers of fine sand.	
					Bottom of borehole at 32' b.g.s.	



ABB ENVIRONMENTAL SERVICES, INC.

FIELD BORING LOG

BORING NO.: SB-3

PROJECT NO.: 9111-11		PROJECT NAME: TEXTRON / GORHAM		PAGE 1 OF 1	
CONTRACTOR: GEOLOGIC		DRILLER: R. EASTWOOD	DATE STARTED: 10/25/94	COMPLETED: 10/25/94	
METHOD: HSA		CASING SIZE: 4 3/4"	PID: OVM	PROTECTION LEVEL: D	
GROUND ELEV.		SOIL DRILLED: 25'	WATER LEVEL:	TOTAL DEPTH: 27'	
LOGGED BY: K. DONOVAN		CHECKED BY:	DATE:		

SAMPLE NO.	DEPTH IN FEET	BLOWS PER 6 INCHES	PEN REC	JAR HEADSPACE (ppm)	DESCRIPTION	NOTES
					0-2": Asphalt.	
S1	0-2		2.0/1.5	7.7	Top 6": SAND, fine, 20% medium, glass Last 1': SAND, fine, slag, iron layers, casting sand, copper staining.	Fill
S2	5-7		2.0/0	-	SAND, fine, 20% medium, brown, dry.	
S3	10-12	6,8,8,15	2.0/1.5	0	Similar to S2.	
S4	15-17	28,43,10,8	2.0/0.5	0	SAND, fine, 10% coarse, 20% medium, brown.	Fill
S5	20-22	10,10,12,17	2.0/2.0	0	SAND, 90% fine, 10% silt, interbedded 1/16" layers dark gray/red-brown, gray.	
S6	25-27	6,6,14,20	2.0/2.0	0	Similar to S5.	
					Bottom of borehole at 27' b.g.s.	



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FIELD BORING LOG

BORING NO.: SB-4

PROJECT NO.: 9111-11		PROJECT NAME: TEXTRON / GORHAM		PAGE 1 OF 1	
CONTRACTOR: GEOLOGIC		DRILLER: R. EASTWOOD	DATE STARTED: 10/25/94	COMPLETED: 10/25/94	
METHOD: HSA		CASING SIZE: 4 3/4"	PID: OVM	PROTECTION LEVEL: D	
GROUND ELEV.		SOIL DRILLED: 25'	WATER LEVEL:	TOTAL DEPTH: 27'	
LOGGED BY: K. DONOVAN		CHECKED BY:	DATE:		

SAMPLE NO.	DEPTH IN FEET	BLOWS PER 6 INCHES	PEN REC	JAR HEADSPACE (ppm)	DESCRIPTION	NOTES
					0-3": Asphalt.	
S1	0-2		2.0/1.5	0	Top .75': SAND, 80% fine, 15% medium, 5% coarse, brown. Next .75': SAND, fine, glass, fibers, wood, iron nail, iron slag.	Fill
S2	5-7		2.0/1.7	0	Top 0.2': SAND, fine, wood chips. 0.5': SAND, fine, 10% medium, brown. 0.5': SAND, fine, 40% medium, brown. 0.5': SAND, fine, 5% medium, light brown.	
S3	10-12	6,8,7,7	2.0/1.5	0	SAND, 90-95% fine, 5-10% medium, light brown.	
S4	15-17	6,6,8,14	2.0/2.0	0	Similar to S3, more coarse, 20-40% medium, light brown.	
S5	20-22	10,11,15,14	2.0/2.0	0	SAND, fine, 5% silt, interbedded with fine sand, gray.	
S6	25-27	8,8,12,11	2.0/2.0	0	Similar to S5	
					Bottom of borehole at 27' b.g.s.	



ABB ENVIRONMENTAL SERVICES, INC.

FIELD BORING LOG

BORING NO.: SB-5

PROJECT NO.: 9111-11	PROJECT NAME: TEXTRON / GORHAM		PAGE 1 OF 1
CONTRACTOR: GEOLOGIC	DRILLER: R. EASTWOOD	DATE STARTED: 10/26/94	COMPLETED: 10/26/94
METHOD: HSA	CASING SIZE: 4 3/4"	PID: OVM	PROTECTION LEVEL: D
GROUND ELEV.	SOIL DRILLED: 20'	WATER LEVEL:	TOTAL DEPTH: 22'
LOGGED BY: K. DONOVAN	CHECKED BY:	DATE:	

SAMPLE NO.	DEPTH IN FEET	BLOWS PER 6 INCHES	PEN REC	JAR HEADSPACE (ppm)	DESCRIPTION	NOTES
					0-3": Asphalt.	
S1	0-2	7,4,1,1	2.0/2.0	4.5	Top 1': SAND, fine, green brown, wood, dry. Bottom 1': Mixture of casting sand, fine purple/black sand with fibers, white, hard, fine gained material.	Fill
S2	5-7		2.0/2.0	0.5	Top 1': SAND, 90% fine, 10% medium, purple staining. Bottom 1': SAND, 95% fine 5% medium.	
S3	10-12	10,11,18,23	2.0/2.0	0	SAND, fine, 30% medium, 5% coarse, brown, dry.	
S4	15-17	32,24,31,31	2.0/2.0	0.5	SAND, fine, 5% silt, 1/16" layers of dark brown and dark gray fine sand, gray, wet.	
S5	20-22	12,11,11,15	2.0/2.0	0	Similar to S4.	
					Bottom of borehole at 22' b.g.s.	



ABB ENVIRONMENTAL SERVICES, INC.

FIELD BORING LOG

BORING NO.: SB-6

PROJECT NO.: 9111-11		PROJECT NAME: TEXTRON / GORHAM		PAGE 1 OF 1	
CONTRACTOR: GEOLOGIC		DRILLER: R. EASTWOOD	DATE STARTED: 10/26/94	COMPLETED: 10/26/94	
METHOD: HSA		CASING SIZE: 4 3/4"	PID: OVM	PROTECTION LEVEL: D	
GROUND ELEV.		SOIL DRILLED: 25'	WATER LEVEL:	TOTAL DEPTH: 27'	
LOGGED BY: K. DONOVAN		CHECKED BY:	DATE:		

SAMPLE NO.	DEPTH IN FEET	BLOWS PER 6 INCHES	PEN REC	JAR HEADSPACE (ppm)	DESCRIPTION	NOTES
					0-3": Asphalt.	
S1	0-2	6,6,4,5	2.0/1.5	7.3	SAND, fine, black, fibers, casting sand, iron pieces, copper wire.	Fill
S2	5-7		2.0/.25	11.8	Similar to above.	Drill cuttings contained: wood, crushed tin can, wire mesh, roots (1" dia.) copper wire.
S3	10-12	2,4,6,2	2.0/1.5	4.8	SAND, fine, brown, casting sand, iron, iron slag, fibers, cloth, glass, wood debris.	Fill
S4	15-17		2.0/1.5	2.8	SAND, fine, layers of light brown casting sand, white, yellow-orange and black, fine grained material, hard to soft, pieces of slag (furnace?).	
S5	20-22	2,3,13,14	2.0/2.0	0	SAND, fine, 20% medium, iron staining, roots, wet.	
S6	25-27	7,21,50	2.0/1.0	0	SAND, 75% fine, 25% medium, brown, wet.	
					Bottom of borehole at 27' b.g.s.	



ABB ENVIRONMENTAL SERVICES, INC.

FIELD BORING LOG

BORING NO.: SB-7

PROJECT NO.: 9111-11		PROJECT NAME: TEXTRON / GORHAM		PAGE 1 OF 1	
CONTRACTOR: GEOLOGIC		DRILLER: R. EASTWOOD	DATE STARTED: 10/26/94	COMPLETED: 10/26/94	
METHOD: HSA		CASING SIZE: 4 3/4"	PID: OVM	PROTECTION LEVEL: D	
GROUND ELEV.		SOIL DRILLED: 25'	WATER LEVEL:	TOTAL DEPTH: 27'	
LOGGED BY: K. DONOVAN		CHECKED BY:	DATE:		

SAMPLE NO.	DEPTH IN FEET	BLOWS PER 6 INCHES	PEN REC	JAR HEADSPACE (ppm)	DESCRIPTION	NOTES
					0-2": Asphalt.	
S1	0-2		2.0/2.0	1.1	SAND, fine, brown, 5% coarse sand, piece of metal (copper), casting sand, iron.	Fill
S2	5-7		2.0/1.0	0	SAND, fine, brown, wood, brick chips.	Fill
S3	10-12	5,6,11,12	2.0/2.0	0	SAND, fine, 5% medium, dark brown grading to light brown, dry.	Native material
S4	15-17	9,9,11,14	2.0/1.0	0	Similar to S3.	
S5	20-22	8,10,15,10	2.0/1.0	0	Similar to S4, 20% medium sand.	
S6	25-27	10,11,11,11	2.0/1.0	0	Similar to S4, wet.	
					Bottom of borehole at 27' b.g.s.	

2003 5 29 11:05



**SITE INVESTIGATION REPORT -
ADDITIONAL ASSESSMENT TASKS
PROVIDENCE YMCA - PARCEL C
PROVIDENCE, RHODE ISLAND**

PREPARED FOR:

Rhode Island Department of Environmental Management
Providence, Rhode Island

PREPARED BY:

GZA GeoEnvironmental, Inc.
Providence, Rhode Island

May 2003
File No. 32384.02

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BORING CO. GZA Drilling, Inc.
 FOREMAN Chris Lenfing
 GZA ENG. Wendell T. Barry

BORING LOCATION See Exploration Location Plan
 GROUND SURFACE ELEV. ±68.7' DATUM NGVD
 DATE START 11-14-01 DATE END 11-14-01

SAMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF A 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 IN
 CASING: UNLESS OTHERWISE NOTED, CASING DRIVEN USING A 300 lb HAMMER FALLING 24 IN.
 CASING SIZE: OTHER 3 3/4" HSA

GROUNDWATER READINGS				
DATE	TIME	WATER	AUGER	STABILIZATION TIME
11-14-01	1050	29'	30'	30 minutes

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
5		S-1	24/11	0-2	4-7	Top 7": Medium dense, brown, fine to medium SAND, some Silt, trace fine Gravel Bottom 4": Medium dense, brown, fine SAND, little Silt		FINE TO COARSE SAND
					11-13			
10		S-2	24/15	5-7	5-8	Medium dense, brown, fine to medium SAND, trace(-) Silt		
					10-14			
15		S-3	24/16	10-12	4-6	Medium dense, brown, fine to coarse SAND, little fine to medium Gravel, trace(-) Silt		±13'
					9-11			
20		S-4	24/18	15-17	7-10	Dense, gray, fine SAND, trace Silt	1	FINE SAND
					20-31			
25		S-5	24/20	20-22	18-29	Very dense, gray, fine SAND, trace Silt		
					30-32			
30		S-6	24/22	25-27	14-18	Dense, gray, fine SAND, some Silt		
					19-25			
		S-7	24/23	30-32	11-14	Dense, gray, fine SAND and SILT (wet)		SAND AND SILT
					18-20			
End of Exploration at ±32'								

GRANULAR SOILS BLOWS/FT DENSITY		COHESIVE SOILS BLOWS/FT DENSITY	
0-4	VERY LOOSE	<2	VERY SOFT
4-10	LOOSE	2-4	SOFT
10-30	MEDIUM DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
>50	VERY DENSE	15-30	V. STIFF
		>30	HARD

REMARKS:
 1. Black sand observed on augers while advancing from 15 to 25'. Odors not observed.

NOTES:
 1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
 2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS IN WATER LEVEL MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

BORING CO. <u>GZA Drilling, Inc.</u>	BORING LOCATION <u>See Exploration Location Plan</u>
FOREMAN <u>Chris Lenting</u>	GROUND SURFACE ELEV. <u>±70.1'</u> DATUM <u>NGVD</u>
GZA ENG. <u>Wendell T. Barry</u>	DATE START <u>11-14-01</u> DATE END <u>11-14-01</u>

SAMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF A 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 IN CASING: UNLESS OTHERWISE NOTED, CASING DRIVEN USING A 300 lb HAMMER FALLING 24 IN. CASING SIZE: OTHER 3 3/4" HSA	GROUNDWATER READINGS <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>DATE</th> <th>TIME</th> <th>WATER</th> <th>AUGER</th> <th>STABILIZATION TIME</th> </tr> <tr> <td>11-14-01</td> <td>1330</td> <td>dry</td> <td>30'</td> <td>45 minutes</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	DATE	TIME	WATER	AUGER	STABILIZATION TIME	11-14-01	1330	dry	30'	45 minutes										
DATE	TIME	WATER	AUGER	STABILIZATION TIME																	
11-14-01	1330	dry	30'	45 minutes																	

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN/REC	DEPTH (FT)	BLOWS/6"			
5		S-1	24/18	0-2	2-5	Medium dense, brown, fine to coarse SAND, trace fine Gravel, trace(-) Silt	FINE TO MEDIUM SAND	
					5-5			
10		S-2	24/7	5-7	7-15	Dense, brown, fine to medium SAND, trace(-) Silt	FINE SAND	
					17-28			
15		S-3	24/9	10-12	4-5	Medium dense, brown, fine to coarse SAND, little fine to medium Gravel, trace(-) Silt	FINE SAND	
					11-8			
20		S-4	24/16	15-17	3-5	Medium dense, gray, fine SAND, little(-) Silt	SAND AND GRAVEL	
					8-10			
25		S-5	24/12	20-22	33-41	Very dense, gray, fine to coarse SAND and fine to coarse GRAVEL, trace Silt	FINE SAND	
					40-41			
30		S-6	24/15	25-27	7-8	Medium dense, gray, fine SAND, trace Silt	FINE SAND	
					10-15			
		S-7	24/16	30-32	10-11	Medium dense, gray, fine SAND, trace Silt (wet)	FINE SAND	
					13-14			
End of Exploration at ±32'								

GRANULAR SOILS BLOWS/FT DENSITY	COHESIVE SOILS BLOWS/FT DENSITY	REMARKS:
0-4 VERY LOOSE	<2 VERY SOFT	
4-10 LOOSE	2-4 SOFT	
10-30 MEDIUM DENSE	4-8 M. STIFF	
30-50 DENSE	8-15 STIFF	
>50 VERY DENSE	15-30 V. STIFF	
	>30 HARD	

1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL
 2) WATER LEVEL READINGS HAVE BEEN MADE AT TIME AND UNDER CONDITIONS STATED. FLUCTUATIONS IN WATER LEVEL MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

BORING CO. GZA Drilling, Inc.
FOREMAN Chris Lening
GZA ENG. Wendell T. Barry

BORING LOCATION See Exploration Location Plan
GROUND SURFACE ELEV. +68.9' **DATUM** NGVD
DATE START 11-14-01 **DATE END** 11-15-01

SAMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF A 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 IN

CASING: UNLESS OTHERWISE NOTED, CASING DRIVEN USING A 300 lb HAMMER FALLING 24 IN.

CASING SIZE: OTHER 3 3/4" HSA

GROUNDWATER READINGS				
DATE	TIME	WATER	AUGER	STABILIZATION TIME
11-15-01	0800	29'	30'	15 minutes

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
5		S-1	24/13	0-2	8-8	Medium dense, brown, fine SAND, trace Silt	±0.2'	ASPHALT
					7-14			
10		S-2	24/11	5-7	3-4	Medium dense, brown, fine to coarse SAND, trace fine Gravel, trace(-) Silt		FINE TO COARSE SAND
					8-7			
15		S-3	24/12	10-12	5-6	Medium dense, brown, fine to coarse SAND, trace fine Gravel, trace(-) Silt		
					9-11			
20		S-4	24/13	15-17	6-6	Medium dense, brown, fine to coarse SAND, trace(-) Silt		
					7-12			
25		S-5	24/15	20-22	20-31	Very dense, gray, fine to coarse SAND and fine to coarse GRAVEL, trace Silt	±19'	SAND AND GRAVEL
					16-14			
30		S-6	24/9	25-27	12-18	Dense, gray, fine to coarse SAND, little fine to medium Gravel, trace Silt		FINE TO COARSE SAND
					16-15			
		S-7	24/17	30-32	14-22	Very dense, gray, fine to coarse SAND, some fine to medium Gravel, trace Silt (wet)		
					30-37			
End of Exploration at ±32'								

GRANULAR SOILS BLOWS/FT DENSITY		COHESIVE SOILS BLOWS/FT DENSITY	
0-4	VERY LOOSE	<2	VERY SOFT
4-10	LOOSE	2-4	SOFT
10-30	MEDIUM DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
>50	VERY DENSE	15-30	V. STIFF
		>30	HARD

REMARKS:

NOTES: 1. STRATUM BOUNDARY LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL
 2. WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED. FLUCTUATIONS OF GROUNDWATER
 MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

BORING CO. <u>GZA Drilling, Inc.</u> FOREMAN <u>Chris Lenting</u> GZA ENG. <u>Wendell T. Bary</u>	BORING LOCATION <u>See Exploration Location Plan</u> GROUND SURFACE ELEV. <u>±65.3'</u> DATUM <u>NGVD</u> DATE START <u>11-15-01</u> DATE END <u>11-15-01</u>
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SAMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF A 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 IN CASING: UNLESS OTHERWISE NOTED, CASING DRIVEN USING A 300 lb HAMMER FALLING 24 IN. CASING SIZE: OTHER 3 3/4" HSA	GROUNDWATER READINGS <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>DATE</th> <th>TIME</th> <th>WATER</th> <th>AUGER</th> <th>STABILIZATION TIME</th> </tr> </thead> <tbody> <tr> <td>11-15-01</td> <td>1015</td> <td>28'</td> <td>30'</td> <td>35 minutes</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	DATE	TIME	WATER	AUGER	STABILIZATION TIME	11-15-01	1015	28'	30'	35 minutes										
DATE	TIME	WATER	AUGER	STABILIZATION TIME																	
11-15-01	1015	28'	30'	35 minutes																	

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN/REC	DEPTH (FT)	BLOWS/6"			
5		S-1	24/17	0-2	5-9	Medium dense, brown, fine to coarse SAND, little fine to coarse	±0.1'	FILL
					6-8	Gravel, trace Silt, trace Brick Fragments		
		S-2	24/12	5-7	7-5	Loose, brown, fine to coarse SAND, trace fine Gravel, trace Silt, trace		
					3-11	Brick Fragments		
10		S-3	24/19	10-12	19-15	Top 3": Dense, brown, fine to coarse SAND, little fine to coarse	±11'	SANDY SILT
					19-19	Gravel, trace Brick Fragments		
						Middle 5": Dense, brown, fine to coarse SAND, trace fine to coarse		
						Gravel, trace Silt		
						Bottom 11": Dense, brown SILT and fine SAND		
		S-4	24/12	15-17	11-12	Medium dense, gray, fine SAND and SILT		
20					13-15			
		S-5	24/18	20-22	10-8	Medium dense, gray SILT, little fine Sand (wet)		
					12-15			
25								
		S-6	24/17	25-27	3-6	Medium dense, brown SILT, little fine Sand (wet)		
					12-14			
30								
		S-7	24/15	30-32	5-7	Medium dense, brown SILT, little fine Sand (wet)		
					9-12			
End of Exploration at ±32'								

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY
0-4	VERY LOOSE	<2	VERY SOFT
4-10	LOOSE	2-4	SOFT
10-30	MEDIUM DENSE	4-8	M. STIFF
30-50	DENSE	8-15	STIFF
>50	VERY DENSE	15-30	V. STIFF
		>30	HARD

REMARKS:

NOTES:
 1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
 2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATION OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

BORING CO. <u>GZA Drilling, Inc.</u> FOREMAN <u>Chris Lenting</u> GZA ENG. <u>Wendell T. Barry</u>	BORING LOCATION <u>See Exploration Location Plan</u> GROUND SURFACE ELEV. <u>±69.2'</u> DATUM <u>NGVD</u> DATE START <u>11-16-01</u> DATE END <u>11-20-01</u>
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SAMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF A 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 IN CASING: UNLESS OTHERWISE NOTED, CASING DRIVEN USING A 300 lb HAMMER FALLING 24 IN. CASING SIZE: OTHER 3 3/4" HSA	GROUNDWATER READINGS <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>DATE</th> <th>TIME</th> <th>WATER</th> <th>AUGER</th> <th>STABILIZATION TIME</th> </tr> <tr> <td>11-20-01</td> <td>0800</td> <td>30'</td> <td>30'</td> <td>10 minutes</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	DATE	TIME	WATER	AUGER	STABILIZATION TIME	11-20-01	0800	30'	30'	10 minutes										
DATE	TIME	WATER	AUGER	STABILIZATION TIME																	
11-20-01	0800	30'	30'	10 minutes																	

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
5		S-1	24/11	0-2	6-11	Medium dense, brown, fine to coarse SAND, trace fine to coarse Gravel, trace(-) Silt		FINE TO COARSE SAND
					14-16			
10		S-2	24/11	5-7	12-16	Medium dense, brown, fine to coarse SAND, trace(-) Silt		±9'
					12-11			
15		S-3	24/13	10-12	9-14	Medium dense, brown, fine to medium SAND, trace(-) Silt		FINE TO MEDIUM SAND
					16-21			
20		S-4	24/13	15-17	8-9	Medium dense, gray, fine to medium SAND, trace Silt		±20'
					7-9			
25		S-5	24/14	20-22	10-12	Medium dense, gray, fine SAND, little(-) Silt		FINE SAND
					14-16			
30		S-6	24/1	25-27	11-21	Dense, gray, fine SAND, trace(+) Silt		±29'
					22-29			
		S-7	24/17	30-32	4-13	Very stiff, gray, clayey SILT (wet)		CLAYEY SILT
					8-11			
End of Exploration at ±32'								

GRANULAR SOILS BLOWS/FT DENSITY	COHESIVE SOILS BLOWS/FT DENSITY	REMARKS:
0-4 VERY LOOSE	<2 VERY SOFT	
4-10 LOOSE	2-4 SOFT	
10-30 MEDIUM DENSE	4-8 M. STIFF	
30-50 DENSE	8-15 STIFF	
>50 VERY DENSE	15-30 V. STIFF	
	>30 HARD	

STRAIT LINES INDICATE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. BOUNDARIES MAY BE GRADUAL. BOUNDARIES MAY NOT BE SEEN DEEPER THAN 30 FEET AND MAY NOT CORRELATE WITH THE TABLE OF GROUNDWATER. MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

BORING CO. <u>GZA Drilling, Inc.</u>	BORING LOCATION <u>See Exploration Location Plan</u>
FOREMAN <u>Chris Lenling</u>	GROUND SURFACE ELEV. <u>+67.4'</u> DATUM <u>NGVD</u>
GZA ENG. <u>Wendell T. Barry</u>	DATE START <u>11-16-01</u> DATE END <u>11-16-01</u>

SAMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF A 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 IN CASING: UNLESS OTHERWISE NOTED, CASING DRIVEN USING A 300 lb HAMMER FALLING 24 IN. CASING SIZE: <u>OTHER 3 3/4" HSA</u>	GROUNDWATER READINGS <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>DATE</th> <th>TIME</th> <th>WATER</th> <th>AUGER</th> <th>STABILIZATION TIME</th> </tr> <tr> <td>11-16-01</td> <td>1240</td> <td>29.5'</td> <td>30'</td> <td>30 minutes</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	DATE	TIME	WATER	AUGER	STABILIZATION TIME	11-16-01	1240	29.5'	30'	30 minutes										
DATE	TIME	WATER	AUGER	STABILIZATION TIME																	
11-16-01	1240	29.5'	30'	30 minutes																	

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
5		S-1	24/11	0-2	6-9	Medium dense, brown, fine to coarse SAND, trace(-) Silt	±0.1'	ASPHALT
					11-14			
10		S-2	24/12	5-7	10-18	Dense, brown, fine to coarse SAND, some fine to coarse Gravel, trace Silt	±8'	FINE TO COARSE SAND
					20-15			
15		S-3	24/11	10-12	7-10	Medium dense, gray SILT, little fine Sand	±14'	SANDY SILT
					11-13			
20		S-4	24/19	15-17	9-12	Medium dense, gray, fine SAND and SILT		SAND AND SILT
					16-18			
25		S-5	24/18	20-22	7-11	Medium dense, gray, fine SAND and SILT		
					14-15			
30		S-6	24/20	25-27	7-12	Medium dense, gray, fine SAND and SILT (wet)		
					8-16			
		S-7	24/17	30-32	13-14	Medium dense, gray, fine SAND and SILT (wet)		
					11-13			
End of Exploration at ±32'								

GRANULAR SOILS	COHESIVE SOILS	REMARKS:	
BLOWS/FT DENSITY	BLOWS/FT DENSITY		
0-4 VERY LOOSE	<2 VERY SOFT		
4-10 LOOSE	2-4 SOFT		
10-30 MEDIUM DENSE	4-8 M. STIFF		
30-50 DENSE	8-15 STIFF		
>50 VERY DENSE	15-30 V. STIFF		
	>30 HARD		

BORING CO. <u>GZA Drilling, Inc.</u>	BORING LOCATION <u>See Exploration Location Plan</u>
FOREMAN <u>Chris Lenling</u>	GROUND SURFACE ELEV. <u>±68'</u> DATUM <u>NGVD</u>
GZA ENG. <u>Wendell T. Barry</u>	DATE START <u>11-15-01</u> DATE END <u>11-16-01</u>

SAMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF A 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 IN CASING: UNLESS OTHERWISE NOTED, CASING DRIVEN USING A 300 lb HAMMER FALLING 24 IN. CASING SIZE: OTHER 3 3/4" HSA	GROUNDWATER READINGS				
	DATE	TIME	WATER	AUGER	STABILIZATION TIME
	01-07-02	1400	28.5'	-	2 months

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN/REC	DEPTH (FT)	BLOWS/6"			
5		S-1	24/11	0-2	11-15	Top 5": Medium dense, dark brown, fine to coarse SAND and fine to coarse GRAVEL, trace Silt, trace Brick Fragments	±0.1'	ASPHALT
					8-5	Bottom 6": Medium dense, brown, fine to medium SAND, trace fine Gravel, trace Silt		
10		S-2	24/7	5-7	1-1	Loose, brown, fine to coarse SAND, little fine to coarse Gravel, trace Silt	±6'	FILL
					6-14			
15		S-3	24/11	10-12	6-20	Dense, gray, fine to coarse SAND, little fine to coarse Gravel, trace Silt		FINE TO COARSE SAND
					18-24			
20		S-4	24/0	15-17	12-11	No recovery		FINE TO COARSE SAND
					12-16			
25		S-5	24/14	20-22	7-9	Top 6": Medium dense, gray, fine to medium SAND, trace(-) Silt		FINE TO COARSE SAND
					8-7	Bottom 8": Medium dense, gray, fine SAND, trace(-) Silt		
30		S-6	12-12	25-26	100-100	Very dense, brown, fine to coarse SAND, some fine to coarse Gravel, trace Silt	±29'	SANDY SILT
		S-7	24/21	30-32	12-13	Dense, gray SILT, little fine Sand (wet)		SANDY SILT
					20-22			SANDY SILT

<table border="1"> <tr> <th colspan="2">GRANULAR SOILS</th> <th colspan="2">COHESIVE SOILS</th> </tr> <tr> <th>BLOWS/FT DENSITY</th> <th></th> <th>BLOWS/FT DENSITY</th> <th></th> </tr> <tr> <td>0-4</td> <td>VERY LOOSE</td> <td><2</td> <td>VERY SOFT</td> </tr> <tr> <td>4-10</td> <td>LOOSE</td> <td>2-4</td> <td>SOFT</td> </tr> <tr> <td>10-30</td> <td>MEDIUM DENSE</td> <td>4-8</td> <td>M. STIFF</td> </tr> <tr> <td>30-50</td> <td>DENSE</td> <td>8-15</td> <td>STIFF</td> </tr> <tr> <td>>50</td> <td>VERY DENSE</td> <td>15-30</td> <td>V. STIFF</td> </tr> <tr> <td></td> <td></td> <td>>30</td> <td>HARD</td> </tr> </table>	GRANULAR SOILS		COHESIVE SOILS		BLOWS/FT DENSITY		BLOWS/FT DENSITY		0-4	VERY LOOSE	<2	VERY SOFT	4-10	LOOSE	2-4	SOFT	10-30	MEDIUM DENSE	4-8	M. STIFF	30-50	DENSE	8-15	STIFF	>50	VERY DENSE	15-30	V. STIFF			>30	HARD	REMARKS:
GRANULAR SOILS		COHESIVE SOILS																															
BLOWS/FT DENSITY		BLOWS/FT DENSITY																															
0-4	VERY LOOSE	<2	VERY SOFT																														
4-10	LOOSE	2-4	SOFT																														
10-30	MEDIUM DENSE	4-8	M. STIFF																														
30-50	DENSE	8-15	STIFF																														
>50	VERY DENSE	15-30	V. STIFF																														
		>30	HARD																														

NOTES: 1) STRATIFICATION LEVELS REPRESENT APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL. 2) PENETRATION TESTS (PEN/REC) MAY BE AFFECTED BY VIBRATION EQUIPMENT OR OTHER FACTORS. 3) PENETRATION TESTS MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
35		S-8	24/14	35-37	13-18	Dense, gray SILT, little fine Sand (wet)		SANDY SILT
					25-30			
40		S-9	24/12	40-42	7-10	Medium dense, fine SAND, some Silt (wet)	1	
					9-15			
						End of Exploration at ±42'		
45								
50								
55								
60								
65								
70								
75								

GRANULAR SOILS BLOWS/FT DENSITY		COHESIVE SOILS BLOWS/FT DENSITY		REMARKS:
0-4	VERY LOOSE	<2	VERY SOFT	
4-10	LOOSE	2-4	SOFT	
10-30	MEDIUM DENSE	4-8	M. STIFF	
30-50	DENSE	8-15	STIFF	
>50	VERY DENSE	15-30	V. STIFF	
		>30	HARD	

NOTES: 1) STRATIFICATION LINES ARE PRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

BORING CO. <u>GZA Drilling, Inc.</u> FOREMAN <u>Chris Lenfing</u> GZA ENG. <u>Wendell T. Barry</u>	BORING LOCATION <u>See Exploration Location Plan</u> GROUND SURFACE ELEV. <u>±66.9'</u> DATUM <u>NGVD</u> DATE START <u>11-15-01</u> DATE END <u>11-15-01</u>
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SAMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF A 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 IN. CASING: UNLESS OTHERWISE NOTED, CASING DRIVEN USING A 300 lb HAMMER FALLING 24 IN. CASING SIZE: <u>OTHER 3 3/4" HSA</u>	GROUNDWATER READINGS <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>DATE</th> <th>TIME</th> <th>WATER</th> <th>AUGER</th> <th>STABILIZATION TIME</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	DATE	TIME	WATER	AUGER	STABILIZATION TIME										
DATE	TIME	WATER	AUGER	STABILIZATION TIME												

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN/REC	DEPTH (FT)	BLOWS/6"			
5		S-1	24/12	0-2	8-11	Top 6": Medium dense, brown, fine to coarse SAND and fine to coarse GRAVEL	±0.1'	ASPHALT
					10-9	Bottom 6": Medium dense, brown, fine to medium SAND, trace fine Gravel, trace(-) Silt		
		S-2	24/8	5-7	4-6	Medium dense, brown, fine to medium SAND, trace Silt		
					9-13			
10		S-3	24/10	10-12	14-22	Top 9": Dense, brown, fine to coarse SAND, some fine to medium Gravel, trace Silt	±12'	FINE TO MEDIUM SAND
					25-18	Bottom 1": Dense, gray SILT and fine SAND		
		S-4	24/13	15-17	15-21	Dense, gray SILT and fine SAND		
					18-16			
20		S-5	24/17	20-22	6-12	Dense, gray SILT and fine SAND (wet)		SILT AND SAND
					10-12			
		S-6	24/18	25-27	5-6	Medium dense, gray SILT and fine SAND (wet)		
					8-18			
30		S-7	24/18	30-32	12-18	Dense, gray SILT and fine SAND (wet)		
					18-31			
End of Exploration at ±32'								

GRANULAR SOILS		COHESIVE SOILS		REMARKS:
BLOWS/FT DENSITY		BLOWS/FT DENSITY		
0-4	VERY LOOSE	<2	VERY SOFT	
4-10	LOOSE	2-4	SOFT	
10-30	MEDIUM DENSE	4-8	M. STIFF	
30-50	DENSE	8-15	STIFF	
>50	VERY DENSE	15-30	V. STIFF	
		>30	HARD	

NOTES: 1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
 2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED. FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

BORING CO. <u>GZA Drilling, Inc.</u>	BORING LOCATION <u>See Exploration Location Plan</u>
FOREMAN <u>Chris Lenling</u>	GROUND SURFACE ELEV. <u>±65.2'</u> DATUM <u>NGVD</u>
GZA ENG. <u>Wendell T. Barry</u>	DATE START <u>11-20-01</u> DATE END <u>11-20-01</u>

SAMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF A 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 IN CASING: UNLESS OTHERWISE NOTED, CASING DRIVEN USING A 300 lb HAMMER FALLING 24 IN. CASING SIZE: <u>OTHER 3 3/4" HSA</u>	GROUNDWATER READINGS				
	DATE	TIME	WATER	AUGER	STABILIZATION TIME
	11-20-01	1000	dry	30'	15 minutes

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
5		S-1	24/1	0-2	13-23	Dense, brown, fine to coarse SAND, little fine Gravel, trace(-) Silt	±0.1'	ASPHALT
					25-14			
10		S-2	24/0	5-7	11-12	Gravel in tip of spoon	±5'	FILL
					18-26			
15		S-3	24/12	10-12	7-10	Medium dense, brown, fine to coarse SAND, trace(-) Silt		FINE TO COARSE SAND
					12-21			
20		S-4	24/11	15-17	10-14	Dense, brown, fine to coarse SAND, trace(-) Silt		
					17-27			
25		S-5	24/15	20-22	20-20	Top 10": Dense, brown, fine to coarse SAND, trace(-) Silt Bottom 3": Dense, gray, fine SAND, trace Silt	±21'	
					26-31			
30		S-6	24/17	25-27	8-17	Dense, gray, fine SAND, trace Silt		FINE SAND
					21-23			
		S-7	24/13	30-32	10-13	Dense, gray, fine SAND, little(-) Silt (wet)		
					18-27			
End of Exploration at ±32'								

GRANULAR SOILS BLOWS/FT DENSITY 0-4 VERY LOOSE 4-10 LOOSE 10-30 MEDIUM DENSE 30-50 DENSE >50 VERY DENSE	COHESIVE SOILS BLOWS/FT DENSITY <2 VERY SOFT 2-4 SOFT 4-8 M. STIFF 8-15 STIFF 15-30 V. STIFF >30 HARD	REMARKS:
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NOTES:
 1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. CONDITIONS MAY BE GRADUAL.
 2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED. FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

BORING CO. <u>GZA Drilling, Inc.</u>	BORING LOCATION <u>See Exploration Location Plan</u>
FOREMAN <u>Chris Lenling</u>	GROUND SURFACE ELEV. <u>±62.4'</u> DATUM <u>NGVD</u>
GZA ENG. <u>Wendell T. Barry</u>	DATE START <u>11-20-01</u> DATE END <u>11-20-01</u>

SAMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF A 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 IN CASING: UNLESS OTHERWISE NOTED, CASING DRIVEN USING A 300 lb HAMMER FALLING 24 IN. CASING SIZE: <u>OTHER 3 3/4" HSA</u>	GROUNDWATER READINGS				
	DATE	TIME	WATER	AUGER	STABILIZATION TIME
	11-20-01	1230	dry	30'	20 minutes

DEPTH	CASING BLOWS	SAMPLE				SAMPLE DESCRIPTION BURMISTER CLASSIFICATION	R K	STRATUM DESCRIPTION
		NO	PEN./REC	DEPTH (FT)	BLOWS/6"			
5		S-1	24/12	0-2	4-4	Loose, black, fine to coarse SAND, little Brick Fragments, little(+)	1	FILL
					5-7	Silt, little fine Gravel		
10		S-2	24/1	5-7	10-4	Loose, black, fine to coarse SAND, little fine to coarse Gravel,		
					2-4	little(-) Silt		
15		S-3	24/2	10-12	20-17	Dense, black, fine to medium SAND, some Organics, Timber, trace		
					16-12	Silt		
20		S-4	24/9	15-17	20-11	Top 3": Medium dense, dark brown, fine to coarse SAND, trace Brick	±16'	FINE TO COARSE SAND
					14-14	Fragments, Organics		
						Bottom 6": Medium dense, brown, fine to coarse SAND, trace(-) Silt		
25		S-5	24/14	20-22	6-9	Medium dense, brown, fine to coarse SAND, trace Gravel, trace(-) Silt	±26'	FINE SAND
					12-26			
30		S-6	24/13	25-27	7-9	Top 10": Medium dense, brown, fine to coarse SAND, trace(-)	±26'	FINE SAND
					13-14	Silt (wet)		
						Bottom 3": Medium dense, gray, fine SAND, trace Silt		
		S-7	24/2	30-32	7-9	Medium dense, gray, fine SAND, trace Silt		
					12-13			
End of Exploration at ±32'								

GRANULAR SOILS BLOWS/FT DENSITY 0-4 VERY LOOSE 4-10 LOOSE 10-30 MEDIUM DENSE 30-50 DENSE >50 VERY DENSE	COHESIVE SOILS BLOWS/FT DENSITY <2 VERY SOFT 2-4 SOFT 4-8 M. STIFF 8-15 STIFF 15-30 V. STIFF >30 HARD	REMARKS: 1. Split spoon sampler bouncing.
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NOTES:
 1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL
 2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED. FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

ENVIRONMENTAL DRILLING, INC.

(508) 355-6144

RR 2, WHEELWRIGHT ROAD, BOX 188
BARRE, MASSACHUSETTS 01005

Client Hunter, Inc.			Date 3-27-89		Job No. 89-0327		
Location Gorham Mills, Providence, RI							
BORING NO. B1/MW-A		Ground Elev. .	Date Start 3-27-89		Date Complete 3-27-89	Drilling Stone Foreman Stone	
						Eng./Hydrol. Geologist Stone	
DEPTH	Sample Data				Soil and/or bedrock strata descriptions		
	No.	Depth (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
	1	1'-3'	off auger				M. dense, dry, F-M sand
5	2	4'6"-6'	11-6-5				
10	3	9'6"-11'	6-7-7				
15	4	14'6"-16'	7-6-7				
					18'		M. dense, dry to moist, F-C sand, tr. of F-gravel
20	5	19'6"-21'	6-6-9				
25	6	24'6"-26'	11-12-13				
					28'		M. dense, wet, M-C sand, tr. of F-M gravel
30	7	29'6"-31'	9-12-15				
35	8	34'6"-36'	7-11-14				
40	9	39'6"-41'	6-9-5			40'	M. dense, wet, F-sand and inorganic silt

Type of Boring		Casing Size:		Hollow Stem Auger Size:	
Proportion Percentages Traces 0 to 10% Some 10 to 40% And 40 to 50%		Granular Soils (blows per ft.) 0 to 4 Very Loose 30 to 50 Dense 4 to 10 Loose Over 50 Very Dense 10 to 30 Medium Dense		Cohesive Soils (blows per ft.) 0 to 2 Very Soft 8 to 15 Stiff 2 to 4 Soft 15 to 30 Very Stiff 4 to 8 Medium Stiff Over 30 Hard	
Standard penetration test (SPT) = 140# hammer falling 30" Blows are per 6" taken with an 18" long x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.					

ENVIRONMENTAL DRILLING, INC.

(508) 355-6144

RR 2, WHEELWRIGHT ROAD, BOX 188

BARRE, MASSACHUSETTS 01005

Client		Hunter Inc.		Date		3-27-89		Job No.		89-0327											
Location		Gorham Mills Providence, R.I.																			
BORING NO. #2		MW-B		Ground Elev.		Date Start		3-27-89		Date Complete		3-27-89		Drilling Foreman		Harrison		Eng./Hydrol. Geologist			
DEPTH	Sample Data					Soil and/or bedrock strata descriptions															
	No.	Depth (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata														
	1	0'-2'	off auger				Med. dense, dry, F/C sand, some F/C gravel, tr. of inorganic silt, fill														
5	2	4'6"-6'	6-12-13																		
10	3	9'6"-11'	8-13-13																		
						13'	Med. dense, dry, F/sand, tr. of inorganic silt														
15	4	14'6"-16'	6-6-10																		
						20'	Med. dense, moist to wet, F/sand, some inorganic silt														
20	5	19'6"-21'	6-10-10																		
						33'	* End boring 33' * Well point set at 33' * Water at completion 28' * Screen 18' to 33' * Sand to 16' * Bentonite 14' to 16'														
25	6	24'6"-26'	5-7-7																		
30	7	29'6"-31'	6-6-7																		
35																					
40																					

Type of Boring Casing Size: Hollow Stem Auger Size: $4\frac{1}{4}$ "

Proportion Percentages

Traces 0 to 10%
Some 10 to 40%
And 40 to 50%

Granular Soils (blows per ft.)

0 to 4 Very Loose	30 to 50 Dense
4 to 10 Loose	Over 50 Very Dense
10 to 30 Medium Dense	

Cohesive Soils (blows per ft.)

0 to 2 Very Soft	8 to 15 Stiff
2 to 4 Soft	15 to 30 Very Stiff
4 to 8 Medium Stiff	Over 30 Hard

Standard penetration test (SPT) = 140# hammer falling 30"

Blows are per 6" taken with an 18" long x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.

The terms and percentages used to describe soil and/or rock are based on visual identification of the retrieved samples. ■ Moisture content indicated may be affected by time of year and water added during the drilling process. ■ Water levels indicated may vary with seasonal fluctuation and the degree of soil saturation when the

ENVIRONMENTAL DRILLING, INC.

RR 2, WHEELWRIGHT ROAD, BOX 188

BARRE, MASSACHUSETTS 01005

(9) 355-6144

Client **Hunter, Inc.** Date **3-27-89** Job No. **89-0327**

Location **Gorham Mills, Providence, RI**

BORING NO. **B3/MW-C** Ground Elev. _____ Date Start **3-27-89** Date Complete **3-27-89** Drilling Stone Foreman _____ Eng./Hydro. Stone Geologist _____

DEPTH	Sample Data					Soil and/or bedrock strata descriptions	
	Sample		Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
	No.	Depth (ft.)					
5							F-M sand and assorted fill
10							
15	1	14'6"-16'	9-21-11				
					17'		
20	2	19'6"-21'	7-5-6				
25	3	24'6"-26'	4-5-5				
30	4	29'6"-31'	7-12-15				
35	5	34'6"-36'	7-6-7		35'		
					36'		
40							M. dense, wet, F-sand, some inorganic silt
							* End of boring 36'/well point 34'
							* Water at completion 25'
							* Top of screen 19'/sand 17'
							* Bentonite seal 15'-17'

Type of Boring _____ Casing Size: _____ Hollow Stem Auger Size: _____

Proportion Percentages Traces 0 to 10% Some 10 to 40% And 40 to 50%	Granular Soils (blows per ft.) 0 to 4 Very Loose 30 to 50 Dense 4 to 10 Loose Over 50 Very Dense 10 to 30 Medium Dense	Cohesive Soils (blows per ft.) 0 to 2 Very Soft 8 to 15 Stiff 2 to 4 Soft 15 to 30 Very Stiff 4 to 8 Medium Stiff Over 30 Hard
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Standard penetration test (SPT) = 140# hammer falling 30"
 Blows are per 6" taken with an 18" long x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.

ENVIRONMENTAL DRILLING, INC.

(508) 355-6144

RR 2, WHEELWRIGHT ROAD, BOX 188

BARRE, MASSACHUSETTS 01005

Client **Hunter Inc.** Date **3-27-89** Job No. **89-0327**
 Location **Gorham Mills Providence, R.I.**

BORING NO. **#4 MW-D** Ground Elev. _____ Date Start **3-27-89** Date Complete **3-27-89** Drilling Foreman **Harrison** Eng./Hydrol. Geologist _____

DEPTH	Sample Data				Soil and/or bedrock strata descriptions		
	No.	Sample Depth (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
	1	0'-2'	off auger				Med. dense, dry, F/C sand, some F/C gravel, tr. of inorganic silt
5	2	4'6"-6'	6-11-12				
10	3	9'6"-11'	5-8-8		10'		
15	4	14'6"-16'	5-10-9				
20	5	19'6"-21'	5-6-6				
25	6	24'6"-26'	4-4-4				
30	7	29'6"-31'	4-5-4				
35							* End boring 33' * Well point set at 32' * Water at completion 19'8" * Top of screen to 17' * Sand to 15' * Bentonite to 13'
40							

Type of Boring _____ Casing Size: _____ Hollow Stem Auger Size: **4 1/4"**

Proportion Percentages Traces 0 to 10% Some 10 to 40% And 40 to 50%	Granular Soils (blows per ft.) 0 to 4 Very Loose 30 to 50 Dense 4 to 10 Loose Over 50 Very Dense 10 to 30 Medium Dense	Cohesive Soils (blows per ft.) 0 to 2 Very Soft 8 to 15 SUIT 2 to 4 Soft 15 to 30 Very SUIT 4 to 8 Medium SUIT Over 30 Hard
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Standard penetration test (SPT) = 140# hammer falling 30"
 Blows are per 6" taken with an 18" long x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.

The terms and percentages used to describe soil and/or rock are based on visual identification of the retrieved samples. Moisture content indicated may be affected by time of year and water added during the drilling process. Water levels indicated maximum with seasonal fluctuation and the decreased soil saturation when the

ENVIRONMENTAL DRILLING, INC.

(508) 355-6144

RR 2, WHEELWRIGHT ROAD, BOX 188

BARRE, MASSACHUSETTS 01005

Client **Hunter, Inc.** Date **3-27-89** Job No. **89-0327**

Location **Gorham Mills, Providence, RI**

BORING NO. **B5/MW-E** Ground Elev. **-** Date Start **3-27-89** Date Complete **3-27-89** Drilling Stone Foreman **Stone** Eng./Hydro. Geologist **Stone**

DEPTH	Sample Data					Soil and/or bedrock strata descriptions		
	No.	Sample Depth (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata	
5							F-M sand and assorted fill	
10					12'			
15	1	14'6"-16'	14-7-6					M. dense, dry, F-M sand, tr. of F-gravel
					18'			
20	2	19'6"-21'	4-5-5					Stiff, wet, inorganic silt, some F-sand
25	3	24'6"-26'	4-4-4					
30	4	29'6"-31'	4-6-7			32'		
35	5	34'6"-36'	5-5-7			36'	M. dense, wet, F-sand, some inorganic silt * End of boring 36'/well point 34' * Water at completion 24'6" * Top of screen 14'/sand 12' * Bentonite seal 10'-12'	
40								

Type of Boring	Casing Size:	Hollow Stem Auger Size:
Proportion Percentages Trace 0 to 10% Some 10 to 40% And 40 to 50%	Granular Soils (blows per ft.) 0 to 4 Very Loose 30 to 50 Dense 4 to 10 Loose Over 50 Very Dense 10 to 30 Medium Dense	Cohesive Soils (blows per ft.) 0 to 2 Very Soft 8 to 15 Stiff 2 to 4 Soft 15 to 30 Very Stiff 4 to 8 Medium Stiff Over 30 Hard
Standard penetration test (SPT) = 140# hammer falling 30" Blows are per 6" taken with an 18" long x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.		

The terms and percentages used to describe soil and or rock are based on visual identification of the retrieved samples. ■ Moisture content indicated may be affected

ENVIRONMENTAL DRILLING, INC.

(508) 355.6144

RR 2, WHEELWRIGHT ROAD, BOX 188

BARRE, MASSACHUSETTS 01005

Client **Hunter Inc.** Date **3-27-89** Job No. **89-0327**

Location **Gorham Mills Providence, R.I.**

BORING NO. **B-6 MW-F** Ground Elev. Date Start **3-27-89** Date Complete **3-27-89** Drilling Foreman **Harrison** Eng./Hydrol. Geologist

DEPTH	Sample Data					Soil and/or bedrock strata descriptions	
	Sample		Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
	No.	Depth (ft.)					
5							Med. dense, dry, F/C sand, some F/C gravel, tr. of inorganic silt, glass, brick and white unknown material, fill
10							
15	1	14'6"-16'	7-7-13			15'6"	
20	2	19'6"-21'	8-11-12			20'	Med. dense, dry, F/sand, tr. of inorganic silt
25	3	24'6"-26'	9-9-14				Med. dense, moist to wet, F/C sand, tr. of inorganic silt
30	4	29'6"-31'	8-8-8			33'	* End boring 33' * Well point set at 32' * Water at completion 20'4" * Screen to 17' * Sand to 15' * Bentonite to 13'
35							
40							

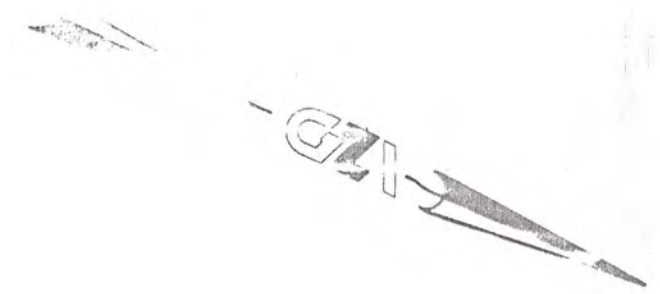
Type of Boring **Casing Size:** **Hollow Stem Auger Size: 4 1/2"**

Proportion Percentages Trace 0 to 10% Some 10 to 40% And 40 to 50%	Granular Soils (blows per ft.) 0 to 4 Very Loose 30 to 50 Densa 4 to 10 Loose Over 50 Very Dense 10 to 30 Medium Dense	Cohesive Soils (blows per ft.) 0 to 2 Very Soft 8 to 15 SUFF 2 to 4 Soft 15 to 30 Very SUFF 4 to 8 Medium SUFF Over 30 Hard
--	--	--

Standard penetration test (SPT) = 140# hammer falling 30"
 Blows are per 6" taken with an 18" long x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.

The terms and percentages used to describe soil and or rock are based on visual identification of the retrieved samples. Moisture content indicated may be affected by the method used to determine it. Moisture content is indicated in percentages with seasonal fluctuations and the decrease of soil saturation when the

P:\GZA_GeoEnvironmental, Inc. (CAD FILE) 32384_01\32384-01.dwg (LAYOUT EDP)



BY GAROFALO, TITLED "SUBDIVISION PLAN OF LOTS 32, 33, 34, 35, 36 AND 37 FORMER THURMAN MANUFACTURING SITE SITUATED ON N DELAWARE AVENUE, PROVIDENCE, RHODE ISLAND, GUYTON MILLS", DATED JANUARY 31, 2001, ORIGINAL SCALE 1"=60'.

(4) THE LOCATIONS OF THE TEST PITS, BORINGS, AND SOIL GAS PROBES WERE APPROXIMATELY DETERMINED BY TAKE MEASUREMENTS FROM EXISTING TOPOGRAPHIC AND MAN-MADE FEATURES. THIS DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED.

GZ-100 BORINGS PERFORMED BY GZA DRILLING, INC. BETWEEN 11/16/01 AND 11/20/01, OBSERVED BY GZA PERSONNEL (CW) INDICATES OBSERVATION WELL INSTALLED

TP-1 TEST PITS PERFORMED BY C. PEZZA & SON, INC. BETWEEN 11/16/01 AND 11/19/01, OBSERVED BY GZA PERSONNEL

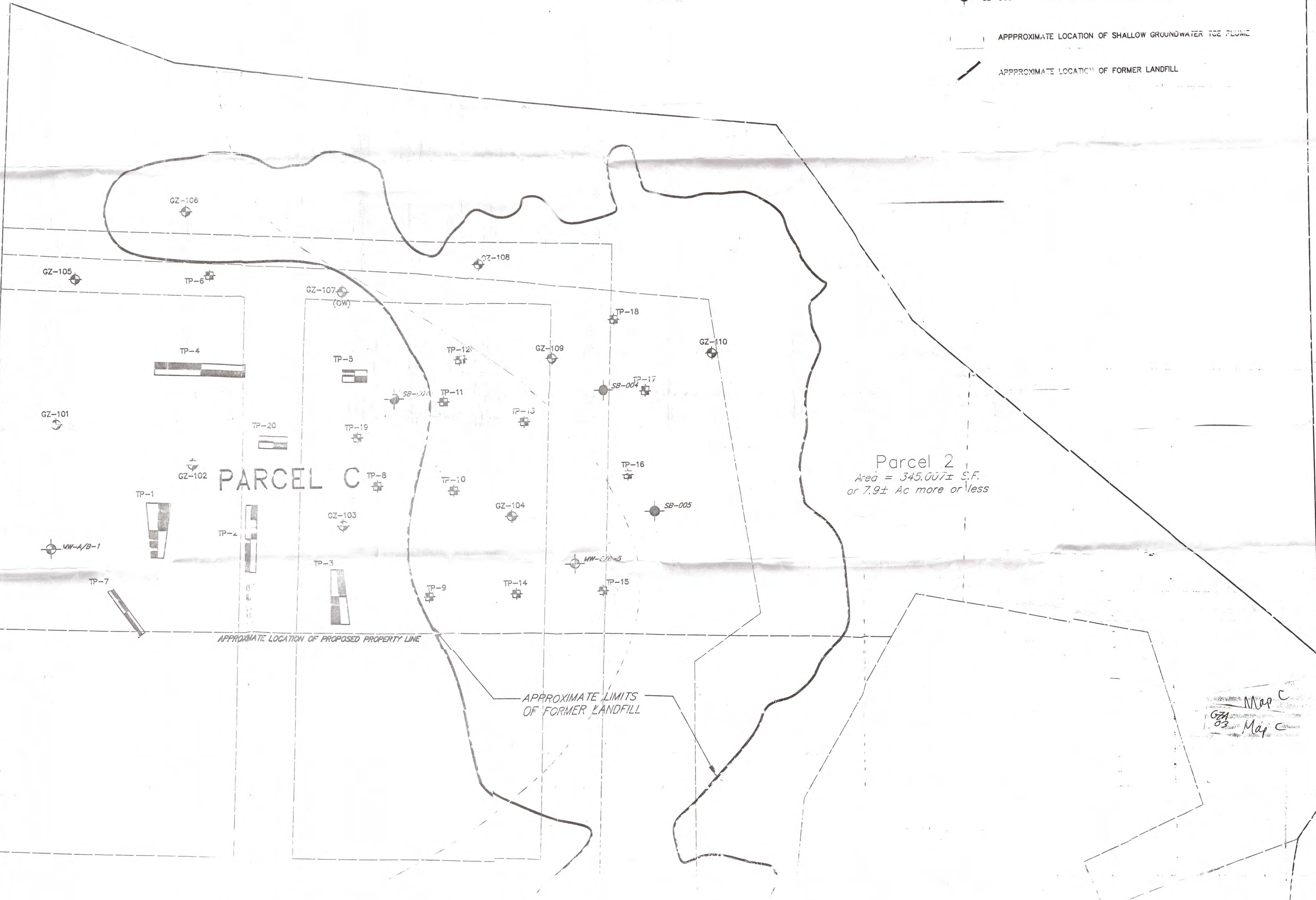
MW-1001 MONITOR WELLS PERFORMED BY OTHERS

SB-008 BORINGS PERFORMED BY OTHERS

APPROXIMATE LOCATION OF SHALLOW GROUNDWATER TCE PLUME

APPROXIMATE LOCATION OF FORMER LANDFILL

428
422-424
420
414-416
410
404-406
400-402
396-398
392-394
388-384
384-383



PARCEL C

Parcel 2
Area = 345,007± S.F.
or 7.9± Ac more or less

APPROXIMATE LOCATION OF PROPOSED PROPERTY LINE

APPROXIMATE LIMITS OF FORMER LANDFILL

REV#	DESCRIPTION	EY	DATE

SCALE IN FEET

0' 40' 80' 160'

GZA
GeoEnvironmental, Inc.

PROJ. MGR.	DRC
CHK'D BY:	DLD
REV'D BY:	DRC
DRAWN BY:	LAD
SCALE:	1"=40'
DATE:	DEC., 2001

PROVIDENCE YMCA- PARCEL C
PROVIDENCE, RHODE ISLAND

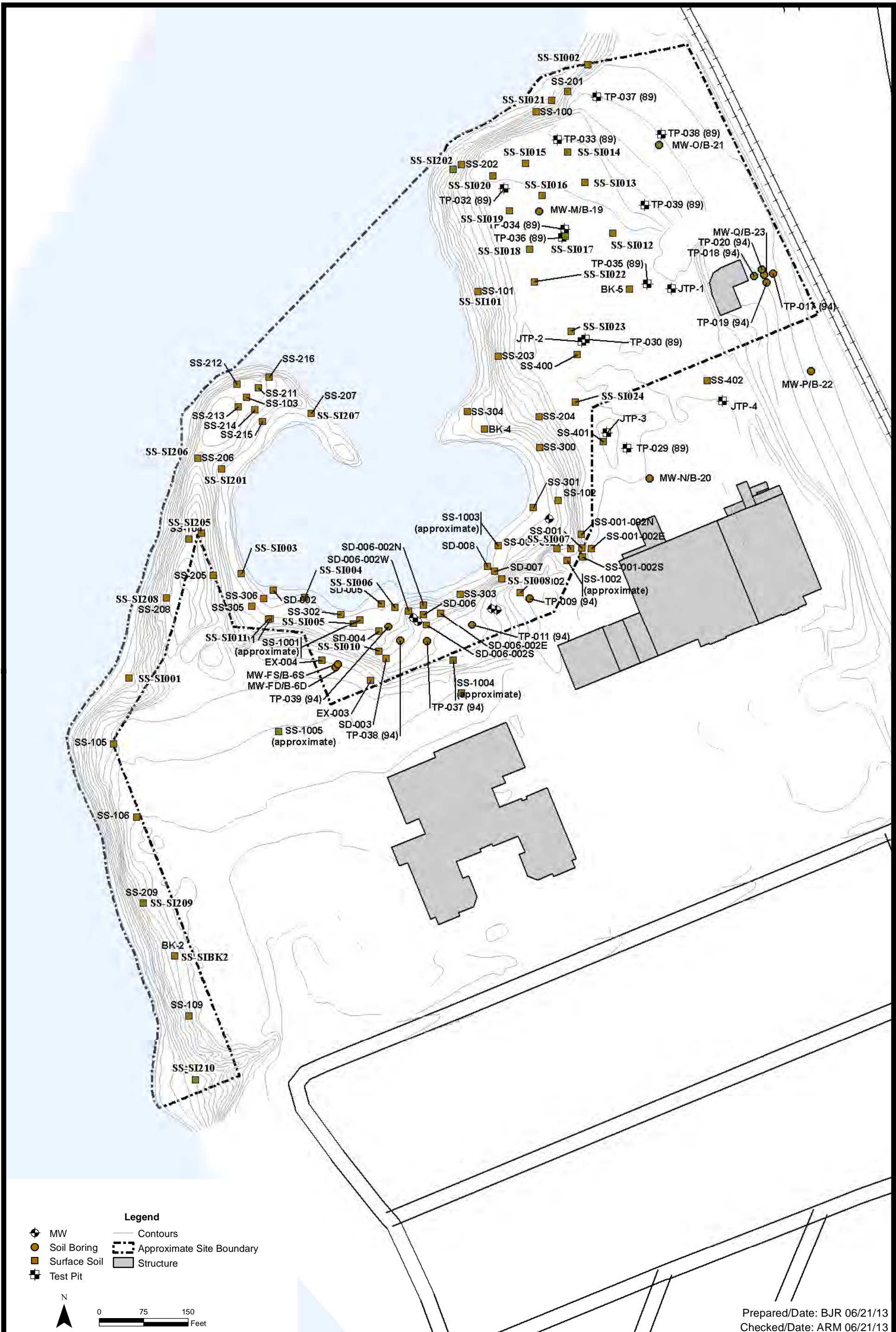
EXPLORATION
LOCATION PLAN

Map C
GZA 03 Map C

PROJECT NO.
32384.01

FIGURE NO.
2

APPENDIX A - 2.2
Phase III Area Soil Boring-MW Logs



333 Adelaide Avenue Site
Providence, Rhode Island



Summary of 1994-2007 Soil
Investigation Locations
Project 3650-11-0222

Figure 3.1

ENVIRONMENTAL DRILLING, INC.

(508) 355-6144

RR 2, WHEELWRIGHT ROAD, BOX 188

BARRE, MASSACHUSETTS 01005

Client **Hunter, Inc.** Date **3-31-89** Job No. **89-0327**

Location **Gorham Mills, Providence, RI**

BORING NO. **B19/MW-M** Ground Elev. **-** Date Start **3-31-89** Date Complete **3-31-89** Drilling Stone Foreman **Eng./Hydro. Stone Geologist**

DEPTH	Sample Data					Soil and/or bedrock strata descriptions	
	Sample		Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
	No.	Depth (ft.)					
5	1	1'-4'	off auger			3'	F-M sand, tr. of assorted fill
5	2	5'-7'	4-4-6-5			8'	M. dense, dry, F-M sand
10	3	10'-12'	5-9-9-11			18'	M. dense, dry, F-sand, tr. of inorganic silt
15	4	15'-17'	9-7-7-7			18'	
20	5	20'-22'	11-14-14-16			24'	M. dense, moist, F-sand, some inorganic silt
25	6	25'-26'	7-7			26'	M. dense, wet, F-sand, some inorganic silt, F-M gravel
	6A	26'-27'	7-9				
30	7	30'-32'	4-5-6-6			37'	M. dense, wet, F-M sand
35	8	35'-37'	0-0-3-4			37'	* End of boring 37' * Well point 34'6" * Water at completion 25' * Top of screen 19'6" * Top of sand 17' * Bentonite seal 15'-17'
40							

Type of Boring **Casing Size:** **Hollow Stem Auger Size:**

Proportion Percentages Trace 0 to 10% Some 10 to 40% And 40 to 50%	Granular Soils (blows per ft.) 0 to 4 Very Loose 30 to 50 Dense 4 to 10 Loose Over 50 Very Dense 10 to 30 Medium Dense	Cohesive Soils (blows per ft.) 0 to 2 Very Soft 8 to 15 Stiff 2 to 4 Soft 15 to 30 Very Stiff 4 to 8 Medium Stiff Over 30 Hard
--	--	---

Standard penetration test (SPT) = 140# hammer falling 30"
 Blows are per 6" taken with an 18" long x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.

The terms and percentages used to describe soil and or rock are based on visual identification of the retrieved samples. ■ Moisture content indicated may be affected by time of year and water added during the drilling process. ■ Water levels indicated may vary with seasonal fluctuation and the degree of soil saturation when the boring was taken. ■ The stratification lines represent the approximate boundaries between soil types, the actual transitions may be gradual. ■

ENVIRONMENTAL DRILLING, INC.

(508) 355-6144

RR 2, WHEELWRIGHT ROAD, BOX 188

BARRE, MASSACHUSETTS 01005

Client **Hunter, Inc.** Date _____ Job No. **89-0327**

Location **Gorham Mills, Providence, RI**

BORING NO. B21/MW-0	Ground Elev. _____	Date Start _____	Date Complete _____	Drilling Stone Foreman _____	Eng./Hydrol. Stone Geologist _____
----------------------------	--------------------	------------------	---------------------	------------------------------	------------------------------------

DEPTH	Sample Data					Soil and/or bedrock strata descriptions	
	No.	Sample Depth (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
5						3'	F-M sand, tr. of assorted fill
10	1	10'-12'	7-8-9-9				M. dense, dry to wet, F-M sand
15						16'	
20	2	20'-22'	6-6-5-6				M. dense, wet, F-sand, some inorganic silt
25							
30	3	30'-32'	5-7-7-6			32'	
35							<ul style="list-style-type: none"> * End of boring 32' * Well point 29'6" * Water at completion 16' * Top of screen 14'6" * Top of sand 12' * Bentonite seal 10'-12'
40							

Type of Boring _____	Casing Size: _____	Hollow Stem Auger Size: _____
Proportion Percentages Traces 0 to 10% Some 10 to 40% And 40 to 50%	Granular Soils (blows per ft.) 0 to 4 Very Loose 30 to 50 Dense 4 to 10 Loose Over 50 Very Dense 10 to 30 Medium Dense	Cohesive Soils (blows per ft.) 0 to 2 Very Soft 8 to 15 Stiff 2 to 4 Soft 15 to 30 Very Stiff 4 to 8 Medium Stiff Over 30 Hard
Standard penetration test (SPT) = 140# hammer falling 30" Blows are per 6" taken with an 18" long x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.		

The terms and percentages used to describe soil and or rock are based on visual identification of the retrieved samples. ■ Moisture content indicated may be affected by time of year and water added during the drilling process. ■ Water levels indicated may vary with seasonal fluctuation and the degree of soil saturation when 1" boring was taken. ■ The stratification lines represent the approximate boundaries between soil types, the actual transitions may be gradual. ■

ENVIRONMENTAL DRILLING, INC.

(508) 355-6144

RR 2, WHEELWRIGHT ROAD, BOX 188

BARRE, MASSACHUSETTS 01005

Client Hunter Inc. **Date** 3-31-89 **Job No.** 89-0327

Location Gorham Mills Providence, R.I.

BORING NO. B-23 **Ground Elev.** MW-Q **Date Start** 3-31-89 **Date Complete** 3-31-89 **Drilling Foreman** Harrison **Eng./Hydro. Geologist**

DEPTH	Sample Data				Soil and/or bedrock strata descriptions		
	No.	Sample Depth (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
1	0'-2'	off auger					Med. dense, dry, F/C sand, tr. of F/C gravel, inorganic silt, brick asphalt, fill
5	2	4'6"-6'6"	9-3-12-8				
10	3	9'6"-11'6"	10-7-8-8				
						13'	
15	4	14'6"-16'6"	5-4-5-4				Loose, moist to wet, inorganic silt, tr. of layers of F/sand
20	5	19'6"-21'6"	3-3-2-4				
25	6	24'6"-26'6"	3-4-4-4				
						26'6"	
30							<ul style="list-style-type: none"> * End boring 26'6" * Well point set at 23'4" * Water at completion 15'6" * Top of screen 8'4" * Top of sand 6' * Top of bentonite 4'
35							
40							

Type of Boring Casing Size: **Flow Stem Auger Size:** 4 1/4"

Proportion Percentages Trace 0 to 10% Some 10 to 40% And 40 to 50%	Granular Soils (blows per ft.) 0 to 4 Very Loose 30 to 50 Dense 4 to 10 Loose Over 50 Very Dense 10 to 30 Medium Dense	Cohesive Soils (blows per ft.) 0 to 2 Very Soft 8 to 15 Stiff 2 to 4 Soft 15 to 30 Very Stiff 4 to 8 Medium Stiff Over 30 Hard
Standard penetration test (SPT) = 140# hammer falling 30" Blows are per 6" taken with an 18" long x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.		

The terms and percentages used to describe soil and or rock are based on visual identification of the retrieved samples. Moisture content indicated may be affected by time of year and water added during the drilling process. Water levels indicated may vary with seasonal fluctuation and the degree of soil saturation when the boring was taken. The stratification lines represent the approximate boundaries between soil types, the actual transitions may be gradual.

APPENDIX A - 3
Site Test Pit Logs

APPENDIX A - 3.1
Parcel C TP Logs

2003 5 29 11:05



**SITE INVESTIGATION REPORT -
ADDITIONAL ASSESSMENT TASKS
PROVIDENCE YMCA - PARCEL C
PROVIDENCE, RHODE ISLAND**

PREPARED FOR:

Rhode Island Department of Environmental Management
Providence, Rhode Island

PREPARED BY:

GZA GeoEnvironmental, Inc.
Providence, Rhode Island

May 2003

File No. 32384.02

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40 BROADWAY, PROVIDENCE, RI

GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS

DESCRIPTION: Providence YMCA - Parcel C
 LOCATION: Providence, Rhode Island

FILE NO.: 32384.01
 DATE: 11-16-01

EXCAVATION EQUIPMENT

GEOTECHNICAL ENGINEER: Wendell T. Barry

CONTRACTOR: C. Pezza & Sons

OPERATOR: Dana Moniz

MAKE: CAT

MODEL: 330

CAPACITY: 2.5 cu. yd.

REACH: 18 feet

GROUND ELEV.: ±69.8'

TIME STARTED: 0745

TIME COMPLETED: 0945

WEATHER: Partly Cloudy, 55-60

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK NO.
-1-	Brown, fine to medium SAND, trace Silt, trace Brick Fragments (Fill)	E		
-2-		E		
-3-		E		
-4-	Concrete Rubble, Bricks, Wire Reinforcement Mesh, Timber, some fine to medium SAND trace(+) Silt (Fill)	E		1
-5-		E		
-6-		E		
-7-		E		
-8-		E		
-9-		E		
-10-		E		2
-11-	Brown, fine to medium SAND, trace Silt	E		
-12-		E		
-13-		E		
-14-		E		3
End of Exploration at ±14'				

- REMARKS:
- Concrete foundation ±14 inches thick x 36 inches long x 18 inches wide at east end of test pit.
 - Bottom of fill ±10' below grade at west end of test pit sloping upwards to the east to ±6' below grade.
 - No groundwater encountered.

<p>TEST PIT PLAN</p>	<p>LEGEND:</p> <table border="1"> <tr> <th>BOULDER SIZE RANGE CLASSIFICATION</th> <th>COUNT LETTER DESIGNATION</th> <th>PROPORTIONS USED</th> <th>EXCAVATION EFFORT</th> </tr> <tr> <td>6"-18"</td> <td>A</td> <td>TRACE (TR) 0-10%</td> <td>E EASY</td> </tr> <tr> <td>18"-36"</td> <td>B</td> <td>LITTLE (L) 10-20%</td> <td>M MODERATE</td> </tr> <tr> <td>36" OR LARGER</td> <td>C</td> <td>SOME (SO) 20-35%</td> <td>D DIFFICULT</td> </tr> <tr> <td></td> <td></td> <td>SAND 35-50%</td> <td>△</td> </tr> </table>	BOULDER SIZE RANGE CLASSIFICATION	COUNT LETTER DESIGNATION	PROPORTIONS USED	EXCAVATION EFFORT	6"-18"	A	TRACE (TR) 0-10%	E EASY	18"-36"	B	LITTLE (L) 10-20%	M MODERATE	36" OR LARGER	C	SOME (SO) 20-35%	D DIFFICULT			SAND 35-50%	△	<p>WATER TABLE</p>
		BOULDER SIZE RANGE CLASSIFICATION	COUNT LETTER DESIGNATION	PROPORTIONS USED	EXCAVATION EFFORT																	
6"-18"	A	TRACE (TR) 0-10%	E EASY																			
18"-36"	B	LITTLE (L) 10-20%	M MODERATE																			
36" OR LARGER	C	SOME (SO) 20-35%	D DIFFICULT																			
		SAND 35-50%	△																			
<p>SCALE: 1" = 10'</p>			<p>DATE: 11-16-01</p>																			

140 BROADWAY, PROVIDENCE, RI

GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS

DESCRIPTION: Providence YMCA - Parcel C
 LOCATION: Providence, Rhode Island

FILE NO.: 32384.01
 DATE: 11-16-01

EXCAVATION EQUIPMENT

3ZA ENGINEER: Wendell T. Barry

CONTRACTOR: C. Pezza & Sons

OPERATOR: Dana Moniz

MAKE: CAT

CAPACITY: 2.5 cu. yd.

MODEL: 330

REACH: 18 feet

GROUND ELEV.: ±69.2'

TIME STARTED: 1000

TIME COMPLETED: 1045

WEATHER: Partly Cloudy, 55-60

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK NO.
-1-	Brown, fine to medium SAND, trace Silt, trace(+) Bricks, Concrete Fragments (Fill)	E		
-2-		E		1
-3-		E		
-4-		E		
-5-	Brown, fine to medium SAND, trace(-) Silt	E		
-6-	End of Exploration at ±6'	E		2
-7-				
-8-				
-9-				
-10-				
-11-				
-12-				
-13-				
-14-				

REMARKS:

- Concrete foundation ±18 inches wide x 12 inches thick x 12 feet long, buried 2.5 feet below existing grade.
- No groundwater encountered.

TEST PIT PLAN	LEGEND:	BOULDER	COUNT	PROPORTIONS USED	EXCAVATION EFFORT
	<p>SIZE RANGE CLASSIFICATION</p> <p>6"-18"</p> <p>18"-36"</p> <p>36" OR LARGER</p>	<p>LETTER DESIGNATION</p> <p>A</p> <p>B</p> <p>C</p>	<p>TRACE (TR)</p> <p>LITTLE (LI)</p> <p>SOME (SO)</p> <p>MANY (MA)</p>	<p>0-10%</p> <p>10-20%</p> <p>20-35%</p> <p>35-50%</p>	<p>E MODERATE</p> <p>M MODERATE</p> <p>D DIFFICULT</p> <p>▽ OBSERVED GROUNDWATER LEVEL</p>

140 BROADWAY, PROVIDENCE, RI

DESCRIPTION: Providence YMCA - Parcel C
 LOCATION: Providence, Rhode Island

FILE NO.: 32384.01
 DATE: 11-16-01

GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS

EXCAVATION EQUIPMENT

3ZA ENGINEER: Wendell T. Barry

CONTRACTOR: C. Pezza & Sons

OPERATOR: Dana Moniz

MAKE: CAT

CAPACITY: 2.5 cu. yd. MODEL: 330 REACH: 18 feet

GROUND ELEV.: ±68.9

TIME STARTED: 1100

TIME COMPLETED: 1230

WEATHER: Partly Cloudy, 55-60

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK NO.
-1-	BRICKS, CONCRETE RUBBLE, FOUNDATIONS, TIMBER, STEEL MESH, some fine to medium Sand, little(-) Silt (Fill)	E		
-2-		E		
-3-		E		
-4-		E		
-5-		E		
-6-	BRICKS, CONCRETE RUBBLE, TIMBER, METAL, little fine to medium Sand, little(-) Silt (Fill)	E		
-7-		E		1
-8-		E		
-9-		E		
-10-		E		
-11-	BRICKS, CONCRETE FOUNDATION and fine to medium SAND, trace Silt (Fill) FTG	E		
-12-		E		
-13-		E		
-14-		E		
-15-		E		
-16-	Brown, fine to medium SAND, trace Silt	E		
-17-		E		
-18-		E		2 3,4
End of Exploration at ±18'				

REMARKS:

- Concrete foundation is as large as 3'x6'x6'.
- Foundation footing ±14' below existing grade.
- Bottom of fill sloping downward towards the east.
- No groundwater encountered.

TEST PIT PLAN



NORTH

LEGEND:

BOULDER
 SIZE RANGE
 CLASSIFICATION
 24-48"
 49-24"
 25-36"
 37-48"
 49-60"
 61-72"
 73-84"
 85-96"
 97-108"
 109-120"

COUNT
 LETTER
 DESIGNATION
 A
 B

PROPORTIONS
 USED
 TRACE (TR)
 0-10%
 SOME (SO)
 20-75%

EXCAVATION
 EFFORT
 E FASY
 M MODERATE
 D DIFFICULT

VOLUME = 1200 cu. yd.

140 BROADWAY, PROVIDENCE, RI

GEOTECHNICAL/GEOHYDROLOGICAL
CONSULTANTS

DESCRIPTION: Providence YMCA - Parcel C
LOCATION: Providence, Rhode Island

FILE NO.: 32384.01
DATE: 11-16-01

EXCAVATION EQUIPMENT

ISA ENGINEER: Wendell T. Barry

CONTRACTOR: C. Pezza & Sons

OPERATOR: Dana Moriz

WEATHER: Partly Cloudy, 55-60

MAKE: CAT

MODEL: 330

CAPACITY: 2.5 cu. yd.

REACH: 18 feet

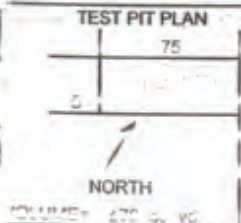
GROUND ELEV.: ±70'

TIME STARTED: 1250

TIME COMPLETED: 1315

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK NO.
-1-	Brown, fine to medium SAND, trace Silt	E		
-2-	Orange-brown, fine to medium SAND, trace(-) Silt	E		
-3-	Brown, fine to medium SAND, trace(-) Silt	E		
-4-	Brown, fine to medium SAND, trace(-) Silt	E		
-5-	End of Exploration at ±5'	E		1
-6-				
-7-				
-8-				
-9-				
-10-				
-11-				
-12-				
-13-				
-14-				

REMARKS:
1. No groundwater encountered.



LEGEND:

BOULDER
SIZE RANGE
CLASSIFICATION
6"-18"
18"-36"
36" OR LARGER

COUNT
LETTER
DESIGNATION
A
B
C

PROPORTIONS USED
TRACE (T)
LITTLE (L)
SOME (SO)
MUCH (M)

EXCAVATION EFFORT
E EASY
M MODERATE
D DIFFICULT
▽ OBSERVED GROUNDWATER LEVEL

140 BROADWAY, PROVIDENCE, RI

GEOTECHNICAL/GEOHYDROLOGICAL
CONSULTANTS

DESCRIPTION: Providence YMCA - Parcel C
LOCATION: Providence, Rhode Island

FILE NO.: 32384.01
DATE: 11-16-01

EXCAVATION EQUIPMENT

32A ENGINEER: Wendell T. Barry

CONTRACTOR: C. Pezza & Sons

OPERATOR: Dana Moniz

MAKE: CAT

CAPACITY: 2.5 cu. yd. REACH: 18 feet

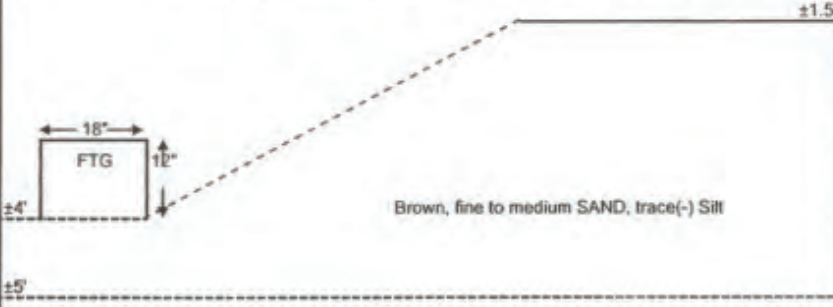
GROUND ELEV.: ±69.3

TIME STARTED: 1330

TIME COMPLETED: 1350

WEATHER: Partly Cloudy, 55-60

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK NO.
-1-	Brown, fine to medium SAND, trace Brick Fragments, trace Silt (Fill)	E		
-2-		E		
-3-		E		
-4-	Brown, fine to medium SAND, trace(-) Silt	E		1
-5-		E		
-6-	Brown, fine to coarse SAND and fine to coarse GRAVEL, trace(-) Silt	E		
-7-		E		2
-8-	End of Exploration at ±7'			
-9-				
-10-				
-11-				
-12-				
-13-				
-14-				



REMARKS:

1. Concrete foundation at a depth of ±4' (±18" wide x 12" thick).
2. No groundwater encountered.

TEST PIT PLAN	LEGEND:	COUNT	PROPORTIONS USED	EXCAVATION EFFORT
	<p>BOULDER</p> <p>SIZE RANGE CLASSIFICATION</p> <p>6"-18"</p> <p>18"-36"</p> <p>36" OR LARGER</p>	<p>LETTER DESIGNATION</p> <p>A</p> <p>B</p> <p>C</p>	<p>TRACE (TR) 0-10%</p> <p>LITTLE (L) 10-20%</p> <p>SOME (SO) 20-35%</p> <p>MANY 35-50%</p>	<p>E EAST</p> <p>M MODERATE</p> <p>D DIFFICULT</p>

*140 BROADWAY, PROVIDENCE, RI

GEOTECHNICAL/GEOHYDROLOGICAL
CONSULTANTS

DESCRIPTION: Providence YMCA - Parcel C
LOCATION: Providence, Rhode Island

FILE NO.: 32384.01
DATE: 11-16-01

EXCAVATION EQUIPMENT

GZA ENGINEER: Wendell T. Barry
WEATHER: Partly Cloudy, 55-60

CONTRACTOR: C. Pezza & Sons
OPERATOR: Dana Moniz
MAKE: CAT MODEL: 330
CAPACITY: 2.5 cu. yd. REACH: 18 feet

GROUND ELEV.: ±67.5'
TIME STARTED: 1400
TIME COMPLETED: 1430

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK NO.
-1-	±1.5' Brown, fine to coarse SAND, some fine to coarse Gravel, trace Silt (Fill)	E		
-2-		E		
-3-	Brown, fine to coarse SAND and fine to coarse GRAVEL, trace(-) Silt	E		
-4-		E		
-5-		E		
-6-		E		
-7-		E		
-8-		±8' Brown, fine to medium SAND, trace Silt	E	
-9-	E			
-10-	E			
-11-	E			
-12-	E			
-13-	E			
-14-	E			1
End of Exploration at ±14'				

REMARKS:
1. No groundwater encountered.

TEST PIT PLAN	LEGEND:	BOULDER COUNT	PROPORTIONS USED	EXCAVATION EFFORT
16	BOULDER	COUNT		
8	SIZE RANGE	LETTER DESIGNATION	TRACE (TP) 0-10%	E EASY
←	CLASSIFICATION	A	LITTLE (LI) 10-20%	M MODERATE
	6"-18"		SOME (SO) 20-50%	D DIFFICULT
	18"-36"		MANY (MO) 50-100%	∇
	36"-48"			

140 BROADWAY, PROVIDENCE, RI

GEOTECHNICAL/GEOHYDROLOGICAL
CONSULTANTS

DESCRIPTION: Providence YMCA - Parcel C
LOCATION: Providence, Rhode Island

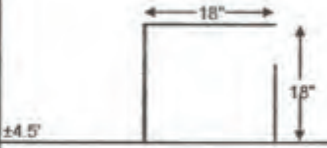
FILE NO.: 32384.01
DATE: 11-16-01

EXCAVATION EQUIPMENT

3ZA ENGINEER: Wendell T. Barry
WEATHER: Partly Cloudy, 55-60

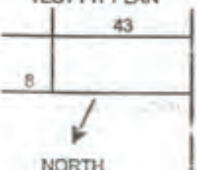



CONTRACTOR: C. Pezza & Sons
OPERATOR: Dana Moniz
MAKE: CAT MODEL: 330
CAPACITY: 2.5 cu. yd. REACH: 18 feet

GROUND ELEV.: ±69.8'
TIME STARTED: 1440
TIME COMPLETED: 1515

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK NO.
-1-	Brown, fine to medium SAND, little Brick and Concrete Fragments (Fill)	E		
-2-		E		
-3-		E		
-4-	 FTG	E		1
-5-	Brown, fine to medium SAND, trace Silt	E		
-6-		E		
-7-		E		
-8-		E		
-9-		E		
-10-		E		
-11-	End of Exploration at ±10'			
-12-				
-13-				
-14-				

REMARKS:

- Concrete foundation (±18" thick x 18" wide).
- No groundwater encountered.

<p>TEST PIT PLAN</p>  <p>VOLUME= ±130 cu. yd.</p>	<p>LEGEND:</p> <table border="0"> <tr> <td>BOULDER</td> <td>COUNT</td> <td>PROPORTIONS USED</td> <td rowspan="4"> <p>EXCAVATION EFFORT</p> <p>E EASY M MODERATE D DIFFICULT</p>  <p>OBSERVED GROUNDWATER LEVEL</p> </td> </tr> <tr> <td>SIZE RANGE</td> <td>LETTER</td> <td>TRACE (TR) 0-10%</td> </tr> <tr> <td>CLASSIFICATION</td> <td>DESIGNATION</td> <td>LITTLE (LI) 10-20%</td> </tr> <tr> <td>6"-18"</td> <td>A</td> <td>SOME (SO) 20-35%</td> </tr> <tr> <td>18"-36"</td> <td>B</td> <td>AND 35-50%</td> <td></td> </tr> <tr> <td>36" OR LARGER</td> <td>C</td> <td></td> <td></td> </tr> </table>	BOULDER	COUNT	PROPORTIONS USED	<p>EXCAVATION EFFORT</p> <p>E EASY M MODERATE D DIFFICULT</p>  <p>OBSERVED GROUNDWATER LEVEL</p>	SIZE RANGE	LETTER	TRACE (TR) 0-10%	CLASSIFICATION	DESIGNATION	LITTLE (LI) 10-20%	6"-18"	A	SOME (SO) 20-35%	18"-36"	B	AND 35-50%		36" OR LARGER	C		
		BOULDER	COUNT	PROPORTIONS USED		<p>EXCAVATION EFFORT</p> <p>E EASY M MODERATE D DIFFICULT</p>  <p>OBSERVED GROUNDWATER LEVEL</p>																
SIZE RANGE	LETTER	TRACE (TR) 0-10%																				
CLASSIFICATION	DESIGNATION	LITTLE (LI) 10-20%																				
6"-18"	A	SOME (SO) 20-35%																				
18"-36"	B	AND 35-50%																				
36" OR LARGER	C																					

140 BROADWAY, PROVIDENCE, RI

DESCRIPTION: Providence YMCA - Parcel C
 LOCATION: Providence, Rhode Island

FILE NO.: 32384.01
 DATE: 11-19-01

GEOTECHNICAL/GEOHYDROLOGICAL
 CONSULTANTS

EXCAVATION EQUIPMENT

GZA ENGINEER: Wendell T. Barry

CONTRACTOR: C. Pezza & Sons

GROUND ELEV.: ±69.1'

OPERATOR: Dana Moniz

TIME STARTED: 0800

MAKE: CAT

MODEL: 330

TIME COMPLETED: 0820

CAPACITY: 2.5 cu. yd.

REACH: 18 feet

WEATHER: Partly Cloudy, 55-60

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK NO.
-1-	±1.5' ASPHALT	E		
-2-	Brown fine to coarse GRAVEL and fine to coarse SAND, trace(-) Silt (Fill)	E		
-3-		E		
-4-		E		
-5-	Brown, fine to medium SAND, trace Silt	E		
-6-		E		
-7-		E		
-8-		E		
-9-		E		1
-10-	End of Exploration at ±9'			
-11-				
-12-				
-13-				
-14-				

REMARKS:

- 1. No groundwater encountered.

TEST PIT PLAN	LEGEND:	COUNT	PROPORTIONS USED	EXCAVATION EFFORT
<p>VOLUME = 14' x 7' x 1' = 98 cu. yd.</p>	<p>BOULDER</p> <p>SIZE RANGE CLASSIFICATION</p> <p>6"-16"</p> <p>18"-36"</p>	<p>LETTER DESIGNATION</p> <p>A</p> <p>B</p> <p>-</p>	<p>TRACE (TR) 0-10%</p> <p>LITTLE (LI) 10-20%</p> <p>SOME (SO) 20-35%</p> <p>MUCH (MU) 35-50%</p>	<p>E EASY</p> <p>M MODERATE</p> <p>D DIFFICULT</p> <p>▽ OBSERVED GROUNDWATER LEVEL</p>

140 BROADWAY, PROVIDENCE, RI

GEOTECHNICAL/GEOHYDROLOGICAL
CONSULTANTS

DESCRIPTION: Providence YMCA - Parcel C
LOCATION: Providence, Rhode Island

FILE NO.: 32384.01
DATE: 11-19-01

EXCAVATION EQUIPMENT

GEOTECHNICAL ENGINEER: Wendell T. Barry

CONTRACTOR: C. Pezza & Sons

OPERATOR: Dana Moniz

MAKE: CAT

CAPACITY: 2.5 cu. yd.

MODEL: 330

REACH: 18 feet

GROUND ELEV.: ±67.1'

TIME STARTED: 0825

TIME COMPLETED: 0900

WEATHER: Partly Cloudy, 55-60

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK NO.
	±1'			
-1-	ASPHALT	E		
-2-	Brown, fine to medium SAND, trace Silt, trace Bricks (Fill)	E		
-3-	±2'	E		
-4-	Dark brown, fine to medium SAND, some Bricks, little(-) Silt (Fill)	E		
-5-		E		
-6-		E		
-7-	±6'	E		
-8-	Orange-brown, fine to medium SAND, trace Silt	E		
-9-		E		
-10-	±9'	E		
-11-	Brown, fine to coarse SAND, trace(-) Silt	E		1
-12-	End of Exploration at ±11'			
-13-				
-14-				

REMARKS:

1. No groundwater encountered.

TEST PIT PLAN	LEGEND:	BOULDER	COUNT	PROPORTIONS USED	EXCAVATION EFFORT
18	CLASSIFICATION	LETTER DESIGNATION	LETTER DESIGNATION	PROPORTIONS USED	EFFORT
	6"-18"	A	A	TRACE (TR) 0-10%	MODERATE
	18"-36"	B	B	LITTLE (L) 10-20%	DIFFICULT
	36"-60" LARGER	C	C	SOME (SO) 20-35%	
				AND 35-50%	
					E M D OBSERVED GROUNDWATER LEVEL

140 BROADWAY, PROVIDENCE, RI

GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	DESCRIPTION: Providence YMCA - Parcel C	FILE NO.: 32384.01
	LOCATION: Providence, Rhode Island	DATE: 11-19-01

EXCAVATION EQUIPMENT

GZA ENGINEER: Wendell T. Barry	CONTRACTOR: C. Pezza & Sons	GROUND ELEV.: ±67
WEATHER: Partly Cloudy, 55-60	OPERATOR: Dana Moniz	TIME STARTED: 0910
	MAKE: CAT	TIME COMPLETED: 0945
	CAPACITY: 2.5 cu. yd.	REACH: 18 feet

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK NO.
	±1.5' ASPHALT			
-1-	Gray, fine to coarse SAND, trace fine Gravel, trace Silt (Fill)	E		
-2-	±1.5'	E		
-3-	CONCRETE, BRICK, TIMBER, COBBLES, and fine to coarse SAND, trace(+) Silt (Fill)	E		
-4-		E		
-5-		E		
-6-	±5.5'	E		
-7-	Orange-brown, fine to medium SAND, trace Silt	E		
-8-		E		
-9-	±9'	E		
-10-		E		
-11-	Brown, fine to coarse SAND, trace(-) Silt	E		
-12-		E		
-13-		E		
-14-		E		1
	End of Exploration at ±14'			

REMARKS:
1. No groundwater encountered.

	LEGEND:			
	BOULDER CLASSIFICATION 6"-18" 18"-36" 36" OR LARGER	COUNT LETTER DESIGNATION A B C	PROPORTIONS USED TRACE (TR) 0-10% LITTLE (LI) 10-20% SOME (SO) 20-35% MANY (MD) 35-50%	EXCAVATION EFFORT E EASY M MODERATE D DIFFICULT

140 BROADWAY, PROVIDENCE, RI

GEOTECHNICAL/GEOHYDROLOGICAL
CONSULTANTS

DESCRIPTION: Providence YMCA - Parcel C
LOCATION: Providence, Rhode Island

FILE NO.: 32384.01
DATE: 11-19-01

EXCAVATION EQUIPMENT

GZA ENGINEER: Wendell T. Barry

CONTRACTOR: C. Pezza & Sons

WEATHER: Partly Cloudy, 55-60

OPERATOR: Dana Moniz

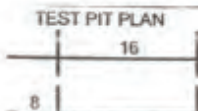
MAKE: CAT

CAPACITY: 2.5 cu. yd. MODEL: 330 REACH: 18 feet

GROUND ELEV.: ±67.2'
TIME STARTED: 0950
TIME COMPLETED: 1015

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK NO.
-1-	Brown, fine to coarse SAND, trace(+) Silt, trace Brick Fragments (Fill)	E		
-2-		E		
-3-		E		
-4-	BRICKS, TIMBER, PLASTER, METALS and fine to medium SAND, little(-) Silt, trace Trash (Fill)	E		
-5-		E		
-6-		E		
-7-		E		
-8-	Orange-brown, fine to medium SAND, trace Silt	E		
-9-		E		
-10-		E		
-11-		E		
-12-	Brown, fine to coarse SAND, trace(-) Silt	E		
-13-		E		
-14-		E		
-15-		E		
-16-		E		1
End of Exploration at ±16'				

REMARKS:
No groundwater encountered.



LEGEND:

BOULDER	COUNT
SIZE RANGE	LETTER
CLASSIFICATION	DESIGNATION

PROPORTIONS	
NEED	
TRACE (TR)	0-10%
(BRICKS, etc.)	10-20%

EXCAVATION EFFORT	
E	EASY
M	MODERATE
H	DIFFICULT

140 BROADWAY, PROVIDENCE, RI

GEOTECHNICAL/GEOHYDROLOGICAL
CONSULTANTS

DESCRIPTION: Providence YMCA - Parcel C
LOCATION: Providence, Rhode Island

FILE NO.: 32384.01
DATE: 11-19-01

EXCAVATION EQUIPMENT

GZA ENGINEER: Wendell T. Barry

CONTRACTOR: C. Pezza & Sons

OPERATOR: Dana Moniz

GROUND ELEV.: ±67.1'

WEATHER: Partly Cloudy, 55-60

MAKE: CAT

MODEL: 330

TIME STARTED: 1020

CAPACITY: 2.5 cu. yd. REACH: 18 feet

TIME COMPLETED: 1045

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK NO.
-1-	BRICKS, METAL, PLASTER and fine to medium SAND, little(-) Silt (Fill)	E		
-2-		E		
-3-		E		
-4-		E		1
-5-		E		
-6-		E		
-7-		E		
-8-	Orange-brown, fine to medium SAND, trace Silt	E		
-9-		E		
-10-		E		
-11-		E		
-12-		E		
-13-		E		
-14-		E		
-15-	Brown, fine to coarse SAND, trace(-) Silt	E		
-16-		E		2
End of Exploration at ±16'				

REMARKS:

- Write plaster-like material at ±3.5' (±12 inch thick).
- No groundwater encountered.

TEST PIT PLAN	LEGEND:	BOULDER COUNT	PROPORTIONS USED	EXCAVATION EFFORT
	<p>SIZE RANGE CLASSIFICATION</p> <p>6"-18" A</p>	<p>LETTER DESIGNATION</p> <p>A</p>	<p>TRACE (TR) 0-10%</p> <p>LITTLE (LJ) 10-20%</p> <p>MORE (MJ) 20-50%</p> <p>MANY (MY) 50-100%</p>	<p>E EASY</p> <p>M MODERATE</p> <p>D DIFFICULT</p>

140 BROADWAY, PROVIDENCE, RI

GEOTECHNICAL/GEOHYDROLOGICAL
CONSULTANTS

DESCRIPTION: Providence YMCA - Parcel C
LOCATION: Providence, Rhode Island

FILE NO.: 32384.01
DATE: 11-19-01

EXCAVATION EQUIPMENT

GZA ENGINEER: Wendell T. Barry

CONTRACTOR: C. Pezza & Sons

OPERATOR: Dana Moniz

MAKE: CAT

MODEL: 330

CAPACITY: 2.5 cu. yd. REACH: 18 feet

GROUND ELEV.: ±65.6'

TIME STARTED: 1050

TIME COMPLETED: 1125

WEATHER: Partly Cloudy, 55-60

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK NO.
-1-	Dark brown, fine to coarse SAND, some Brick, Timber, Metal (Fill)	E		
-2-		E		
-3-		E		
-4-		E		
-5-		E		
-6-		E		
-7-		E		
-8-		E		
-9-		E		
-10-		±10'	E	
-11-	Brown, fine to medium SAND, trace Silt	E		
-12-		E		
-13-		E		1
-14-	End of Exploration at ±13'			

REMARKS:

- 1. No groundwater encountered.

<p>TEST PIT PLAN 16 16 NORTH</p>	<p>LEGEND:</p> <p>BOULDER</p> <p>SIZE RANGE CLASSIFICATION</p> <p>6"-18" 18"-36" 36" OR LARGER</p>	<p>COUNT</p> <p>LETTER DESIGNATION</p> <p>A B C</p>	<p>PROPORTIONS USED</p> <p>TRACE (TR) 0-10% LITTLE (LI) 10-20% SOME (SO) 20-35% AND</p>	<p>EXCAVATION EFFORT</p> <p>E EASY M MODERATE D DIFFICULT</p>

40 BROADWAY, PROVIDENCE, RI

GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS

DESCRIPTION: Providence YMCA - Parcel C
 LOCATION: Providence, Rhode Island

FILE NO.: 32384.01
 DATE: 11-19-01

EXCAVATION EQUIPMENT

SEA ENGINEER: Wendell T. Barry
 WEATHER: Partly Cloudy, 55-60

CONTRACTOR: [Redacted] & Sons
 OPERATOR: Dana Moniz
 MAKE: CAT MODEL: 330
 CAPACITY: 2.5 cu. yd. REACH: 18 feet

GROUND ELEV.: ±65.3
 TIME STARTED: 1130
 TIME COMPLETED: 1245

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK NO.
-1-	Brown, fine to medium SAND, some Bricks, little Timber, Metal, Plaster, Gravel, trace Silt (Fill)	E		
-2-		E		
-3-		E		1
-4-		E		
-5-		E		
-6-		E		
-7-		E		
-8-		E		
-9-		E		
-10-	Brown, fine to medium SAND, trace(+) Silt (Possible Fill)	E		
-11-		E		
-12-		E		
-13-		E		
-14-		E		
-15-		E		
-16-		E		
-17-		E		
-18-	End of Exploration at ±18'	E		2

- REMARKS:
- White plaster-like material at ±2.5' (±12" thick).
 - No groundwater encountered.

<p>TEST PIT PLAN 20 8 NORTH</p>	<p>LEGEND:</p> <table border="0"> <tr> <td>BOULDER</td> <td>COUNT</td> <td>PROPORTIONS USED</td> <td rowspan="2"> <table border="0"> <tr> <td>E</td> <td>EASY</td> </tr> <tr> <td>M</td> <td>MODERATE</td> </tr> <tr> <td>D</td> <td>DIFFICULT</td> </tr> </table> </td> </tr> <tr> <td>SIZE RANGE</td> <td>LETTER DESIGNATION</td> <td>TRACE (TR) 0-10%</td> </tr> <tr> <td>CLASSIFICATION</td> <td>A</td> <td>SOME (SO) 20-35%</td> </tr> <tr> <td>18"-36"</td> <td>B</td> <td>AND 35-50%</td> </tr> <tr> <td>36" OR LARGER</td> <td>C</td> <td></td> </tr> </table>	BOULDER	COUNT	PROPORTIONS USED	<table border="0"> <tr> <td>E</td> <td>EASY</td> </tr> <tr> <td>M</td> <td>MODERATE</td> </tr> <tr> <td>D</td> <td>DIFFICULT</td> </tr> </table>	E	EASY	M	MODERATE	D	DIFFICULT	SIZE RANGE	LETTER DESIGNATION	TRACE (TR) 0-10%	CLASSIFICATION	A	SOME (SO) 20-35%	18"-36"	B	AND 35-50%	36" OR LARGER	C		<p>OBSERVED GROUNDWATER LEVEL</p>
		BOULDER	COUNT	PROPORTIONS USED		<table border="0"> <tr> <td>E</td> <td>EASY</td> </tr> <tr> <td>M</td> <td>MODERATE</td> </tr> <tr> <td>D</td> <td>DIFFICULT</td> </tr> </table>	E	EASY	M	MODERATE	D	DIFFICULT												
E	EASY																							
M	MODERATE																							
D	DIFFICULT																							
SIZE RANGE	LETTER DESIGNATION	TRACE (TR) 0-10%																						
CLASSIFICATION	A	SOME (SO) 20-35%																						
18"-36"	B	AND 35-50%																						
36" OR LARGER	C																							
VOLUME= ±110 cu. yd.																								

GEOTECHNICAL/GEOHYDROLOGICAL
CONSULTANTS

DESCRIPTION: Providence YMCA - Parcel C
LOCATION: Providence, Rhode Island

FILE NO.: 32384.01
DATE: 11-19-01

EXCAVATION EQUIPMENT

SEA ENGINEER: Wendell T. Barry

CONTRACTOR: C. Pezza & Sons

OPERATOR: Dana Moniz

MAKE: CAT

CAPACITY: 2.5 cu. yd.

MODEL: 330

REACH: 18 feet

GROUND ELEV.: ±64.2'

TIME STARTED: 1250

TIME COMPLETED: 1315

WEATHER: Partly Cloudy, 55-60

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK NO.
-1-	Dark brown, fine to medium SAND and BRICKS, TIMBER, PLASTER, CONCRETE (Fill)	E		
-2-		E		
-3-		E		
-4-		E		
-5-		E		
-6-		E		
-7-		E		
-8-		E		
-9-		E		
-10-		E		
-11-		E		
-12-		E		
-13-		E		
-14-		14'	E	
-15-	Brown, fine to coarse SAND, trace(-) Silt	E		
-16-		E		
-17-		E		
-18-		E		1
End of Exploration at ±18'				

REMARKS:

1. No groundwater encountered.

<p>TEST PIT PLAN</p> <p>26 8 NORTH</p>	<p>LEGEND:</p> <p>BOULDER</p> <p>SIZE RANGE</p> <p>CLASSIFICATION</p> <p>6"-18"</p> <p>18"-36"</p> <p>36" OR LARGER</p>	<p>COUNT</p> <p>LETTER DESIGNATION</p> <p>A</p> <p>B</p> <p>C</p>	<p>PROPORTIONS USED</p> <p>TRACE (TR)</p> <p>LITTLE (L)</p> <p>SOME (SO)</p> <p>MANY (M)</p>	<p>0-10%</p> <p>10-20%</p> <p>20-35%</p> <p>35-50%</p>	<p>EXCAVATION EFFORT</p> <p>E EASY</p> <p>M MODERATE</p> <p>H DIFFICULT</p> <p>▽ OBSERVED GROUNDWATER LEVEL</p>

140 BROADWAY, PROVIDENCE, RI

GEOTECHNICAL/GEOHYDROLOGICAL
CONSULTANTS

DESCRIPTION: Providence YMCA - Parcel C
LOCATION: Providence, Rhode Island

FILE NO.: 32384.01
DATE: 11-19-01

EXCAVATION EQUIPMENT

32A ENGINEER: Wendell T. Barry

CONTRACTOR: C. Pezza & Sons

OPERATOR: Dana Moniz

GROUND ELEV.: ±64.1'

WEATHER: Partly Cloudy, 55-60

MAKE: CAT

MODEL: 330

TIME STARTED: 1330

CAPACITY: 2.5 cu. yd.

REACH: 18 feet

TIME COMPLETED: 1350

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK NO.
-1-	Brown, fine to medium SAND, little Brick, Metal, Timber, Trash, Silt (Fill)	E		
-2-		E		
-3-		E		
-4-		E		
-5-		E		
-6-		E		
-7-		E		
-8-	Orange-brown, fine to medium SAND, trace Roots, trace Silt	E		
-9-	Brown, fine to coarse SAND, trace fine Gravel, trace Silt	E		
-10-		E		
-11-	End of Exploration at ±11'	E		1
-12-				
-13-				
-14-				

REMARKS:
1. No groundwater encountered.

<p>TEST PIT PLAN</p> <p>VOLUME = 450 cu. yd</p>	<p>LEGEND:</p> <table border="0"> <tr> <td>BOULDER</td> <td>COUNT</td> <td>PROPORTIONS USED</td> <td>EXCAVATION EFFORT</td> </tr> <tr> <td>SIZE RANGE</td> <td>LETTER</td> <td></td> <td></td> </tr> <tr> <td>CLASSIFICATION</td> <td>DESIGNATION</td> <td></td> <td></td> </tr> <tr> <td>6"-18"</td> <td>A</td> <td>TRACE (TR) 0-10%</td> <td>E EASY</td> </tr> <tr> <td>18"-36"</td> <td>B</td> <td>LITTLE (L) 10-20%</td> <td>M MODERATE</td> </tr> <tr> <td>36" OR LARGER</td> <td>C</td> <td>SOME (SO) 20-35%</td> <td>D DIFFICULT</td> </tr> <tr> <td></td> <td></td> <td>AND 36.50%</td> <td> OBSERVED GROUNDWATER LEVEL</td> </tr> </table>	BOULDER	COUNT	PROPORTIONS USED	EXCAVATION EFFORT	SIZE RANGE	LETTER			CLASSIFICATION	DESIGNATION			6"-18"	A	TRACE (TR) 0-10%	E EASY	18"-36"	B	LITTLE (L) 10-20%	M MODERATE	36" OR LARGER	C	SOME (SO) 20-35%	D DIFFICULT			AND 36.50%	OBSERVED GROUNDWATER LEVEL		
		BOULDER	COUNT	PROPORTIONS USED	EXCAVATION EFFORT																										
SIZE RANGE	LETTER																														
CLASSIFICATION	DESIGNATION																														
6"-18"	A	TRACE (TR) 0-10%	E EASY																												
18"-36"	B	LITTLE (L) 10-20%	M MODERATE																												
36" OR LARGER	C	SOME (SO) 20-35%	D DIFFICULT																												
		AND 36.50%	OBSERVED GROUNDWATER LEVEL																												

140 BROADWAY, PROVIDENCE, RI

GEOTECHNICAL/GEOHYDROLOGICAL
CONSULTANTS

DESCRIPTION: Providence YMCA - Parcel C
LOCATION: Providence, Rhode Island

FILE NO.: 32384.01
DATE: 11-19-01

EXCAVATION EQUIPMENT

32A ENGINEER: Wendell T. Barry

CONTRACTOR: C. Pezza & Sons

OPERATOR: Dana Moniz

MAKE: CAT

CAPACITY: 2.5 cu. yd.

MODEL: 330

REACH: 18 feet

GROUND ELEV.: ±64.5'

TIME STARTED: 1425

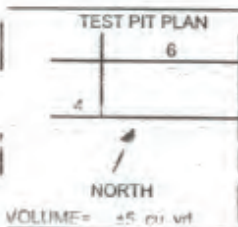
TIME COMPLETED: 1440

WEATHER: Partly Cloudy, 55-60

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK NO.
-1-	Brown, fine to medium SAND, trace(-) Silt	E		
-2-		E		
-3-		E		
-4-		E		
-5-		E		1
-6-	End of Exploration at ±5'			
-7-				
-8-				
-9-				
-10-				
-11-				
-12-				
-13-				
-14-				

REMARKS:

- 1. No groundwater encountered.



LEGEND:

BOULDER SIZE RANGE CLASSIFICATION	COUNT LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" OR LARGER	C

PROPORTIONS USED	
TRACE (TR)	0-10%
LITTLE (LJ)	10-20%
SOME (SO)	20-35%
MANY (MA)	35-50%

EXCAVATION EFFORT	
E	EASY
M	MODERATE
D	DIFFICULT
▽	

GEOTECHNICAL/GEOHYDROLOGICAL
CONSULTANTS

DESCRIPTION: Providence YMCA - Parcel C
LOCATION: Providence, Rhode Island

FILE NO.: 32384.01
DATE: 11-19-01

EXCAVATION EQUIPMENT

GZA ENGINEER: Wendell T. Barry

CONTRACTOR: C. Pezza & Sons

OPERATOR: Dana Moniz

GROUND ELEV.: ±69'

WEATHER: Partly Cloudy, 55-60

MAKE: CAT

MODEL: 330

TIME STARTED: 1445

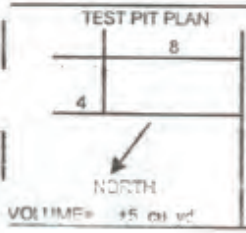
CAPACITY: 2.5 cu. yd.

REACH: 18 feet

TIME COMPLETED: 1455

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK NO.
-1-	Brown, fine to medium SAND, trace(-) Silt	E		
-2-		E		
-3-		E		
-4-		E		
-5-		E		1
-6-	End of Exploration at ±5'			
-7-				
-8-				
-9-				
-10-				
-11-				
-12-				
-13-				
-14-				

REMARKS:
1. No groundwater encountered.



LEGEND:		PROPORTIONS USED		EXCAVATION EFFORT	
BOULDER	COUNT	TRACE (TR)	0-10%	E	EASY
SIZE RANGE	LETTER DESIGNATION	LITTLE (L)	10-20%	M	MODERATE
CLASSIFICATION		SOME (SO)	20-35%	D	DIFFICULT
6"-18"	A	AND	35-50%		OBSERVED GROUNDWATER LEVEL
18"-36"	B				
36" OR LARGER	C				

GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS
 DESCRIPTION: Providence YMCA - Parcel C
 FILE NO.: 32384.01
 LOCATION: Providence, Rhode Island
 DATE: 11-19-01

EXCAVATION EQUIPMENT
 GZA ENGINEER: Wendell T. Barry
 CONTRACTOR: C. Pezza & Sons
 OPERATOR: Dana Moniz
 WEATHER: Partly Cloudy, 55-60
 MAKE: CAT
 MODEL: 330
 REACH: 18 feet
 CAPACITY: 2.5 cu. yd.
 GROUND ELEV.: ±69.7'
 TIME STARTED:
 TIME COMPLETED:

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK NO.
-1-	Brown, fine to medium SAND, little(-) Brick (Fill), trace Timber	E		
-2-		E		
-3-		E		
-4-		E		
-5-		E		
-6-		E		
-7-		E		
-8-		E		
-9-		E		
-10-	Brown, fine to medium SAND, some Timber, Brick (Fill)	E		
-11-		E		
-12-		E		
-13-		E		
-14-		E		
-15-		E		
-16-		E		1
End of Exploration at ±16'				

REMARKS:
 1. No groundwater encountered.

TEST PIT PLAN

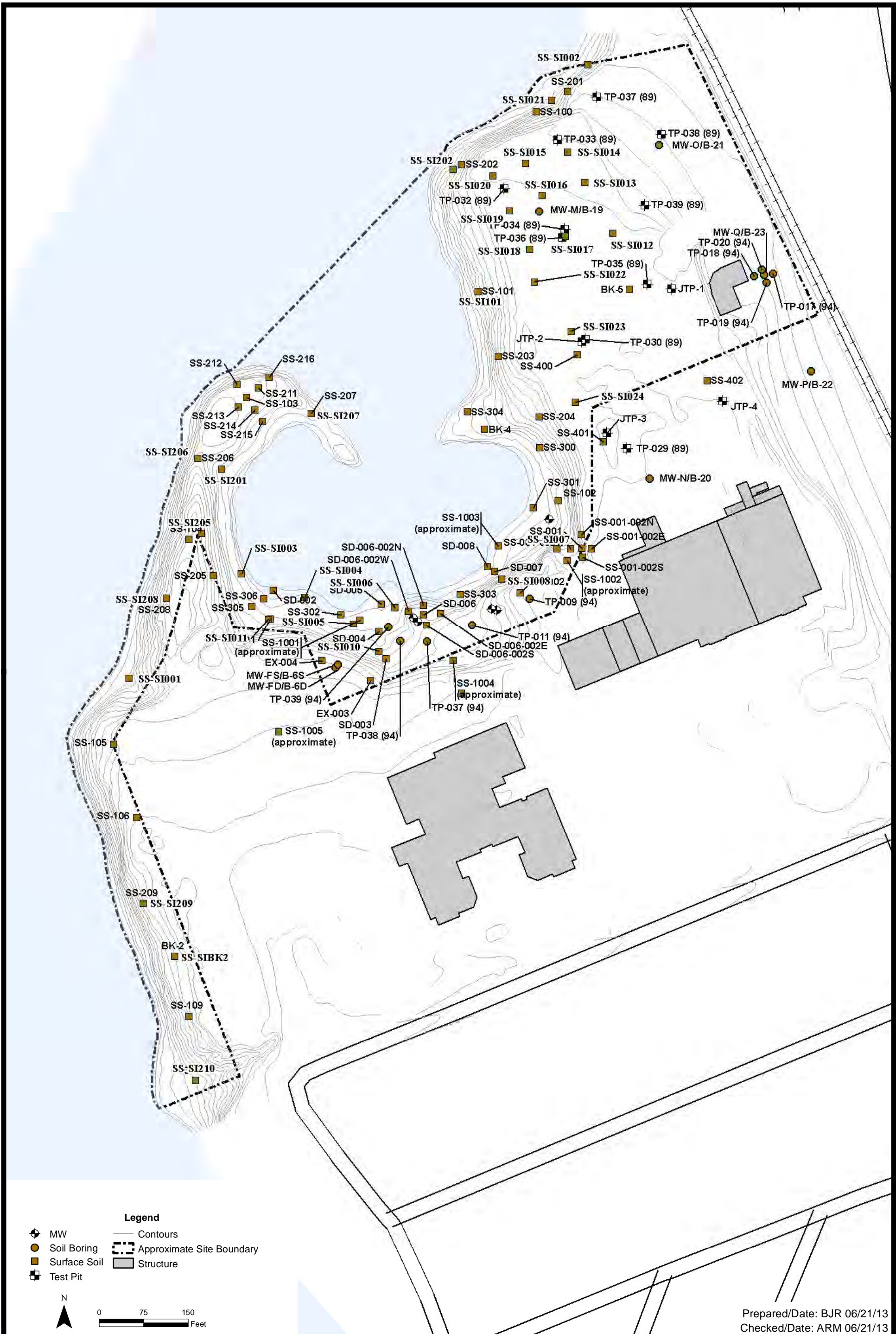
LEGEND:

BOULDER	COUNT	PROPORTIONS USED	EXCAVATION EFFORT
SIZE RANGE	LETTER		
CLASSIFICATION	DESIGNATION	TRACE (TR)	EASY
6"-18"	A	0-10%	MODERATE
18"-36"	B	10-20%	DIFFICULT
36"-60"	C	20-35%	
60"-120"	D	35-50%	
120"-240"	E	50-100%	

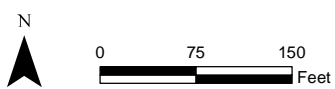
VOLUME = 400 cu. yd.

DATE: 11-19-01

APPENDIX A - 3.2
Phase III Soil-TP Logs



- Legend**
- ◆ MW
 - Soil Boring
 - Surface Soil
 - ⊠ Test Pit
 - Contours
 - - - Approximate Site Boundary
 - ▭ Structure



Prepared/Date: BJR 06/21/13
 Checked/Date: ARM 06/21/13

333 Adelaide Avenue Site
 Providence, Rhode Island



Summary of 1994-2007 Soil
 Investigation Locations
 Project 3650-11-0222

Figure 3.1



- SERVICES
- Geotechnical
 - Environmental
 - Construction
 - Underground Tank
& Materials Testing

PRELIMINARY GEOTECHNICAL EVALUATION

**GORHAM MANUFACTURING REDEVELOPMENT
PROVIDENCE, RHODE ISLAND**

PROJECT NO. C98597G

APRIL 9, 1999

Prepared for:

**Mr. David Patrick
Banks Building Company, LLC
167 Point Street, Suite 300
Providence, RI 02903-4736**

□ 150 Zachary Road
Manchester, NH 05109-5614
(603) 647-9700 Fax 647-4432

□ 44 Wood Avenue, Unit #4
Mansfield, MA 02048-1255
(508) 337-6100 Fax 261-1348

□ One Hartford Square, Unit #19
New Britain, CT 06052-1161
(860) 223-6100 Fax 229-9567


Internet Address: <http://www.jgi-geo.com>

Printed on 100% Recycled Paper

TEST PIT LOG

PROJECT:	Gorham Manufacturing Redevelopment	JGI INSPECTOR:	TEST PIT NO: JTP-1
LOCATION:	Providence, Rhode Island	Tim Carney	LOCATION: See Sketch
PROJECT NO.:	C98597	WEATHER:	
DATE:	April 1, 1999	50's, Cloudy	SURFACE EL: unknown
EXCAVATION EQUIPMENT:		GROUNDWATER OBSERVATIONS	
CONTRACTOR:	Clean Harbors, Inc.	DATE	TIME
OPERATOR:	Dave Turner	4/1/99	none
MAKE:	Caterpillar		observed
CAPACITY:	1 yd	MODEL:	235B
		REACH:	20 ft


Depth (ft.)	Stratum Change	SOIL DESCRIPTION	Boulder Size/Count	Notes
1	0.9'	TOPSOIL.		
2	3.4'	Brown, medium to fine SAND, trace Gravel, trace red Brick.		
3				
4			(Fill)	
5	4.4'	Former TOPSOIL/subsoil with Roots.		
6	6.5'	Brown, medium to fine SAND, trace Gravel.		
7		White, stratified, fine SAND, with 1/2 inch layers of coarse to fine Sand.		
8				
9				
10			(Outwash)	
11			Exploration terminated - 10.0'.	
12				
13				
14				
15				
16				

NOTES:	PIT DIMENSIONS:	 JAWORSKI GEOTECH, INC.
	Length: 13.0' Width: 6.0' Depth: 6.0'	
REMARKS: The stratification lines represent the approximate boundary between soil types and the transition may be gradual. Water level readings have been made in the test pits at times under conditions stated on the test pit logs. Fluctuations in the level of the groundwater may occur due to other factors than those present at the time measurements were made. Proportions Used: trace (0-10%), little (10-20%), some (20-35%), and (35-50%)		

TEST PIT LOG

PROJECT: Gorham Manufacturing Redevelopment LOCATION: Providence, Rhode Island PROJECT NO.: C98597 DATE: April 1, 1999	JGI INSPECTOR: Tim Carney WEATHER: 50's, Cloudy TEST PIT NO: JTP-2 LOCATION: See Sketch SURFACE EL: unknown								
EXCAVATION EQUIPMENT: CONTRACTOR: Clean Harbors, Inc. OPERATOR: Dave Turner MAKE: Caterpillar MODEL: 235B CAPACITY: 1 yd REACH: 20 ft	GROUNDWATER OBSERVATIONS <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 25%;">DATE</th> <th style="width: 25%;">TIME</th> <th style="width: 25%;">DEPTH</th> <th style="width: 25%;">NOTES</th> </tr> <tr> <td>4/1/99</td> <td>none</td> <td>observed</td> <td></td> </tr> </table>	DATE	TIME	DEPTH	NOTES	4/1/99	none	observed	
DATE	TIME	DEPTH	NOTES						
4/1/99	none	observed							

Depth (ft.)	Stratum Change	SOIL DESCRIPTION	Boulder Size/Count	Notes
1	0.9'	TOPSOIL.		
2	2.0'	Brown, medium to fine SAND, little Silt, trace Gravel, and Roots. (Subsoil)		
3		White/light brown, alternating 6-8 inch layers of medium to fine SAND, trace Gravel to coarse to fine SAND, little Gravel.		
4				
5				
6				
7				
8				
9				
10				
11				
12				
13		(Outwash)		
14		Exploration terminated - 12.0'.		
15				
16				

NOTES: 	PIT DIMENSIONS: Length: 13.0' Width: 6.0' Depth: 12.0'	 JAWORSKI GEOTECH, INC.
REMARKS: The stratification lines represent the approximate boundary between soil types and the transition may be gradual. Water level readings have been made in the test pits at times under conditions stated on the test pit logs. Fluctuations in the level of the groundwater may occur due to other factors than those present at the time measurements were made. Proportions Used: trace (0-10%), little (10-20%), some (20-35%), and (35-50%)		

ENVIRONMENTAL DRILLING, INC.

(508) 355-6144

RR 2, WHEELWRIGHT ROAD, BOX 188

BARRE, MASSACHUSETTS 01005

Client **Hunter, Inc.** Date _____ Job No. **89-0327**

Location **Gorham Mills, Providence, RI**

BORING NO. **B21/MW-0** Ground Elev. _____ Date Start _____ Date Complete _____ Drilling Stone Foreman _____ Eng./Hydrol. Stone Geologist _____

DEPTH	Sample Data					Soil and/or bedrock strata descriptions	
	No.	Depth (ft.)	Blows 6" Penetration	Rec. Inches	Casing Blows Per ft.	Strata Change Depth	Visual Identification of Soil and/or Rock Strata
							F-M sand, tr. of assorted fill
					3'		
5							M. dense, dry to wet, F-M sand
10	1	10'-12'	7-8-9-9				
15						16'	
20	2	20'-22'	6-6-5-6				M. dense, wet, F-sand, some inorganic silt
25							
30	3	30'-32'	5-7-7-6				
						32'	
							* End of boring 32'
							* Well point 29'6"
							* Water at completion 16'
							* Top of screen 14'6"
							* Top of sand 12'
							* Bentonite seal 10'-12'
35							
40							

Type of Boring _____ Casing Size: _____ Hollow Stem Auger Size: _____

Proportion Percentages Traces 0 to 10% Some 10 to 40% And 40 to 50%	Granular Soils (blows per ft.) 0 to 4 Very Loose 30 to 50 Dense 4 to 10 Loose Over 50 Very Dense 10 to 30 Medium Dense	Cohesive Soils (blows per ft.) 0 to 2 Very Soft 8 to 15 Stiff 2 to 4 Soft 15 to 30 Very Stiff 4 to 8 Medium Stiff Over 30 Hard
Standard penetration test (SPT) = 140# hammer falling 30" Blows are per 6" taken with an 18" long x 2" O.D. x 1 3/8" I.D. split spoon sampler unless otherwise noted.		

The terms and percentages used to describe soil and or rock are based on visual identification of the retrieved samples. ■ Moisture content indicated may be affected by time of year and water added during the drilling process. ■ Water levels indicated may vary with seasonal fluctuation and the degree of soil saturation when the boring was taken. ■ The stratification lines represent the approximate boundaries between soil types, the actual transitions may be gradual. ■

HUNTER, INC.	TEST PIT LOG	NO: <u>TP-17</u>	SH <u>1/1</u>
PROJECT <u>Gorham Mill Facility Site Assessment</u>	NO: <u>89-632.02</u>		
LOCATION <u>Adelaide Ave. and Downing Street Providence, RI</u>	DATE <u>5/24/89</u>		
CONTRACTOR / OPERATOR / EQUIPMENT <u>J.E. Chase, Inc. Bruce Forg John Deere 710B</u>			
ELEVATION _____	COMPLETION DEPTH <u>10.0'</u>	WATER LEVEL <u>No Ground Water</u>	
LOGGED BY <u>Alton Day Stone / Joel Curatolo</u> REMARKS _____			

ELEV	DEPTH (FEET)	CLASSIFICATION / DESCRIPTION
	0	<div style="display: flex; justify-content: space-between;"> <u>NORTH</u> <u>SOUTH</u> </div> <p style="text-align: center;">FILL</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p style="font-size: small; margin: 0;">WASTE - FILL CONTAINING COLORED CLAY SOLEDS WOOD, OLD PIPES, SAND</p> </div>
	5	<p style="text-align: center;">FILL</p> <p style="text-align: right; font-size: small;">YELLOW - BROWN MEDIUM - COARSE SAND AND GRAVEL</p> <p style="text-align: right; font-size: small;"><u>SAMPLE S-1</u></p>
	10	<p>DRY BOH 10.0'</p>
	15	<p>NOTE: DEPTH LIMITED BY IMPARTING PIT WALLS</p>

HUNTER, INC.	TEST PIT LOG	NO: <i>TP-18</i>	SH 1/1
PROJECT <u>Gorham Mill Facility Site Assessment</u>	NO: <u>89-632.02</u>		
LOCATION <u>Adelaide Ave. and Downing Street Providence, RI</u>	DATE <u>3/24/89</u>		
CONTRACTOR / OPERATOR / EQUIPMENT <u>J.E. Chase, Inc. Bruce Forg John Deere 710B</u>			
ELEVATION _____	COMPLETION DEPTH <u>12.0</u>	WATER LEVEL <u>No Ground Water</u>	
LOGGED BY <u>Alton Day Stone / Joel Curatolo</u> REMARKS _____			

ELEV	DEPTH (FEET)	CLASSIFICATION / DESCRIPTION
	0	<i>NORTH</i> <i>SOUTH</i>
		FILL
		WASTE - FILL CONTAINS COLORED CLAY SOLIDS WOOD, METAL, SAND
	5	FILL
		<i>YELLOW - BROWN MEDIUM - COARSE SAND AND GRAVEL</i>
	10	<p><i>YELLOW COARSE TO FINE (+) SAND LITTLE SILT, LITTLE MEDIUM TO FINE (+) GRAVEL</i></p> <p style="text-align: right;"><u>SAMPLE S-1</u></p>
		<i>DRY</i>
		<i>BOH 12.0'</i>
	15	<p><i>NOTE:</i></p> <p><i>- WASTE DEPOSITED OVER EDGE OF ENBANKMENT TO NORTH OF PIT</i></p>


PROJECT Gorham Mill Facility Site Assessment NO: 89-632.02

LOCATION Adelaide Ave. and Downing Street Providence, RI DATE 3/24/89

CONTRACTOR / OPERATOR / EQUIPMENT J.E. Chase, Inc. Bruce Forg John Deere 710B

ELEVATION _____ COMPLETION DEPTH 13.0' WATER LEVEL No Ground Water

LOGGED BY Alton Day Stone / Joel Curatolo REMARKS _____

ELEV	DEPTH (FEET)	CLASSIFICATION / DESCRIPTION	
	0	 <p>WASTE-FILL CONTAINS DARK SAND AND GRAVEL MATRIX MIXED WITH PEPPES, SHEET METAL DEBRIS AND LAYERS AND LUMPS OF WHITE CLAY-SOLID MATERIAL.</p>	
	5		
			YELLOW COARSE TO FINE (H) SAND LITTLE SILT, LITTLE MEDIUM TO FINE (H) GRAVEL
	10		LIGHT TAN COARSE TO FINE SAND, TRACE SILT, LITTLE (H) MEDIUM TO FINE (H) GRAVEL DRY
	15		BOH 13.0'

HUNTER, INC.	TEST PIT LOG	NO: <i>TP-20</i>	SH 1/1
PROJECT <u>Gorham Mill Facility Site Assessment</u>	NO: <u>89-632.02</u>		
LOCATION <u>Adelaide Ave. and Downing Street Providence, RI</u>	DATE <u>3/24/89</u>		
CONTRACTOR / OPERATOR / EQUIPMENT <u>J.E. Chase, Inc. Bruce Forg John Deere 710B</u>			
ELEVATION _____	COMPLETION DEPTH <u>11.0'</u>	WATER LEVEL <u>No Ground Water</u>	
LOGGED BY <u>Alton Day Stone / Joel Curatolo</u> REMARKS _____			

ELEV	DEPTH (FEET)	CLASSIFICATION / DESCRIPTION
	0	<p><i>FILL</i></p> <p><i>WASTE-FILL → DIRT MATRIX CONTAINING WHITE, GREEN, AND PURPLE CLAY WASTE. GREEN CLOTH + DIRT, WOOD, STONE, BRICK GLASS DEBRIS.</i></p>
	5	<p><i>GREY BROWN SAND FILL</i></p>
		<p><i>YELLOW COARSE TO FINE (+) SAND LITTLE SILT, LITTLE MEDIUM TO FINE (+) GRAVEL</i></p>
	10	<p><i>LIGHT TAN COARSE TO FINE SAND, TRACE SILT, LITTLE (+) MEDIUM TO FINE (+) GRAVEL</i></p>
	15	<p><i>DRY BOH 11.0'</i></p>

HUNTER, INC.

TEST PIT LOG

NO: TP-30

SH 1/1

PROJECT Gorham Mill Facility Site Assessment

NO: 89-632.02

LOCATION Adelaide Ave. and Downing Street Providence, RI

DATE 3/24/89

CONTRACTOR / OPERATOR / EQUIPMENT J.E. Chase, Inc. Bruce Forg John Deere 710B

ELEVATION _____ COMPLETION DEPTH 10.0' WATER LEVEL No Ground Water

LOGGED BY Alton Day Stone / Joel Curatolo REMARKS _____

ELEV	DEPTH (FEET)	CLASSIFICATION / DESCRIPTION
	0	BLACK TOPSOIL + ROOT ZONE
		BROWN-YELLOW SAND
	5	<p>LIGHT TAN COARSE TO FINE SAND, TRACE SILT, LITTLE (+) MEDIUM TO FINE (+) GRAVEL</p> <p>GREY SILT, TRACE (+) FINE SAND</p> <p>YELLOW COARSE TO FINE (+) SAND LITTLE SILT, LITTLE MEDIUM TO FINE (+) GRAVEL</p>
	10	<p>DRY</p> <p>BOH 10.0'</p>
	15	

PROJECT Gorham Mill Facility Site Assessment NO: 89-632.02

LOCATION Adelaide Ave. and Downing Street Providence, RI DATE 3/27/89

CONTRACTOR / OPERATOR / EQUIPMENT J.E. Chase, Inc. Bruce Forg John Deere 710B

ELEVATION _____ COMPLETION DEPTH 15.5' WATER LEVEL No Ground Water

LOGGED BY Alton Day Stone / Joel Curatolo REMARKS _____

ELEV	DEPTH (FEET)	CLASSIFICATION / DESCRIPTION
	0	FILL ASPHALT, CINDER/ASH, BRICK
	5	LIGHT TAN COARSE TO FINE SAND, TRACE SILT, LITTLE MEDIUM TO FINE (H) GRAVEL
	10	TRANSITIONAL LAYER INCLUDES LIGHT TO YELLOW COARSE SAND AND GRAVEL
	15	UPPER LAYERS INCLUDE DARK MEDIUM TO FINE SAND GREY SILT, TRACE (H) FINE SAND <u>SAMPLE S-1</u>
	15.5	DRY BOH 15.5'

HUNTER, INC.	TEST PIT LOG	NO: <u>TP-32</u>	SH <u>1/1</u>
PROJECT <u>Gorham Mill Facility Site Assessment</u>	NO: <u>89-632.02</u>		
LOCATION <u>Adelaide Ave. and Downing Street Providence, RI</u>	DATE <u>3/27/89</u>		
CONTRACTOR / OPERATOR / EQUIPMENT <u>J.E. Chase, Inc. Bruce Forg John Deere 710B</u>			
ELEVATION _____	COMPLETION DEPTH <u>15.5'</u>	WATER LEVEL <u>No Ground Water</u>	
LOGGED BY <u>Alton Day Stone / Joel Curatolo</u> REMARKS _____			

ELEV	DEPTH (FEET)	CLASSIFICATION / DESCRIPTION	
	0	<p><i>LIGHT TAN COARSE TO FINE SAND, TRACE SILT, LITTLE (H) MEDIUM TO FINE (H) GRAVEL</i></p> <hr style="border: 0.5px solid black;"/> <p style="text-align: right;"><i>2.5'</i> <u>THIN ORANGE GRAVEL LAYER</u></p> <p style="text-align: right;"><i>SAND IS COARSER AND EXHIBITS CROSS BEDDING IN THIS LAYER</i></p> <hr style="border: 0.5px solid black;"/> <p style="text-align: right;"><i>7.0'</i></p> <hr style="border: 0.5px solid black;"/> <p style="text-align: center;">↓</p>	
	5		
	10		
	15		
	15.5		
	15.5		<i>DRY</i>
	15.5		<i>BOH 15.5'</i>

PROJECT Gorham Mill Facility Site Assessment NO: 89-632.02

LOCATION Adelaide Ave. and Downing Street Providence, RI DATE 3/27/89

CONTRACTOR / OPERATOR / EQUIPMENT J.E. Chase, Inc. Bruce Forg John Deere 710B

ELEVATION _____ COMPLETION DEPTH 16.0' WATER LEVEL No Ground Water

LOGGED BY Alton Day Stone / Joel Curatolo REMARKS _____

ELEV	DEPTH (FEET)	CLASSIFICATION / DESCRIPTION
	0	ASPHALT ON TOP OF BROWN FILL SAND AND COBBLES
		FILL
		MEDIUM SAND AND GRAVEL
		ORANGE + YELLOW SAND + SILT
		GREY SAND AND GRAVEL
		BLACK ROOT ZONE ABOVE LAYER OF CLAM SHELLS SAMPLE S-2
	5	ORANGE FINE SAND AND SILT SAMPLE S-1
		LIGHT GREY SAND + SILT
		MIXED BROWN AND ORANGE SANDS
	10	
	15	GREY SILT, TRACE (-) FINE SAND
		DRY
		BOH 16.0'

HUNTER, INC.	TEST PIT LOG	NO: TP-34	SH 1/1
PROJECT	Gorham Mill Facility Site Assessment	NO:	89-632.02
LOCATION	Adelaide Ave. and Downing Street Providence, RI	DATE	3/27/89
CONTRACTOR / OPERATOR / EQUIPMENT	J.E. Chase, Inc. Bruce Forg John Deere 710B		
ELEVATION	COMPLETION DEPTH	9.0'	WATER LEVEL
			No Ground Water
LOGGED BY	Alton Day Stone / Joel Curatolo		
	REMARKS		

ELEV	DEPTH (FEET)	CLASSIFICATION / DESCRIPTION
	0	<i>FILL</i> <i>ASPHALT COVERING BROWN SAND AND COBBLES</i>
	5	<i>LIGHT TAN COARSE TO FINE SAND, TRACE SILT, LITTLE MEDIUM TO FINE (+) GRAVEL</i>
	10	<i>DRY BOH 9.0'</i>
	15	<i>NOTE: - BUILDING DEBRIS FOUND IN NORTH END OF PIT. MAY BE BURIED WALL OR FOUNDATION.</i>

HUNTER, INC.	TEST PIT LOG	NO: <u>TP-35</u>	SH <u>1/1</u>
PROJECT <u>Gorham Mill Facility Site Assessment</u>	NO: <u>89-632.02</u>		
LOCATION <u>Adelaide Ave. and Downing Street Providence, RI</u>	DATE <u>3/27/89</u>		
CONTRACTOR / OPERATOR / EQUIPMENT <u>J.E. Chase, Inc. Bruce Forg John Deere 710B</u>			
ELEVATION _____	COMPLETION DEPTH <u>10.0</u>	WATER LEVEL <u>No Ground Water</u>	
LOGGED BY <u>Alton Day Stone / Joel Curatolo</u> REMARKS _____			

ELEV	DEPTH (FEET)	CLASSIFICATION / DESCRIPTION
	0	<i>DARK BROWN - BLACK SOD + SAND</i>
		<i>BROWN - YELLOW SAND AND SILT</i>
	5	<div style="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center; margin-right: 10px;">↑</div> <div style="text-align: center; margin-right: 10px;">↓</div> <div style="text-align: center;"> <p><i>LIGHT TAN COARSE TO FINE SAND, TRACE SILT, LITTLE (+) MEDIUM TO FINE (+) GRAVEL</i></p> </div> </div>
		<i>LAYERS COARSE SAND + GRAVEL</i>
		6'
		<i>MEDIUM TO FINE SAND</i>
		8'
		<i>COARSE SAND</i>
	10	<i>DRY BOH 10.0'</i>
	15	

HUNTER, INC.

TEST PIT LOG

NO: TP-36

SH 1/1

PROJECT Gorham Mill Facility Site Assessment

NO: 89-632.02

LOCATION Adelaide Ave. and Downing Street Providence, RI

DATE 3/27/89

CONTRACTOR / OPERATOR / EQUIPMENT J.E. Chase, Inc. Bruce Forg John Deere 710B

ELEVATION _____ COMPLETION DEPTH 8.0' WATER LEVEL No Ground Water

LOGGED BY Alton Day Stone / Joel Curatolo REMARKS _____

ELEV	DEPTH (FEET)	CLASSIFICATION / DESCRIPTION
	0	FILL ASPHALT ABOVE DARK BROWN SAND AND COBBLES
		FILL BROWN SAND AND BUILDING DEBRIS, MAINLY BRICK 4.0' PATCHES OF MORTAR AND CONCRETE
	5	LIGHT TAN COARSE TO FINE SAND, TRACE SILT, LITTLE MEDIUM TO FINE (+) GRAVEL DRY BOH 8.0'
	10	NOTE: - TEST PIT IS SOUTH WEST OF TP-34 INSIDE OF THE FOUNDATION THE EDGE OF WHICH WAS FOUND IN TP.34.
	15	

HUNTER, INC.

TEST PIT LOG

NO: TP-37

SH 1/1

PROJECT Gorham Mill Facility Site Assessment

NO: 89-632.02

LOCATION Adelaide Ave. and Downing Street Providence, RI

DATE 3/27/89

CONTRACTOR / OPERATOR / EQUIPMENT J.E. Chase, Inc. Bruce Forg John Deere 710B

ELEVATION _____ COMPLETION DEPTH 10.0' WATER LEVEL No Ground Water

LOGGED BY Alton Day Stone / Joel Curatolo REMARKS _____

ELEV	DEPTH (FEET)	CLASSIFICATION / DESCRIPTION
	0	FILL ASPHALT ABOVE BROWN SAND BASE
		YELLOW-ORANGE FINE SAND AND SILT
		LIGHT TAN COARSE TO FINE SAND, TRACE SILT, LITTLE (+) MEDIUM TO FINE (+) GRAVEL
	5	BROWN FINE SAND AND SILT
		YELLOW MEDIUM SAND
	10	DRY BOH 10.0'
	15	

HUNTER, INC.

TEST PIT LOG

NO: TP-38

SH 1/1

PROJECT Gorham Mill Facility Site Assessment

NO: 89-632.02

LOCATION Adelaide Ave. and Downing Street Providence, RI

DATE 3/27/89

CONTRACTOR / OPERATOR / EQUIPMENT J.E. Chase, Inc. Bruce Forg John Deere 710B

ELEVATION _____ COMPLETION DEPTH 12.0' WATER LEVEL No Ground Water

LOGGED BY Alton Day Stone / Joel Curatolo REMARKS _____

ELEV	DEPTH (FEET)	CLASSIFICATION / DESCRIPTION
	0	ASPHALT ABOVE BROWN SAND, GRAVEL, + COBBLES
		BROWN FINE SAND ABOVE YELLOW FINE SAND
		LT. COLORED COARSE SAND AND GRAVEL
		YELLOW AND BROWN MIXED SANDS AND CLAM SHELLS
	5	<p>YELLOW COARSE TO FINE (+) SAND LITTLE SILT, LITTLE MEDIUM TO FINE (+) GRAVEL</p> <p>LIGHT TAN TO YELLOW FINE SAND.</p>
	10	
		DRY
		BOH 12.0'
	15	

HUNTER, INC.	TEST PIT LOG	NO: <u>TP-39</u>	SH 1/1
PROJECT <u>Gorham Mill Facility Site Assessment</u>		NO: <u>89-632.02</u>	
LOCATION <u>Adelaide Ave. and Downing Street Providence, RI</u>		DATE <u>3/27/89</u>	
CONTRACTOR / OPERATOR / EQUIPMENT <u>J.E. Chase, Inc. Bruce Forg John Deere 710B</u>			
ELEVATION _____		COMPLETION DEPTH _____ WATER LEVEL <u>No Ground Water</u>	
LOGGED BY <u>Alton Day Stone / Joel Curatolo</u>		REMARKS _____	

ELEV	DEPTH (FEET)	CLASSIFICATION / DESCRIPTION
	0	<i>FILL</i> <i>ASPHALT ABOVE BROWN SAND, GRAVEL, & COBBLES</i>
	5	<i>FILL</i> <i>MIXED YELLOW FINE SAND + GRAVEL, LIGHT TAN - GREY FINE SAND, AND CLAM SHELLS. (FOUND IN PATCHES AND LAYERS).</i> <u>SAMPLE S-1</u>
	10	<i>YELLOW COARSE TO FINE (H) SAND LITTLE SILT, LITTLE MEDIUM TO FINE (H) GRAVEL</i>
	15	<i>GREY SILT, TRACE (H) FINE SAND</i> <i>DRY BOH 12.0'</i>

APPENDIX A - 4
Site Well Diagrams



ABB ENVIRONMENTAL SERVICES, INC.

MONITORING WELL DIAGRAM

PROJECT: GORHAM/TEXTRON, PROVIDENCE, RI

DATE: 11/2/94

PROJECT No.: 09111-12

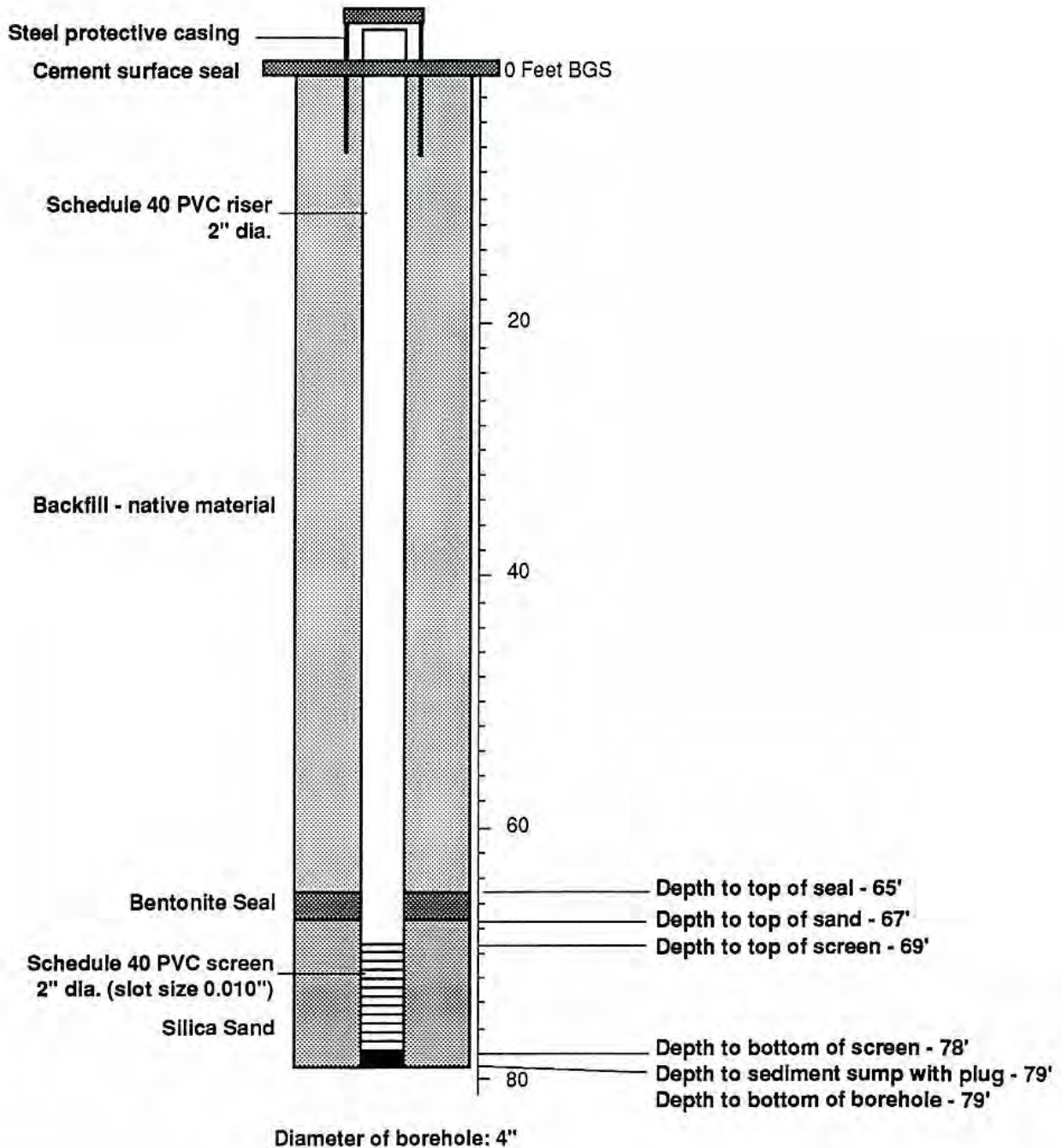
DRILLER: GEOLOGIC, INC.

LOCATION: MW-111D

DRILLING METHOD: DRIVE AND WASH

FIELD GEOLOGIST: K. DONOVAN

DEVELOPMENT METHOD: PUMP & SURGE



Appendix A-4 Site Well Diagrams
Only MW-111D included in this file.
Other well diagrams included within the A-1 Soil Boring Logs

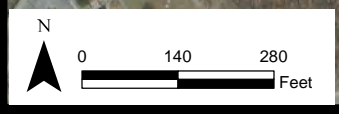
APPENDIX A - 5
Mashapaug Pond Sediment Figs-Logs



Legend

- ▲ URI Sediment Sample Location 1986
- ▼ URI Surface Water Sample Location 1986
- ▼ GZA Surface Water Sample Location 1986
- ▲ RIDEM Sediment Sample Location 1987
- ▼ RIDEM Surface Water Sample Location 1987
- ▲ RIDEM Sediment Sample Location 2005
- ▼ USEPA Water Column Station Surface Water Sampling 2001
- ▼ Surface Water Sample SW-1 through SW-4 were collected on April 15, 1999 by Harding Lawson Associates.
- ▲ Sediment Samples Cove-1 through Cove-3 were collected by R. Dorr on September 5, 2005
- Approximate Site Boundary

Prepared/Date: BJR 10/11/12
 Checked/Date: DEH 10/11/12



333 Adelaide Avenue Site
 Providence, Rhode Island



Historic Surface Water
 and Sediment Sample Locations
 Project 3650-11-0222 Figure 2.1

Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Project Name: **Gorham**

Geologist: **Phil Muller**

Date Started: **6-22-06**

Drilling Company: **Aqua Survey**

Date Completed: **6-22-06**

Drilling Method: **Vibra core**

Total Depth: **8.5**

Depth of Water:

Comments: **recovery = 6.0**

DEET

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	2" Black SILT and Organic Grey med. to coarse SAND, trace fine Gravel, trace organic		0.2		SED1001 @ 6-12" (0945)
2	6 pm				
3	2.3 2.5 Brown Organic Peat				SED1003 @ 2.5-3' (0955)
4	Grey fine to coarse SAND, some organics, little silt		0.2		
5	Grey SILT and CLAY dense		0.1		
6	5.1 DK. grey fine SAND and SILT		0.0		
7					



AQUA SURVEY, INC. SEDIMENT CORE LOG

Client : MACTEC		Project : Providence		Logger: MP	
Job#: 26-186		Date: 06/22/06		Time : 08:20	
Sample Coordinates: 346,655 E		260,111 N		SP NAD 83	
Core # SED-10		DTW(ft)	HDOP=		
Project Depth (inc. ft. overdredge) [PD]:		Core Penetration Length: 8.5			
Measured Water Depth [MWD]: 3.4		Recovered Core Length: 6.3			
Tide Adjust [TA] (+/- ft. from MLW):		Sample Length Retained : 6.3			
Corrected Depth @ MLW: 3.4		Core Volume Retained: 3.2			
Required Sample Core Length [SCL]: -3.4		Collected to Project Depth: <input checked="" type="radio"/> Y / <input type="radio"/> N			
All Length Measurements are in Decimal Feet					
Sample Interval (ft.)	Sample Id #	Description			
Top					
↓					
Bottom					
# of containers:				Core Volumes	
type of container:		bucket	hardliner	cup	other
Water and surface conditions:		Nominal core-barrel diameter		EST. Volume	
		3.0"		.25 gal/ft	
		3.5"		.33gal/ft	
Comments: Turned to Client in liner		4.0"		.50gal/ft	
		Liner Type: <input checked="" type="radio"/> Soft <input type="radio"/> Hard			
		Vibra Corer: <input checked="" type="radio"/> P3 <input type="radio"/> P4 <input type="radio"/> VT6 <input type="radio"/> Other			
Live Organisms present		Y	<input checked="" type="radio"/> N		
Oil Present		Y	<input checked="" type="radio"/> N		
Odor Present		Y	<input checked="" type="radio"/> N		
Debris Present		Y	<input checked="" type="radio"/> N		
Within 10% of Req'd Core Length		Y	<input checked="" type="radio"/> N		
Photo		Y	<input checked="" type="radio"/> N		



Boring Location: **SED 11**

Page 1 of 1

Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Project Name: **Gorham**

Geologist: **Phil Muller**

Date Started: **6.22.06**

Drilling Company: **Aqua Survey**

Date Completed: **6.22.06**

Drilling Method: **Vibra Core**

Total Depth: **8.5**

Depth of Water:

Comments: **recovery = 4.4**

DEP

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	Black SILT, trace organics, soft		0.3		SED1101 @ 0-1' (1015)
2					
2.5					
3	Grey silt fine to med. SAND, ^{some} and Black SILT, med. dense		0.2		SED1103 @ 2.5-3' (1030)
4	Black SILT, some clay organic odor, soft		0.2		
4.4					
5					



AQUA SURVEY, INC. SEDIMENT CORE LOG

Client : MACTEC		Project : Providence		Logger: MP	
Job#: 26-186		Date: 06/22/06		Time : 09:10	
Sample Coordinates: 346,851 E		260,300 N		SP NAD 83	
Core # SED-11		DTW(ft)	HDOP=		
Project Depth (inc. ft. overdredge) [PD]:		Core Penetration Length: 7.1			
Measured Water Depth [MWD]: 11.4		Recovered Core Length: 4.0			
Tide Adjust [TA] (+/- ft. from MLW):		Sample Length Retained : 4.0			
Corrected Depth @ MLW: 11.4		Core Volume Retained: 2.0			
Required Sample Core Length [SCL]: -11.4		Collected to Project Depth: <input checked="" type="radio"/> Y / <input type="radio"/> N			
All Length Measurements are in Decimal Feet					
Sample Interval (ft.)	Sample Id #	Description			
Top					
↓					
Bottom					
# of containers:		Core Volumes			
type of container:		bucket	hardliner	cup	other
Water and surface conditions:		Nominal core-barrel diameter		EST. Volume	
		3.0"		.25 gal/ft	
		3.5"		.33gal/ft	
Comments: Turned to Client in liner		4.0"		.50gal/ft	
		Liner Type: <input checked="" type="radio"/> Soft <input type="radio"/> Hard			
		Vibra Corer: <input checked="" type="radio"/> P3 <input type="radio"/> P4 <input type="radio"/> VT6 <input type="radio"/> Other			
Live Organisms present		Y	<input checked="" type="radio"/> N		
Oil Present		Y	<input checked="" type="radio"/> N		
Odor Present		Y	<input checked="" type="radio"/> N		
Debris Present		Y	<input checked="" type="radio"/> N		
Within 10% of Req'd Core Length		Y	<input checked="" type="radio"/> N		
Photo		Y	<input checked="" type="radio"/> N		



Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Boring Location: **SED12**

Page 1 of 1

Project Name: **Gorham**

Geologist: **Phil Muller**

Date Started: **6.22.06**

Drilling Company: **Agua Survey**

Date Completed: **6.22.06**

Drilling Method: **Vibracore**

Total Depth: **8.5**

Depth of Water:

Comments: **recovery = 4.9'**

DELS

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	Grey and black coarse SAND, ^{so} little gravel trace organic		0.2		SED1201 @ 6'-12' (1101)
2	1.7 Black/grey coarse SAND and CLAY soft		0.1		
3	pm 2.3 2.5 grey fine SAND and SILT, dense		0.2		SED1203 @ 2.5'-3' (1115)
4					
5					



AQUA SURVEY, INC. SEDIMENT CORE LOG

Client : MACTEC		Project : Providence		Logger: MP			
Job#: 26-186		Date: 06/22/06		Time : 09:10			
Sample Coordinates: 347,057 E		260,526 N		SP NAD 83			
Core # SED-12		DTW(ft)	HDOP=				
Project Depth (inc. ft. overdredge) [PD]:		Core Penetration Length: 7.5					
Measured Water Depth [MWD]: 3.3		Recovered Core Length: 5.0					
Tide Adjust [TA] (+/- ft. from MLW):		Sample Length Retained : 5.0					
Corrected Depth @ MLW: 3.3		Core Volume Retained: 2.5					
Required Sample Core Length [SCL]: -3.3		Collected to Project Depth: <input checked="" type="radio"/> Y / <input type="radio"/> N					
All Length Measurements are in Decimal Feet							
Sample Interval (ft.)	Sample Id #	Description					
Top							
↓							
Bottom							
# of containers:				Core Volumes			
type of container:		bucket	hardliner	cup	other	Nominal core-barrel	
Water and surface conditions:						diameter	EST. Volume
Comments:		Turned to Client in liner				3.0"	.25 gal/ft
						3.5"	.33gal/ft
						<u>4.0"</u>	.50gal/ft
						Liner Type: <input checked="" type="radio"/> Soft <input type="radio"/> Hard	
						Vibra Corer: <input checked="" type="radio"/> P3 <input type="radio"/> P4 <input type="radio"/> VT6 <input type="radio"/> Other	
Live Organisms present		Y	<input type="radio"/> N				
Oil Present		Y	<input type="radio"/> N				
Odor Present		Y	<input type="radio"/> N				
Debris Present		Y	<input type="radio"/> N				
Within 10% of Req'd Core Length		Y	<input type="radio"/> N				
Photo		Y	<input type="radio"/> N				

MACTEC

Boring Location: **SED 13**

Page 1 of 1

Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Project Name: **GORHAM**

Geologist: **Phil Muller**

Date Started: **6.22.06**

Drilling Company: **Aqua Survey**

Date Completed: **6.22.06**

Drilling Method: **Vibracore**

Total Depth: **8.5'**

Depth of Water:

Comments: **recovery = 5.0'**

DELA

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0.5	Black med. to coarse SAND, some silt, little Gravel		0.2		SED1301 @ 0-6" (1130)
1	orange/brown coarse SAND, little Gravel, little silt		0.2		
2					
3	Grey fine SAND and SILT, dense		0.2		SED1303 @ 2-2.5' (1150)
4					
5	Grey fine to med. SAND, soft		0.1		
6					



AQUA SURVEY, INC. SEDIMENT CORE LOG

Client : MACTEC		Project : Providence		Logger: MP		
Job#: 26-186		Date: 06/22/06		Time : 09:25		
Sample Coordinates: 347,049 E		260,249 N		SP NAD 83		
Core # SED-13		DTW(ft)	HDOP=			
Project Depth (inc. ft. overdredge) [PD]:		Core Penetration Length: 8.0				
Measured Water Depth [MWD]: 6.5		Recovered Core Length: 5.2				
Tide Adjust [TA] (+/- ft. from MLW):		Sample Length Retained : 5.2				
Corrected Depth @ MLW: 6.5		Core Volume Retained: 2.6				
Required Sample Core Length [SCL]: -6.5		Collected to Project Depth: <input checked="" type="radio"/> Y / <input type="radio"/> N				
All Length Measurements are in Decimal Feet						
Sample Interval (ft.)	Sample Id #	Description				
Top						
↓						
Bottom						
# of containers:				Core Volumes		
type of container:		bucket	hardliner	cup	other	Nominal core-barrel diameter
Water and surface conditions:						EST. Volume
Comments:		Turned to Client in liner				3.0" .25 gal/ft
						3.5" .33gal/ft
						<u>4.0"</u> .50gal/ft
						Liner Type: <input checked="" type="radio"/> Soft <input type="radio"/> Hard
						Vibra Corer: <input checked="" type="radio"/> P3 <input type="radio"/> P4 <input type="radio"/> VT6 <input type="radio"/> Other
Live Organisms present		Y	<input type="radio"/> N			
Oil Present		Y	<input type="radio"/> N			
Odor Present		Y	<input type="radio"/> N			
Debris Present		Y	<input type="radio"/> N			
Within 10% of Req'd Core Length		Y	<input type="radio"/> N			
Photo		Y	<input type="radio"/> N			

MACTEC

Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Boring Location: **SED 14**

Page 1 of 1

Project Name: **Gorham**

Geologist: **Phil Muller**

Date Started: **6-22-06**

Drilling Company: **Agua Survey**

Date Completed: **6-22-06**

Drilling Method: **Vibracore**

Total Depth: **8.5'**

Depth of Water:

Comments: **recovery = 6.0'**

DEA

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	Black SILT, some organics, soft		0.2		SED 1401 @ 0-1' (1210)
2	Grey med. to coarse black SAND, little silt and organics		0.2		SED 1403 @ 2.5-3' (1215)
3					
4					
5					
6					

Black silt + organics →

2.2



AQUA SURVEY, INC. SEDIMENT CORE LOG

Client : MACTEC		Project : Providence		Logger: MP	
Job#: 26-186		Date: 06/22/06		Time : 09:45	
Sample Coordinates: 346,975 E		260,141 N		SP NAD 83	
Core # SED-14		DTW(ft)	HDOP=		
Project Depth (inc. ft. overdredge) [PD]:		Core Penetration Length: 8.5			
Measured Water Depth [MWD]: 9.4		Recovered Core Length: 6.2			
Tide Adjust [TA] (+/- ft. from MLW):		Sample Length Retained : 6.2			
Corrected Depth @ MLW: 9.4		Core Volume Retained: 3.1			
Required Sample Core Length [SCL]: -9.4		Collected to Project Depth: <input checked="" type="radio"/> Y / <input type="radio"/> N			
All Length Measurements are in Decimal Feet					
Sample Interval (ft.)	Sample Id #	Description			
Top					
↓					
Bottom					
# of containers:				Core Volumes	
type of container:		bucket	hardliner	cup	other
Water and surface conditions:				Nominal core-barrel diameter	EST. Volume
				3.0"	.25 gal/ft
				3.5"	.33gal/ft
Comments: Turned to Client in liner				4.0"	.50gal/ft
				Liner Type: <input checked="" type="radio"/> Soft <input type="radio"/> Hard	
				Vibra Corer: <input checked="" type="radio"/> P3 <input type="radio"/> P4 <input type="radio"/> VT6 <input type="radio"/> Other	
Live Organisms present		Y	<input type="radio"/> N		
Oil Present		Y	<input type="radio"/> N		
Odor Present		Y	<input type="radio"/> N		
Debris Present		Y	<input type="radio"/> N		
Within 10% of Req'd Core Length		Y	<input type="radio"/> N		
Photo		Y	<input type="radio"/> N		

MACTEC

Boring Location: **SED 15**

Page 1 of 1

Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Project Name: **Gorham**

Geologist: **Phil Muller**

Date Started: **6-22-06**

Drilling Company: **AQUA Survey**

Date Completed: **6-22-06**

Drilling Method: **Vibra core**

Total Depth: **8.5**

Depth of Water:

Comments: **recovery = 4.0'**

DEIA

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0.3 0.4	Grey fine SAND and Gravel				SED1501 @ 0-1' (1230)
	Grey med. to coarse SAND, some Gravel, 1 clay stringer, grey	Black Silt and Organics	4.8		
			1.1		
					SED1503 @ 2-3' (1255)
3.1	Grey Clay pm CLAY and fine SAND		1.5		
3.6	Same as 0.4 - 3.1 ft		0.9		



AQUA SURVEY, INC. SEDIMENT CORE LOG

Client : MACTEC		Project : Providence		Logger: MP	
Job#: 26-186		Date: 06/22/06		Time : 10:00	
Sample Coordinates: 346,968 E		260,033 N		SP NAD 83	
Core # SED-15		DTW(ft)	HDOP=		
Project Depth (inc. ft. overdredge) [PD]:			Core Penetration Length: 6.8		
Measured Water Depth [MWD]: 6.0			Recovered Core Length: 4.1		
Tide Adjust [TA] (+/- ft. from MLW):			Sample Length Retained :		
Corrected Depth @ MLW: 6.0			Core Volume Retained: 0.0		
Required Sample Core Length [SCL]: -6.0			Collected to Project Depth: <input checked="" type="radio"/> Y / <input type="radio"/> N		
All Length Measurements are in Decimal Feet					
Sample Interval (ft.)	Sample Id #	Description			
Top					
↓					
Bottom					
# of containers:				Core Volumes	
type of container:		bucket	hardliner	cup	other
Water and surface conditions:		Nominal core-barrel diameter		EST. Volume	
		3.0"		.25 gal/ft	
		3.5"		.33gal/ft	
Comments: Turned to Client in line		4.0"		.50gal/ft	
		Liner Type: <input checked="" type="radio"/> Soft <input type="radio"/> Hard			
		Vibra Corer: <input checked="" type="radio"/> P3 <input type="radio"/> P4 <input type="radio"/> VT6 <input type="radio"/> Other			
Live Organisms present	Y	<input type="radio"/> N			
Oil Present	Y	<input type="radio"/> N			
Odor Present	Y	<input type="radio"/> N			
Debris Present	Y	<input type="radio"/> N			
Within 10% of Req'd Core Length	Y	<input type="radio"/> N			
Photo	Y	<input type="radio"/> N			



Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Boring Location: **SED16**

Page 1 of 1

Project Name: **Gorham**

Geologist: **Phil Muller**

Date Started: **6-22-06**

Drilling Company: **Agua Survey**

Date Completed: **6-22-06**

Drilling Method: **Vibracore**

Total Depth: **8.5**

Depth of Water:

Comments: **recovery = 5.6**

DELA

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	Black, SILT, and some organics		0.2		SED1601 @ 0-1' (1315)
2					
2.1	Grey/Brown med. to coarse SAND, some Gravel		0.3		SED1603 @ 2.5-3' (1315) pm
3	↑ more gravel				1330
4					
5					
5.1	V. dense v. fine SAND and		0.2		
5.6	SILT, grey, some Sand				
6					



AQUA SURVEY, INC. SEDIMENT CORE LOG

Client : MACTEC		Project : Providence		Logger: MP	
Job#: 26-186		Date: 06/22/06		Time : 10:15	
Sample Coordinates:		346,907 E	259,927 N	SP NAD 83	
Core # SED-16		DTW(ft)	HDOP=		
Project Depth (inc. ft. overdredge) [PD]:		Core Penetration Length: 8.0			
Measured Water Depth [MWD]: 3.2		Recovered Core Length: 5.6			
Tide Adjust [TA] (+/- ft. from MLW):		Sample Length Retained : 5.0			
Corrected Depth @ MLW: 3.2		Core Volume Retained: 2.5			
Required Sample Core Length [SCL] : -3.2		Collected to Project Depth: <input checked="" type="radio"/> Y / <input type="radio"/> N			
All Length Measurements are in Decimal Feet					
Sample Interval (ft.)	Sample Id #	Description			
Top					
↓					
Bottom					
# of containers:				Core Volumes	
type of container:		bucket	hardliner	cup	other
Water and surface conditions:		Nominal core-barrel diameter		EST. Volume	
		3.0"		.25 gal/ft	
		3.5"		.33gal/ft	
Comments: Turned to Client in line		4.0"		.50gal/ft	
		Liner Type: <input checked="" type="radio"/> Soft <input type="radio"/> Hard			
		Vibra Corer: <input checked="" type="radio"/> P3 <input type="radio"/> P4 <input type="radio"/> VT6 <input type="radio"/> Other			
Live Organisms present		Y	<input type="radio"/> N		
Oil Present		Y	<input type="radio"/> N		
Odor Present		Y	<input type="radio"/> N		
Debris Present		Y	<input type="radio"/> N		
Within 10% of Req'd Core Length		Y	<input type="radio"/> N		
Photo		Y	<input type="radio"/> N		

MACTEC Sediment Core Log MACTEC 107 Audubon Road Wakefield, MA	Boring Location: SEDI7		Page <u>1</u> of <u>1</u>	
	Project Name: Gorham	Geologist: Phil Muller		
	Date Started: 6-22-06	Drilling Company: Agua Survey		
	Date Completed: 6-22-06	Drilling Method: Vibra core		
	Total Depth: 8.5'	Depth of Water:		
	Comments: recovery = 5.7			DEA

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0.5	Black SILT and Organics, soft	0.2 pm	0.2		SEDI701 @ 6"-12" (0915)
	Grey med. to coarse				
2.6	SAND, little Black soft clay	0.4 pm	0.4		
	Grey med. to coarse SAND, trace fine gravel				
3.8					SEDI704 @ 3-3.8' (0930)
	Brown med. to coarse SAND, trace Gravel		0.2		



AQUA SURVEY, INC. SEDIMENT CORE LOG

Client : MACTEC		Project : Providence		Logger: MP	
Job#: 26-186		Date: 06/22/06		Time : 07:40	
Sample Coordinates:		347,084 E	259,963 N	SP NAD 83	
Core # SED-17		DTW(ft)	HDOP=		
Project Depth (inc. ft. overdredge) [PD]:		Core Penetration Length: 8.5			
Measured Water Depth [MWD]: 3.0		Recovered Core Length: 5.6			
Tide Adjust [TA] (+/- ft. from MLW):		Sample Length Retained : 5.6			
Corrected Depth @ MLW: 3.0		Core Volume Retained: 2.8			
Required Sample Core Length [SCL]: -3.0		Collected to Project Depth: <input checked="" type="radio"/> Y / <input type="radio"/> N			
All Length Measurements are in Decimal Feet					
Sample Interval (ft.)	Sample Id #	Description			
Top					
↓					
Bottom					
# of containers:				Core Volumes	
type of container:		bucket	hardliner	cup	other
Water and surface conditions:		Nominal core-barrel diameter		EST. Volume	
		3.0"		.25 gal/ft	
		3.5"		.33gal/ft	
Comments: Turned to Client in line		<input checked="" type="radio"/> 4.0"		.50gal/ft	
		Liner Type: <input checked="" type="radio"/> Soft <input type="radio"/> Hard			
		Vibra Corer: <input checked="" type="radio"/> P3 <input type="radio"/> P4 <input type="radio"/> VT6 <input type="radio"/> Other			
Live Organisms present		Y	<input checked="" type="radio"/> N		
Oil Present		Y	<input checked="" type="radio"/> N		
Odor Present		Y	<input checked="" type="radio"/> N		
Debris Present		Y	<input checked="" type="radio"/> N		
Within 10% of Req'd Core Length		Y	<input checked="" type="radio"/> N		
Photo		Y	<input checked="" type="radio"/> N		

<p>MACTEC</p> <p>Sediment Core Log</p> <p>MACTEC 107 Audubon Road Wakefield, MA</p>	Boring Location: SED 18	
	Project Name: Gorham	Geologist: Phil Muller
	Date Started: 6.22.06	Drilling Company: Aqua Survey
	Date Completed: 6.22.06	Drilling Method: Vibra core
	Total Depth: 8.5'	Depth of Water:
	Comments: recovery = 5.5 DEA	

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	Black SILT, some organic, sheen (organic) on ponding water	0.2 pm	0.2		SED1801 @ 0-1' (1415) pm (1400)
2					
3					
4	3.5 tan CLAY and Organic		0.2		SED1804 @ 3.5-4' (1420)
5	4.2 grey SILT, some fine pr SAND, dense Sand		0.3		
6	5.5				



AQUA SURVEY, INC. SEDIMENT CORE LOG

Client : MACTEC		Project : Providence		Logger: MP	
Job#: 26-186		Date:06/22/06		Time : 10:30	
Sample Coordinates:		346,810 E	259,867 N	SP NAD 83	
Core # SED-18		DTW(ft)	HDOP=		
Project Depth (inc. ft. overdredge) [PD]:		Core Penetration Length: 8.0			
Measured Water Depth [MWD]: 11.4		Recovered Core Length: 4.8			
Tide Adjust [TA] (+/- ft. from MLW):		Sample Length Retained : 4.8			
Corrected Depth @ MLW: 11.4		Core Volume Retained: 2.4			
Required Sample Core Length [SCL]: -11.4		Collected to Project Depth: <input checked="" type="radio"/> Y / <input type="radio"/> N			
All Length Measurements are In Decimal Feet					
Sample Interval (ft.)		Sample Id #		Description	
Top					
Bottom					
# of containers:				Core Volumes	
type of container:		bucket	hardliner	cup	other
Water and surface conditions:				Nominal core-barrel diameter	EST. Volume
				3.0"	.25 gal/ft
				3.5"	.33gal/ft
Comments: Turned to Client in liner				4.0"	.50gal/ft
				Liner Type: <input checked="" type="radio"/> Soft <input type="radio"/> Hard	
				Vibra Corer: <input checked="" type="radio"/> P3 <input type="radio"/> P4 <input type="radio"/> VT6 <input type="radio"/> Other	
Live Organisms present		Y	<input type="radio"/> N		
Oil Present		Y	<input type="radio"/> N		
Odor Present		Y	<input type="radio"/> N		
Debris Present		Y	<input type="radio"/> N		
Within 10% of Req'd Core Length		Y	<input type="radio"/> N		
Photo		Y	<input type="radio"/> N		

<p>MACTEC</p> <p>Sediment Core Log</p> <p>MACTEC 107 Audubon Road Wakefield, MA</p>	Boring Location: SED 19		Page <u>1</u> of <u>1</u>	
	Project Name: Gorham		Geologist: Phil Muller	
	Date Started: 6-22-06		Drilling Company: 6-22-06	
	Date Completed: 6-22-06		Drilling Method: Vibracore	
	Total Depth: 8.5		Depth of Water:	
	Comments: recovery = 6.6			

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	Black SILT, some organic, organic odor		0.2		SED1901 @ 0-1' ^{pm} (1435)
2	1.7 Black SILT and organics		pm 5.0		
3	Decomposing wood Peat-like		5.0		SED1903 @ 2-3' (1450)
4			2.2		
5	4.6 Grey CLAY, some silt and sand, soft				
6	5.1 orange stained med. to coarse SAND		1.5		
7	6.6				



AQUA SURVEY, INC. SEDIMENT CORE LOG

Client : MACTEC		Project : Providence		Logger: MP	
Job#: 26-186		Date: 06/22/06		Time : 10:45	
Sample Coordinates: 347,058 E		259,866 N		SP NAD 83	
Core # SED-19		DTW(ft)	HDOP=		
Project Depth (inc. ft. overdredge) [PD]:		Core Penetration Length: 8.5			
Measured Water Depth [MWD]: 3.5		Recovered Core Length: 6.8			
Tide Adjust [TA] (+/- ft. from MLW):		Sample Length Retained : 6.8			
Corrected Depth @ MLW: 3.5		Core Volume Retained: 3.4			
Required Sample Core Length [SCL]: -3.5		Collected to Project Depth: <input checked="" type="radio"/> Y / <input type="radio"/> N			
All Length Measurements are in Decimal Feet					
Sample Interval (ft.)	Sample Id #	Description			
Top					
↓					
↓					
Bottom					
# of containers:				Core Volumes	
type of container:		bucket	hardliner	cup	other
Water and surface conditions:		Nominal core-barrel diameter		EST. Volume	
		3.0"		.25 gal/ft	
		3.5"		.33gal/ft	
Comments: Turned to Client in line		4.0"		.50gal/ft	
		Liner Type: <input checked="" type="radio"/> Soft <input type="radio"/> Hard			
		Vibra Corer: <input checked="" type="radio"/> P3 <input type="radio"/> P4 <input type="radio"/> VT6 <input type="radio"/> Other			
Live Organisms present		Y	<input checked="" type="radio"/> N		
Oil Present		Y	<input checked="" type="radio"/> N		
Odor Present		Y	<input checked="" type="radio"/> N		
Debris Present		Y	<input checked="" type="radio"/> N		
Within 10% of Req'd Core Length		Y	<input checked="" type="radio"/> N		
Photo		Y	<input checked="" type="radio"/> N		



Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Boring Location: **SED20**

Page 1 of 1

Project Name: **Gorham**

Geologist: **Phil Muller**

Date Started: **6.22.06**

Drilling Company: **Aqua Survey**

Date Completed: **6.22.06**

Drilling Method: **Vibra Core**

Total Depth: **8.5**

Depth of Water:

Comments: **recovery = 7.2'**

DEA

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	Black SAND and SILT Some Organics, Leaf litter top 2"	0.2	0.2		SED2001 @ 6"-12" (0840)
	Black SILT, some Organics organic odor				
2	Black, soft clay				
	Black, SILT and Organics decomposing sticks, brands, little clay, slight organic odor				
3	Tan/olive CLAY, some organics, slight odor	0.2	0.2		SED2003 @ 2.5'-3' (1055) pm 0855
4					
5					
6					
7					



AQUA SURVEY, INC. SEDIMENT CORE LOG

Client : MACTEC		Project : Providence		Logger: MP					
Job#: 26-186		Date: 06/22/06		Time : 08:00					
Sample Coordinates: 347,180 E		259,930 N		SP NAD 83					
Core # SED-20		DTW(ft)	HDOP=						
Project Depth (inc. ft. overdredge) [PD]:		Core Penetration Length: 9.0							
Measured Water Depth [MWD]: 2.9		Recovered Core Length: 7.7							
Tide Adjust [TA] (+/- ft. from MLW):		Sample Length Retained : 7.7							
Corrected Depth @ MLW: 2.9		Core Volume Retained: 3.9							
Required Sample Core Length [SCL]: -2.9		Collected to Project Depth: <input checked="" type="radio"/> Y / <input type="radio"/> N							
All Length Measurements are in Decimal Feet									
Sample Interval (ft.)		Sample Id #		Description					
Top									
↓									
↓									
↓									
↓									
↓									
↓									
↓									
↓									
↓									
↓									
↓									
Bottom									
# of containers: <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 50px;">bucket</td> <td style="width: 50px;">hardliner</td> <td style="width: 50px;">cup</td> <td style="width: 50px;">other</td> </tr> </table>				bucket	hardliner	cup	other	Core Volumes	
bucket	hardliner	cup	other						
type of container:				Nominal core-barrel diameter					
Water and surface conditions:				EST. Volume					
Comments: Turned to Client in line				3.0" .25 gal/ft					
				3.5" .33gal/ft					
				<u>4.0"</u> .50gal/ft					
				Liner Type: <input checked="" type="radio"/> Soft <input type="radio"/> Hard					
				Vibra Corer: <input checked="" type="radio"/> P3 <input type="radio"/> P4 <input type="radio"/> VT6 <input type="radio"/> Other					
Live Organisms present		Y	<input type="radio"/> N						
Oil Present		Y	<input type="radio"/> N						
Odor Present		Y	<input type="radio"/> N						
Debris Present		Y	<input type="radio"/> N						
Within 10% of Req'd Core Length		Y	<input type="radio"/> N						
Photo		Y	<input type="radio"/> N						

MACTEC
Sediment Core Log
 MACTEC
 107 Audubon Road
 Wakefield, MA

Boring Location: **SEDZ1** Page 1 of 1
 Project Name: **Garham** Geologist: **Phil Muller**
 Date Started: **6-22-06** Drilling Company: **AQUA Survey**
 Date Completed: **6-22-06** Drilling Method: **Vibra Core**
 Total Depth: **8.5** Depth of Water:
 Comments: **recovery = 5.5** **DEA**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	Black/Grey fine to coarse SAND, some Black silt, some organics		0.2		SEDZ101 @ 0-1' (1500)
1.3	<hr/>				
2	Brown/Grey med. to coarse SAND, some Gravel				
	little organics		0.2		SEDZ103 @ 2.5-3' (1510)
3	<hr/>				
3.5	Grey CLAY, med. dense, some fine sand				
3.8					
4	Grey med. to coarse SAND, some tan staining		0.1		
5	<hr/>				
5.3	<hr/>				
6	<hr/>				



AQUA SURVEY, INC. SEDIMENT CORE LOG

Client : MACTEC		Project : Providence		Logger: MP					
Job#: 26-186		Date: 06/22/06		Time : 13:40					
Sample Coordinates: 346,732 E		259,875 N		SP NAD 83					
Core # SED-21		DTW(ft)	HDOP=						
Project Depth (inc. ft. overdredge) [PD]:		Core Penetration Length: 8.5							
Measured Water Depth [MWD]: 2.7		Recovered Core Length: 5.7							
Tide Adjust [TA] (+/- ft. from MLW):		Sample Length Retained : 5.7							
Corrected Depth @ MLW: 2.7		Core Volume Retained: 2.9							
Required Sample Core Length [SCL]: -2.7		Collected to Project Depth: <input checked="" type="radio"/> Y / <input type="radio"/> N							
All Length Measurements are in Decimal Feet									
Sample Interval (ft.)	Sample Id #	Description							
Top									
↓									
↓									
Bottom									
# of containers: <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 15%;">bucket</td> <td style="width: 15%;">hardliner</td> <td style="width: 15%;">cup</td> <td style="width: 15%;">other</td> </tr> </table>		bucket	hardliner	cup	other	Core Volumes Nominal core-barrel diameter EST. Volume			
bucket	hardliner	cup	other						
Water and surface conditions:		3.0"		.25 gal/ft					
		3.5"		.33gal/ft					
Comments: Turned to Client in line		4.0"		.50gal/ft					
		Liner Type: <input checked="" type="radio"/> Soft <input type="radio"/> Hard							
		Vibra Corer: <input checked="" type="radio"/> P3 <input type="radio"/> P4 <input type="radio"/> VT6 <input type="radio"/> Other							
Live Organisms present		Y	<input type="radio"/> N						
Oil Present		Y	<input type="radio"/> N						
Odor Present		Y	<input type="radio"/> N						
Debris Present		Y	<input type="radio"/> N						
Within 10% of Req'd Core Length		Y	<input type="radio"/> N						
Photo		Y	<input type="radio"/> N						

MACTEC

Boring Location: **SED 22**

Page 1 of 1

Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Project Name: **GORHAM**

Geologist: **TRH**

Date Started: **6 22 06**

Drilling Company: **Agri Survey**

Date Completed: **6 22 06**

Drilling Method: **VIBRACORE**

Total Depth: **8.5**

Depth of Water:

Comments: **recovery =**

DEA

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	Black organic mat. l		<1.0		SED-22 01 0-1' (1700)
2	Brown to Dark Brown silt and organic mat. l		<1.0		
3	Dark Brown silt and organics to Brown/Tan sand fine and coarse.		<1.0		SED 22 03 @ 2-3 1710
3.8	Brown tan sand to grey sand a fine dark brown deposit reconst. p tan CLAY and organic soft		<1.0		
4	Grey sand to fine sand and silt		<1.0		
5	Grey silt and clay, dense grading up to grey - some ^{stained} tan tendrils		<1.0		
6	coarse sand (fine sand @ 5.5) (5.8 - coarse sand)				
6.3	<hr/>				



AQUA SURVEY, INC. SEDIMENT CORE LOG

Client : MACTEC		Project : Providence		Logger: MP	
Job#: 26-186		Date: 06/22/06		Time : 13:50	
Sample Coordinates: 346,785 E		259,790 N		SP NAD 83	
Core # SED-22		DTW(ft)	HDOP=		
Project Depth (inc. ft. overdredge) [PD]:		Core Penetration Length: 8.5			
Measured Water Depth [MWD]: 2.8		Recovered Core Length: 6.3			
Tide Adjust [TA] (+/- ft. from MLW):		Sample Length Retained : 6.3			
Corrected Depth @ MLW: 2.8		Core Volume Retained: 3.2			
Required Sample Core Length [SCL] : -2.8		Collected to Project Depth: <input checked="" type="radio"/> Y / <input type="radio"/> N			
All Length Measurements are in Decimal Feet					
Sample Interval (ft.)	Sample Id #	Description			
Top					
↓					
↓					
Bottom					
# of containers:				Core Volumes	
type of container:		bucket	hardliner	cup	other
Water and surface conditions:		Nominal core-barrel diameter		EST. Volume	
		3.0"		.25 gal/ft	
		3.5"		.33gal/ft	
Comments: Turned to Client in line		4.0"		.50gal/ft	
		Liner Type: <input checked="" type="radio"/> Soft <input type="radio"/> Hard			
		Vibra Corer: <input checked="" type="radio"/> P3 <input type="radio"/> P4 <input type="radio"/> VT6 <input type="radio"/> Other			
Live Organisms present	Y	<input type="radio"/> N			
Oil Present	Y	<input type="radio"/> N			
Odor Present	Y	<input type="radio"/> N			
Debris Present	Y	<input type="radio"/> N			
Within 10% of Req'd Core Length	Y	<input type="radio"/> N			
Photo	Y	<input type="radio"/> N			

MACTEC
Sediment Core Log
 MACTEC
 107 Audubon Road
 Wakefield, MA


Boring Location: SED 23 Page 1 of 1
 Project Name: Gorham Geologist: TRH
 Date Started: 6 22 06 Drilling Company: Apex Survey
 Date Completed: 6 22 06 Drilling Method: Vibracore
 Total Depth: 8.5 Depth of Water:
 Comments: Recovery 4.5 DETA

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	0-1' fine sand Brown TAN TRACE Gravel		<1.0 ppm		SED 23-01 6 R" pm 0-1'
2	Fine sand and silt TAN 1.5-2 Sand becomes more coarse TRACE organics				12" 1530
3	TAN COARSE SAND SUBANGULAR MORE Fines present TOWARD 3'		<1.0 ppm		SED 2303 @ 2-3' (1540)
4	FINE and COARSE sand becoming MORE greyish in TONE				
5	SAME as above w/more subangular gravel present		<1.0 ppm		



AQUA SURVEY, INC. SEDIMENT CORE LOG

Client : MACTEC		Project : Providence		Logger: MP	
Job#: 26-186		Date:06/22/06		Time : 14:00	
Sample Coordinates:		346,877 E	259,764 N	SP NAD 83	
Core # SED-23		DTW(ft)	HDOP=		
Project Depth (inc_ ft. overdredge) [PD]:		Core Penetration Length: 7.2			
Measured Water Depth [MWD]: 2.4		Recovered Core Length: 4.6			
Tide Adjust [TA] (+/- ft. from MLW):		Sample Length Retained : 4.6			
Corrected Depth @ MLW: 2.4		Core Volume Retained: 2.3			
Required Sample Core Length [SCL] : -2.4		Collected to Project Depth: <input checked="" type="radio"/> Y / <input type="radio"/> N			
All Length Measurements are In Decimal Feet					
Sample Interval (ft.)	Sample Id #	Description			
Top					
↓					
Bottom					
# of containers:				Core Volumes	
type of container:		bucket	hardliner	cup	other
Water and surface conditions:		Nominal core-barrel diameter		EST. Volume	
		3.0"		.25 gal/ft	
		3.5"		.33gal/ft	
Comments: Turned to Client in line		4.0"		.50gal/ft	
		Liner Type: <input checked="" type="radio"/> Soft <input type="radio"/> Hard			
		Vibra Corer: <input checked="" type="radio"/> P3 <input type="radio"/> P4 <input type="radio"/> VT6 <input type="radio"/> Other			
Live Organisms present		Y	<input checked="" type="radio"/> N		
Oil Present		Y	<input checked="" type="radio"/> N		
Odor Present		Y	<input checked="" type="radio"/> N		
Debris Present		Y	<input checked="" type="radio"/> N		
Within 10% of Req'd Core Length		Y	<input checked="" type="radio"/> N		
Photo		Y	<input checked="" type="radio"/> N		

 MACTEC Sediment Core Log MACTEC 107 Audubon Road Wakefield, MA	Boring Location: <u>SED 24</u>		Page <u>1</u> of <u>1</u>
	Project Name: <u>Gorham</u>	Geologist: <u>TRH</u>	
	Date Started: <u>6 22 06</u>	Drilling Company: <u>Aqua Survey</u>	
	Date Completed: <u>SAME</u>	Drilling Method: <u>Vibracore</u>	
	Total Depth: <u>8.5</u>	Depth of Water:	
	Comments: <u>Recovery 6'</u>		

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	DARK ORGANIC MAT. SOME SILT.		< 1.0		SED 24 01 @ 16 35 0-1'
2	DARK ORGANIC MAT. SOME INDISTINGUISHABLE SILT (BLACK)		< 1.0		
3	DARK ORGANIC MAT. SOME TAN SILT.		< 1.0		SED 24 03 2-3' 1650
4	TAN SILT WITH TRACE ORGANICS.		< 1.0		
5	TAN SILT CHANGING OVER TO GREY SAND (COARSE) AND GREY SILT. WHITE SILT OR CLAY		< 1.0		
6	COARSE AND FINE GREY SAND SUB-ROUND,				



AQUA SURVEY, INC. SEDIMENT CORE LOG

Client : MACTEC		Project : Providence		Logger: MP											
Job#: 26-186		Date: 06/22/06		Time : 14:10											
Sample Coordinates: 346,953 E		259,794 N		SP NAD 83											
Core # SED-24		DTW(ft)	HDOP=												
Project Depth (inc. ft. overdredge) [PD]:		Core Penetration Length: 8.0													
Measured Water Depth [MWD]: 3.5		Recovered Core Length: 5.6													
Tide Adjust [TA] (+/- ft. from MLW):		Sample Length Retained : 5.6													
Corrected Depth @ MLW: 3.5		Core Volume Retained: 2.8													
Required Sample Core Length [SCL] : -3.5		Collected to Project Depth: <input checked="" type="radio"/> Y / <input type="radio"/> N													
All Length Measurements are In Decimal Feet															
Sample Interval (ft.)	Sample Id #	Description													
Top															
↓															
↓															
Bottom															
# of containers: <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> </tr> <tr> <td>type of container:</td> <td>bucket</td> <td>hardliner</td> <td>cup</td> <td>other</td> </tr> </table>							type of container:	bucket	hardliner	cup	other	Core Volumes Nominal core-barrel diameter EST. Volume			
type of container:	bucket	hardliner	cup	other											
Water and surface conditions:		3.0"		.25 gal/ft											
		3.5"		.33gal/ft											
Comments: Turned to Client in line		<u>4.0"</u>		.50gal/ft											
		Liner Type: <input checked="" type="radio"/> Soft <input type="radio"/> Hard													
		Vibra Corer: <input checked="" type="radio"/> P3 <input type="radio"/> P4 <input type="radio"/> VT6 <input type="radio"/> Other													
Live Organisms present	Y	<input type="radio"/> N													
Oil Present	Y	<input type="radio"/> N													
Odor Present	Y	<input type="radio"/> N													
Debris Present	Y	<input type="radio"/> N													
Within 10% of Req'd Core Length	Y	<input type="radio"/> N													
Photo	Y	<input type="radio"/> N													

MACTEC
Sediment Core Log
 MACTEC
 107 Audubon Road
 Wakefield, MA

Boring Location: **SED25** Page 1 of 1
 Project Name: **Gorham** Geologist: **Phil Muller**
 Date Started: **6-22-06** Drilling Company: **Aqua Survey**
 Date Completed: **6-22-06** Drilling Method: **Vibracore**
 Total Depth: **8.5** Depth of Water:
 Comments: **recovery = 7.1' DEM**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	Black SILT, some organic soft organic odor		0.2		SED2501 @ 0-1' (1845)
2	1.6		0.1		
3	Black SILT and Organic (Peat-like) soft		0.5		SED2503 @ 2.5-3' (1853)
4				Sampled 6-23-06	{ SED2503D (1005) SED2503MS (1010) SED2503MSD (1015)
5	Olive CLAY and Organic soft				
6					
7				Sampled 6-23-06	{ SED2507 @ 6-7' (1030) SED2507D (1035) SED2507MS (1040) SED2507MSD (1050)



AQUA SURVEY, INC. SEDIMENT CORE LOG

Client : MACTEC		Project : Providence		Logger: MP	
Job#: 26-186		Date: 06/22/06		Time : 14:20	
Sample Coordinates: 347,046 E		259,783 N		SP NAD 83	
Core # SED-25		DTW(ft)	HDOP=		
Project Depth (inc. ft. overdrudge) [PD]:		Core Penetration Length: 8.5			
Measured Water Depth [MWD]: 3.5		Recovered Core Length: 7.4			
Tide Adjust [TA] (+/- ft. from MLW):		Sample Length Retained : 7.4			
Corrected Depth @ MLW: 3.5		Core Volume Retained: 3.7			
Required Sample Core Length [SCL] : -3.5		Collected to Project Depth: <input checked="" type="radio"/> Y / <input type="radio"/> N			
All Length Measurements are In Decimal Feet					
Sample Interval (ft.)	Sample Id #	Description			
Top					
↓					
Bottom					
# of containers:				Core Volumes	
type of container:		bucket	hardliner	cup	other
Water and surface conditions:		Nominal core-barrel diameter		EST. Volume	
		3.0"		.25 gal/ft	
		3.5"		.33gal/ft	
Comments: Turned to Client in line		4.0"		.50gal/ft	
		Liner Type: <input checked="" type="radio"/> Soft <input type="radio"/> Hard			
		Vibra Corer: <input checked="" type="radio"/> P3 <input type="radio"/> P4 <input type="radio"/> VT6 <input type="radio"/> Other			
Live Organisms present		Y	<input type="radio"/> N		
Oil Present		Y	<input type="radio"/> N		
Odor Present		Y	<input type="radio"/> N		
Debris Present		Y	<input type="radio"/> N		
Within 10% of Req'd Core Length		Y	<input type="radio"/> N		
Photo		Y	<input type="radio"/> N		


MACTEC Sediment Core Log MACTEC 107 Audubon Road Wakefield, MA	Boring Location: SED 26		Page <u>1</u> of <u>1</u>
	Project Name: Gorham	Geologist: Phil Muller	
	Date Started: 6.22.06	Drilling Company: AQUA Survey	
	Date Completed: 6.22.06	Drilling Method: Vibra core	
	Total Depth:	Depth of Water:	
	Comments: recovery = 6.9		

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	med. to black coarse SAND and mix of shells, const debris (→ pm and like pm (angular particles) slag particles most likely organic, + gravel-like size particles	0.2			SED2601 @ 0-1' (1810)
2	2 clinker-like pieces - 2" size (placed in jar for further analysis) <hr/> Black fine to coarse SAND				SED2602 @ 1.5-2' (1820)
2.4	<hr/> Black SILT, some organics				
3					
3.3	<hr/> Peat, red/brown, little black silt				
4					
5					SED2605 @ 4-5' (1830) (PAH, METALS) only
6	<hr/>				
7					



AQUA SURVEY, INC. SEDIMENT CORE LOG

Client : MACTEC		Project : Providence		Logger: MP									
Job#: 26-186		Date: 06/22/06		Time : 14:35									
Sample Coordinates: 347,123 E		259,811 N		SP NAD 83									
Core # SED-26		DTW(ft)	HDOP=										
Project Depth (inc. ft. overredge) [PD]:		Core Penetration Length: 8.5											
Measured Water Depth [MWD]: 2.3		Recovered Core Length: 7.4											
Tide Adjust [TA] (+/- ft. from MLW):		Sample Length Retained : 7.4											
Corrected Depth @ MLW: 2.3		Core Volume Retained: 3.7											
Required Sample Core Length [SCL]: -2.3		Collected to Project Depth: <input checked="" type="radio"/> Y / <input type="radio"/> N											
All Length Measurements are in Decimal Feet													
Sample Interval (ft.)		Sample Id #		Description									
Top													
↓													
↓													
↓													
↓													
↓													
↓													
↓													
↓													
↓													
↓													
↓													
Bottom													
# of containers: <table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 50px; height: 15px;"></td> <td style="width: 50px; height: 15px;"></td> <td style="width: 50px; height: 15px;"></td> <td style="width: 50px; height: 15px;"></td> </tr> <tr> <td>bucket</td> <td>hardliner</td> <td>cup</td> <td>other</td> </tr> </table>								bucket	hardliner	cup	other	Core Volumes	
bucket	hardliner	cup	other										
type of container:				Nominal core-barrel									
Water and surface conditions:				diameter	EST. Volume								
				3.0"	.25 gal/ft								
Comments: Turned to Client in line				3.5"	.33gal/ft								
				4.0"	.50gal/ft								
				Liner Type: <input checked="" type="radio"/> Soft <input type="radio"/> Hard									
				Vibra Corer: <input checked="" type="radio"/> P3 <input type="radio"/> P4 <input type="radio"/> VT6 <input type="radio"/> Other									
Live Organisms present		Y	<input checked="" type="radio"/> N										
Oil Present		Y	<input checked="" type="radio"/> N										
Odor Present		Y	<input checked="" type="radio"/> N										
Debris Present		Y	<input checked="" type="radio"/> N										
Within 10% of Req'd Core Length		Y	<input checked="" type="radio"/> N										
Photo		Y	<input checked="" type="radio"/> N										


 MACTEC Sediment Core Log MACTEC 107 Audubon Road Wakefield, MA	Boring Location: SED27		Page <u>1</u> of <u>1</u>	
	Project Name: Gorham		Geologist: Phil Muller	
	Date Started: 6-22-06		Drilling Company: AQUA Survey	
	Date Completed: 6-22-06		Drilling Method: Vibracore	
	Total Depth: 8.5		Depth of Water:	
	Comments: recovery = 4.5			

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0-1	Black SILT, some Organic, organic odor, soft				SED2701 @ 0-1' (1735)
1.4					
2	Black SILT and Organic decaying vegetation peat-like		0.5		
2.5			1.2		
3	Med. to coarse, grey SAND, some Gravel little organic				SED2703 @ 2.5-3' (1746)
3.4					
4	Grey, med. to coarse SAND, little Gravel		0.4		
4.5					
5					
6					
7					



AQUA SURVEY, INC. SEDIMENT CORE LOG

Client : MACTEC		Project : Providence		Logger: MP	
Job#: 26-186		Date: 06/22/06		Time : 14:45	
Sample Coordinates: 347,012 E		259,919 N		SP NAD 83	
Core # SED-27		DTW(ft)	HDOP=		
Project Depth (inc. ft. overdredge) [PD]:		Core Penetration Length: 0.0			
Measured Water Depth [MWD]: 3.5		Recovered Core Length: 0.0			
Tide Adjust [TA] (+/- ft. from MLW):		Sample Length Retained : 0.0			
Corrected Depth @ MLW: 3.5		Core Volume Retained: 0.0			
Required Sample Core Length [SCL]: -3.5		Collected to Project Depth: <input checked="" type="radio"/> Y / <input type="radio"/> N			
All Length Measurements are in Decimal Feet					
Sample Interval (ft.)	Sample Id #	Description			
Top					
↓					
Bottom					
# of containers:				Core Volumes	
type of container:		bucket	hardliner	cup	other
Water and surface conditions:				Nominal core-barrel diameter	EST. Volume
				3.0"	.25 gal/ft
				3.5"	.33gal/ft
Comments: Turned to Client in line				4.0"	.50gal/ft
				Liner Type: <input checked="" type="radio"/> Soft <input type="radio"/> Hard	
				Vibra Corer: <input checked="" type="radio"/> P3 <input type="radio"/> P4 <input type="radio"/> VT6 <input type="radio"/> Other	
Live Organisms present		Y	<input type="radio"/> N		
Oil Present		Y	<input type="radio"/> N		
Odor Present		Y	<input type="radio"/> N		
Debris Present		Y	<input type="radio"/> N		
Within 10% of Req'd Core Length		Y	<input type="radio"/> N		
Photo		Y	<input type="radio"/> N		

 MACTEC Sediment Core Log MACTEC 107 Audubon Road Wakefield, MA	Boring Location: SED 28		Page ___ of ___	
	Project Name: Gorham		Geologist: Phil Muller	
	Date Started: 6-21-06		Drilling Company: Agua Survey	
	Date Completed: 6-21-06		Drilling Method: Vibra Core	
	Total Depth: 8.5'		Depth of Water:	
	Comments: recovery = 5.7'			
	DEA			

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	Black SILT and organic, organic - Peat. organic odor soft		0		SED 2801 @ 6" - 12"
1.7	Small branch @ 2.2'		0		
2	Black Peat/organic, Some silt		0		
3	Branches + decayed wood				SED 2803 @ 2.5-3.0'
4					
5	olive/Tan SILT and CLAY, Soft, some organic		0		
6					
7					



AQUA SURVEY, INC. SEDIMENT CORE LOG

Client : MACTEC		Project : Providence		Logger: MP		
Job#: 26-186		Date: 06/21/06		Time : 09:00		
Sample Coordinates: 347,180 E		259,930 N		SP NAD 83		
Core # SED-28		DTW(ft)	HDOP=			
Project Depth (inc. ft. overdredge) [PD]:		Core Penetration Length: 8.5				
Measured Water Depth [MWD]: 3.5		Recovered Core Length: 5.8				
Tide Adjust [TA] (+/- ft. from MLW):		Sample Length Retained : 5.8				
Corrected Depth @ MLW: 3.5		Core Volume Retained: 2.9				
Required Sample Core Length [SCL]: -3.5		Collected to Project Depth: <input checked="" type="radio"/> Y / <input type="radio"/> N				
All Length Measurements are in Decimal Feet						
Sample Interval (ft.)	Sample Id #	Description				
Top		soft silt				
Bottom						
# of containers:				Core Volumes		
type of container:		bucket	hardliner	cup	other	Nominal core-barrel diameter
Water and surface conditions:						EST. Volume
Comments:		Turned over to Client in liner				3.0" .25 gal/ft
						3.5" .33gal/ft
						4.0" .50gal/ft
						Liner Type: <input checked="" type="radio"/> Soft <input type="radio"/> Hard
						Vibra Corer: <input checked="" type="radio"/> P3 <input type="radio"/> P4 <input type="radio"/> VT6 <input type="radio"/> Other
Live Organisms present		Y	<input checked="" type="radio"/> N			
Oil Present		Y	<input checked="" type="radio"/> N			
Odor Present		Y	<input checked="" type="radio"/> N			
Debris Present		Y	<input checked="" type="radio"/> N			
Within 10% of Req'd Core Length		Y	<input checked="" type="radio"/> N			
Photo		Y	<input checked="" type="radio"/> N			

MACTEC Sediment Core Log MACTEC 107 Audubon Road Wakefield, MA	Boring Location: SED29		Page <u>1</u> of <u>1</u>
	Project Name: Gorham	Geologist: Phil Muller	
	Date Started: 6.21.06	Drilling Company: Aqua Survey	
	Date Completed: 6.21.06	Drilling Method: Vibra core	
	Total Depth: 8.5'	Depth of Water:	
	Comments: recovery = 7.2'		

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	Black SILT, soft and organic organic odor		0		SED 29 01 @ 6" - 12"
2					
3	Black Peat/organic Some Silt slight organic odor		0		
4	Olive/tan SILT and CLAY, some organic soft slight organic odor		0		SED 29 04 @ 3 - 4'
5					
6					
7					

7.2



AQUA SURVEY, INC. SEDIMENT CORE LOG

Client : MACTEC		Project : Providence		Logger: MP		
Job#: 26-186		Date: 06/21/06		Time : 09:15		
Sample Coordinates: 347,007 E		259,774 N		SP NAD 83		
Core # SED-29		DTW(ft)	HDOP=			
Project Depth (inc. ft. overdredge) [PD]:			Core Penetration Length: 8.5			
Measured Water Depth [MWD]: 3.4			Recovered Core Length: 7.0			
Tide Adjust [TA] (+/- ft. from MLW):			Sample Length Retained : 7.0			
Corrected Depth @ MLW: 3.4			Core Volume Retained: 3.5			
Required Sample Core Length [SCL]: -3.4			Collected to Project Depth: <input checked="" type="radio"/> Y / <input type="radio"/> N			
All Length Measurements are in Decimal Feet						
Sample Interval (ft.)	Sample Id #	Description				
Top		soft silt				
Bottom						
# of containers:				Core Volumes		
type of container:		bucket	hardliner	cup	other	Nominal core-barrel diameter
Water and surface conditions:						EST. Volume
70 degrees and sunny						3.0" .25 gal/ft
Comments:		Turned over to Client in liner				3.5" .33gal/ft
						4.0" .50gal/ft
						Liner Type: <input checked="" type="radio"/> Soft <input type="radio"/> Hard
						Vibra Corer: <input checked="" type="radio"/> P3 <input type="radio"/> P4 <input type="radio"/> VT6 <input type="radio"/> Other
Live Organisms present		Y	<input type="radio"/> N			
Oil Present		Y	<input type="radio"/> N			
Odor Present		Y	<input type="radio"/> N			
Debris Present		Y	<input type="radio"/> N			
Within 10% of Req'd Core Length		Y	<input type="radio"/> N			
Photo		Y	<input type="radio"/> N			

<p style="font-size: 24pt; font-weight: bold; margin: 0;">MACTEC</p> <p style="font-size: 18pt; font-weight: bold; margin: 10px 0 0 0;">Sediment Core Log</p> <p style="font-size: 12pt; margin: 0 0 0 20px;">MACTEC 107 Audubon Road Wakefield, MA</p>	Boring Location: SED-30		Page <u>1</u> of <u>1</u>	
	Project Name: Gorham		Geologist: Phil Muller	
	Date Started: 6-21-06		Drilling Company: Agua Survey	
	Date Completed:		Drilling Method: Vibra Core	
	Total Depth: 8.5'		Depth of Water:	
	Comments: recovery = 7.2'			

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	2" leave ^{pin} Leaf Litter Black SILT and Organic		0		SED3001 @ 0.5' - 1'
1.7'	Some Sand, little fine Gravel, Organic odor little leaf litter				
2					
3	Black SILT and Organic 1 piece of Slag Slight organic odor		0		
3.6'					
4					SED3004 3.6' to 4'
5	Tan SILT and CLAY Soft, ^{SOME} LATE organic _{pin}		0		
6					
7	Gray med. to coarse SAND _{pin} mixed w/ olive silt CLAY		0		



AQUA SURVEY, INC. SEDIMENT CORE LOG

Client : MACTEC		Project : Providence			Logger: MP	
Job#: 26-186		Date: 06/21/06		Time : 09:53		
Sample Coordinates: 347,001 E		259,754 N		R1 SP NAD 83		
Core # SED-30		DTW(ft)	HDOP=			
Project Depth (inc. ft. overdredge) [PD]:			Core Penetration Length: 8.5			
Measured Water Depth [MWD]: 1.5			Recovered Core Length: 7.3			
Tide Adjust [TA] (+/- ft. from MLW):			Sample Length Retained : 7.3			
Corrected Depth @ MLW: 1.5			Core Volume Retained: 3.7			
Required Sample Core Length [SCL]: -1.5			Collected to Project Depth: <input checked="" type="radio"/> Y / <input type="radio"/> N			
All Length Measurements are In Decimal Feet						
Sample Interval (ft.)		Sample Id #		Description		
Top						
↓						
Bottom						
# of containers: <input type="checkbox"/> bucket <input type="checkbox"/> hardliner <input type="checkbox"/> cup <input type="checkbox"/> other				Core Volumes		
type of container:				Nominal core-barrel diameter EST. Volume		
Water and surface conditions: 70 degrees and sunny				3.0" .25 gal/ft 3.5" .33gal/ft 4.0" .50gal/ft		
Comments: Turned over to Client in liner				Liner Type: <input checked="" type="radio"/> Soft <input type="radio"/> Hard		
				Vibra Corer: <input checked="" type="radio"/> P3 <input type="radio"/> P4 <input type="radio"/> VT6 <input type="radio"/> Other		
Live Organisms present Y <input checked="" type="radio"/> N						
Oil Present Y <input checked="" type="radio"/> N						
Odor Present Y <input checked="" type="radio"/> N						
Debris Present Y <input checked="" type="radio"/> N						
Within 10% of Req'd Core Length Y <input checked="" type="radio"/> N						
Photo Y <input checked="" type="radio"/> N						

MACTEC Mark Padoser Henry Jenkinson Sediment Core Log MACTEC 107 Audubon Road Wakefield, MA	Boring Location: SED 31		Page <u>1</u> of <u>1</u>	
	Project Name: Garham		Geologist: Phil Muller	
	Date Started: 6.21.06		Drilling Company: Agua Survey	
	Date Completed: 6.21.06		Drilling Method: Vibracore	
	Total Depth: 6.8' 6.5'		Depth of Water:	
	Comments: recovery = 6.8' DELS			

Depth (feet)	Stratigraphy Description	Penetration/Recovery (feet)	Headspace (ppm)	Blows/6 inches	Sample ID
1	0.3 organic leaf litter <hr/> Black silt and organic some slaty (1 chunk or piece) @ 1.5', some	—	< 1.0 ppm 1.9 ppm @ 0.9'	—	SED3101 @ 6" - 12" 6 deep pp
2	leaf litter				
3	2.9				
4	3.6 DK. brown, med. to coarse SAND, little fine Gravel	—	1-2 ppm 1.8 ppm @ 3.3'	—	SED3104 @ 3 - 3.6' deep
5	Grey fine to coarse SAND, little fine Gravel Some became golden SAND pp	—	< 1 ppm	—	
6	little black sand speckles little grey clay lenses		1.9 ppm @ 5.2'		
7	4" grey + orange CLAY, some fine sand				

Notes: No petroleum odor, some organic odor 0 - 2.9'



AQUA SURVEY, INC. SEDIMENT CORE LOG

Client : MACTEC		Project : Providence		Logger: MP			
Job#: 26-186		Date: 06/21/06		Time : 09:30			
Sample Coordinates: 347,024 E		259,756 N		R1 SP NAD 83			
Core # SED-31		DTW(ft)	HDOP=				
Project Depth (inc. ft. overdredge) [PD]:		Core Penetration Length: 8.5					
Measured Water Depth [MWD]: 3.3		Recovered Core Length: 7.1					
Tide Adjust [TA] (+/- ft. from MLW):		Sample Length Retained : 7.1					
Corrected Depth @ MLW: 3.3		Core Volume Retained: 3.6					
Required Sample Core Length [SCL]: -3.3		Collected to Project Depth: <input checked="" type="checkbox"/> Y / <input type="checkbox"/> N					
All Length Measurements are In Decimal Feet							
Sample Interval (ft.)		Sample Id #		Description			
Top				silt to sand			
Bottom							
# of containers:				Core Volumes			
type of container:		bucket	hardliner	cup	other	Nominal core-barrel diameter	EST. Volume
Water and surface conditions: 70 degrees and sunny						3.0"	.25 gal/ft
Comments: Turned over to Client in liner						3.5"	.33gal/ft
						(4.0")	.50gal/ft
						Liner Type: <input checked="" type="checkbox"/> Soft <input type="checkbox"/> Hard	
						Vibra Corer: <input checked="" type="checkbox"/> P3 <input type="checkbox"/> P4 <input type="checkbox"/> VT6 <input type="checkbox"/> Other	
Live Organisms present		Y	<input type="checkbox"/> N				
Oil Present		Y	<input type="checkbox"/> N				
Odor Present		Y	<input type="checkbox"/> N				
Debris Present		Y	<input type="checkbox"/> N				
Within 10% of Req'd Core Length		Y	<input type="checkbox"/> N				
Photo		Y	<input type="checkbox"/> N				

Sediment Core Log

MACTEC
107 Audubon Road
Wakefield, MA

Project Name: **Gorham**

Geologist: **Phil Muller**

Date Started: **6.21.06**

Drilling Company: **Aqua Survey**

Date Completed: **6.21.06**

Drilling Method: **Vibra core**

Total Depth:

Depth of Water:

Comments: **recovery = 5.6'**

DEA

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
1	<p>2" Leaf litter</p> <p>grey fine to med SAND some organic odor, not petroleum or organic (not recognizable)</p>		0.2		SED3201 @ 6" - 12"
1.1 1.4	<p>Black f. to coarse SAND, some red particles (probably sand) or shells, some organics</p> <p>Black SILT and organics piece of slag</p>		0.5		
2.5	<p>Soft</p>				
3	<p>Grey + orange stained fine to med SAND not well sorted</p>		0		SED 3204 @ 2.5 - 4' 3.5'
4					
5					
6					



AQUA SURVEY, INC. SEDIMENT CORE LOG

Client : MACTEC		Project : Providence		Logger: MP		
Job#: 26-186		Date: 06/21/06		Time : 09:53		
Sample Coordinates:		347,053 E	259,763 N	R1 SP NAD 83		
Core # SED-32		DTW(ft)	HDOP=			
Project Depth (inc. ft. over dredge) [PD]:		Core Penetration Length: 8.0				
Measured Water Depth [MWD]: 1.9		Recovered Core Length: 6.0				
Tide Adjust [TA] (+/- ft. from MLW):		Sample Length Retained : 6.0				
Corrected Depth @ MLW: 1.9		Core Volume Retained: 3.0				
Required Sample Core Length [SCL]: -1.9		Collected to Project Depth: <input checked="" type="radio"/> Y / <input type="radio"/> N				
All Length Measurements are in Decimal Feet						
Sample Interval (ft.)	Sample Id #	Description				
Top						
↓						
Bottom						
# of containers:				Core Volumes		
type of container:		bucket	hardliner	cup	other	Nominal core-barrel
Water and surface conditions:				diameter		EST. Volume
Comments:		Turned over to Client in liner		3.0"		.25 gal/ft
				3.5"		.33gal/ft
				<u>4.0"</u>		.50gal/ft
				Liner Type: <input checked="" type="radio"/> Soft <input type="radio"/> Hard		
				Vibra Corer: <input checked="" type="radio"/> P3 <input type="radio"/> P4 <input type="radio"/> VT6 <input type="radio"/> Other		
Live Organisms present		Y	<input type="radio"/> N			
Oil Present		Y	<input type="radio"/> N			
Odor Present		Y	<input type="radio"/> N			
Debris Present		Y	<input type="radio"/> N			
Within 10% of Req'd Core Length		Y	<input type="radio"/> N			
Photo		Y	<input type="radio"/> N			



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: SED - 33		Page <u>1</u> of <u>1</u>
Project Name: Textron, Gorham		Geologist: DCC
Project Number: 3650110222		Drilling Company: T & B
Date Completed: 12-19-11		Drilling Method: vib recover
Total Depth: 37.4'		Depth to Water: /
Comments: /		

Depth (feet)	Stratigraphy Description	Penetration/Recovery (feet)	Headspace (ppm)	Blows/6 inches	Sample ID
0-1	Mostly brown-tan, poorly graded, coarse-med sand, some gravel	1.0/0.9	20.1 4.2 52.3	/	SED-33-01 Dioxin (Furan), PP-13 metals, AVG: 524.70C, grain size, % sand @ 14:00
0-6.6	Mostly dark brown-brown-tan, poorly graded, coarse-med sand, wet, some gravel	8.9/6.6	0.5 1.1 0.2 0.3	/	SED-33-18 TOC, % sand, grain size @ 14:15
8					



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: SED-34

Page 1 of 1

Project Name: Tetron Garham

Geologist: RLK

Project Number: 3650110222

Drilling Company: TG+B

Date Completed: 12-20

Drilling Method: vibracore

Total Depth: 44.7'

Depth to Water: /

Comments: Lack of recovery on 0-8' due to loose urban fill

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 Inches	Sample ID
0 ↓ 2	0-1: Mostly brown-dark brown coarse sand, some med sand, some gravel/cobble	1.0/1.0	0.2 0.4 0.7	/	SED-48-01 34 Dioxins/Furans, pp-13 metals, AVS; SEM, TOC, grain size, % solids @ 10:50
0 ↓ 8	0-1.5: Mostly same as above, but brick frags/urban fill	8.0/1.5	0.1 0.1 0.2	/	SED-48-18 34 TOC, % solids, grain @ 11:00



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: SED-35

Page 1 of 1

Project Name: Textron
Gorham

Geologist: DCC

Project Number: 3650110222

Drilling Company: TCB

Date Completed: 12-16-11

Drilling Method: vibracore

Total Depth: 2'

Depth to Water: /

Comments: /

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 1	Mostly brown, dark brown poorly graded gravelly coarse sand, some med sand fine	1.0/0.9	0.2 0.2 0.3	/	SED-35-01 for Diatoms / Fuvents MS: 3BM, PP-13 metals, TOC, grain size, % solids @ 11:25
2	0 - 1: Mostly tan-gray med sand, some fines, well graded 1 - 1.7: Same as above but more coarse, some gravel, well graded 1.7 - 4.1: same as above, but transitioning to cobbles (rounded)	8.0/4.1	9.7 12.6 15.2 6.3		SED-40-10 grain size, TOC, % solid @ 11:45
8					



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: SED-36

Page 1 of 1

Project Name: Textron, Gorham

Geologist: DLG

Project Number: 3650110222

Drilling Company: TC + B

Date Completed: 12-14-11

Drilling Method: VIBROCORE

Total Depth: 8'

Depth to Water: /

Comments:

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 1 1	0-1.0: Mostly dark brown, black organics and silt; some sand, loose. No odor	1.0/1.0	0.1		SED-36-01 / SED-36-01 DUP for: Diatoms, Furans PP-13 metals, AUS/ SEM, % Solids, TAC, grain size Sample # 1140
			0.2		
			0.2		
1 	0-1.9: Gray-tan coarse sand, some med some fine, poorly graded 1.9-7.0: Mostly dark brown, brown organics, some fine sand	2.0/7.0	0.1		SED-36-1B for: % Solids, grain size, TAC Sample # 1150
			0.2		
			0.2		
	Some silt, some small wood fragments / plant matter				
8					



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: SED-³47

Page 1 of 1

Project Name: Textron,
Gorham

Geologist: DLG

Project Number: 3650110222

Drilling Company: TG+B

Date Completed: 12-15-11

Drilling Method: vibracore

Total Depth: 2'

Depth to Water: /

Comments:

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 1 1	0-1: Mostly gray-tan poorly graded, med-coarse sand, some gravel, some cobble.	1.0/1.0	0.9 1.2 2.4 0.3	/	SED-37-01 for: Diatoms/ Furans, PP-13 metals, TOC, AUS: SEM, grain size @ 14:45 % solids
1	0-3: Mostly gray-tan med-coarse uniform sand, some fines, 3-3.6: Gray-tan sub-rounded poorly graded sandy gravel	8.0/5.5	2.2 12.6 17.3 6.3		SED-37-18 % solids, grain size, TOC @ 14:55
	3.6-5.3: Same as 0-3' above, but small lenses of silt throughout				
2					



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: **SED-38**

Page 1 of 1

Project Name: **Tetron
Gorham**

Geologist: **DLG**

Project Number: **3650110222**

Drilling Company: **TC + B**

Date Completed: **12-13-11**

Drilling Method: **Vibracore**

Total Depth: **8'**

Depth to Water: **/**

Comments: **/**

Depth (feet)	Stratigraphy Description	Penetration/Recovery (feet)	Headspace (ppm)	Blows/6 inches	Sample ID
0 1 1	0-0.3: Mostly med-coarse, brown, tan sand, some gray sand, some cobble 0.3-1.0: same as above but bands of gray-brown respectively, at 0.7 and 0.9'	1.0/1.0	20.1	/	SED-38-01 PP-13 metals Dioxin, Furans, AUS, SBM, grain size, TOC, % solids @ 15:20
1	1-4': same as above, but well graded from med-coarse @ gray 4-5.1: brown tan fine med sand, well graded, no odor	2.0/3.5	20.1	/	SED-38-18 % solids TOC, grain size @ 15:30
	5.1-5.5: same as above, but uniform, some silt, no odor			/	
8					



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: SSD-39.04

Page 1 of 1

Project Name: Tetron
Garham

Geologist: DLK

Project Number: 3650110222

Drilling Company: TG + B

Date Completed: 12-14-11

Drilling Method: u.b.000000

Total Depth: 8'

Depth to Water: /

Comments: /

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 1 1	0-1: Mostly dark brown/black organic silt mixture, saturated	1.0 / 1.0	0.2	/	<u>SSD-39.01</u> for Dioxins/Furans, PP-13 metals, AUS/SEM, TOC, % Solids, grain size @ 12:10
1	0-2.2: Mostly gray-tan fine-med sand, poorly graded 2.2-7.0: Same as above, med-coarse sand	8.0 / 7.6	0.3 0.2 13.2		<u>SSD-39.1B</u> for % Solids, grain size, TOC @ 12:20
8					



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: **SED-40**

Page 1 of 1

Project Name: **Textron, Gorham**

Geologist: **DL**

Project Number: **3650110222**

Drilling Company: **TG+B**

Date Completed: **12-16-11**

Drilling Method: **VIBROCORP**

Total Depth: **8'**

Depth to Water: **/**

Comments:

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 1 3	0-1: Mostly brown-tan gravelly coarse sand, poorly graded	1.0 / 1.0	0.2 0.1 0.1	/	SED-40-01 DIONING/FUELS, PP-13 METALS, AVS: SBM. % solids, grain size, TOC @ 12:00
4	0-1: Mostly brown silt, some fine sand, med dense, wet 1-2: Mostly fine-med sand, poorly graded, some silt.	8.0 / 6.6	0.2 0.2 0.2	/	SED-40-10 % solids, grain size, TOC @ 12:15
	2-3: Mostly gravelly sand, some gravel, loose 3-5: Brown sandy silt, some fine sand		20.1 20.1 20.1		
	5-6.6: Brown med sand, some fine sand, poorly graded		.		



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: **SED-41**

Page 1 of 1

Project Name: **Textron, Gorham**

Geologist: **DLK**

Project Number: **3650110222**

Drilling Company: **TC+B**

Date Completed: **12-15-11**

Drilling Method: **vibracore**

Total Depth: **8'**

Depth to Water: **/**

Comments: **/**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 Inches	Sample ID
0 1 1	Mostly dark brown-black organic/silt mixture, some fine sand, saturated	1.0/1.0	0.2 0.4 2.1 0.9		SED-41-01 for: Diatom/ Furan, PP-13 metals, Avg: SEM % Solids, TOC, grain size
2	0-1: Mostly same as above, more fines 1-2: Gray-tan med to coarse sand, poorly graded, some fines	8.0/5.3	0.3 0.4 10.1 40.2 32.6		@ 10:30 SED-41-1B % Solids, TOC, grain size @ 10:40
	2 to 5.3: Same as above				
8					



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: SED - 42 Page 1 of 1

Project Name: Tetron Gorham Geologist: PLC

Project Number: 3650110222 Drilling Company: T&B

Date Completed: 12-11-14 Drilling Method: vibrocure

Total Depth: ⊖ 1 Depth to Water: /

Comments:

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 1 2	Mostly brown - tan gray gravelly sand, poorly graded, some cobbles	1.0/1.0	0.4 13.9 3.5	/	SED-42-01 for dioxins/ furans, AUS/ SEM, PP-13 metals TOC, % solids, grain size @ 10:00
1	0.0-0.4: Black to gray cobbles and med. coarse, poorly graded sand, black material throughout	2.0/4.1	30.6 10.2 58.6 0.6	⊖	
8	0.4-3.8: Mostly tan, poorly graded med. coarse sand, some fines 3.8-4.1: same as above, more fines, brown		0.5 0.4 0.3		SED-42-18 for: dioxins, furans, AUS/ SEM, PP-13 metals, TOC, % solids, grain size @ 10:15



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: SED-430 ⁰¹ Page 1 of 1

Project Name: Textron, Gorham Geologist: DLC

Project Number: 3650110222 Drilling Company: TG+B

Date Completed: 12-19-11 Drilling Method: vibracore

Total Depth: 8' Depth to Water: /

Comments: /

Depth (feet)	Stratigraphy Description	Penetration/Recovery (feet)	Headspace (ppm)	Blows/6 Inches	Sample ID
0 1	0 - 1: Mostly dark brown - black organic/silt mixture, saturated	1.0/1.0	0.2 0.2 0.3	/	SED-43-01 SED-43-01 DUP Dioxins/Furans, PP-13 metals, AMS:SEM. % solids, @ 14:46 grain 91 71
2 8	0 - 1.2: Mostly same as above, but sandy 1.2 - 6.4: Dark brown, black black med sand, some silt, some organics	8.0/ 6.4	0.1 0.2 0.2	/	SED-43-18 % solids, grain size, TOC @ 15:10



Boring Location: SED-44

Page 1 of 1

Project Name: Textron, Gorham

Geologist: DLK

Project Number: 3650110222

Drilling Company: TCB

Soil Boring Log

Date Completed: 12-15-11

Drilling Method: vibracore

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Total Depth: 2'

Depth to Water: /

Comments: /

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 1 2	0-1: Mostly dark brown - black organic silt mixture, saturated, loose	1.0/1.0	0.2 0.3 0.3	/	SED-44-01 for: Dioxins/ Furans, PP-13 metals, TOC, A SEM, % solids, grain size @ 11:30
1	0-4.3: Mostly same as above, lighter brown, less saturated 4.3-7.4: Same as above w/ lenses of gray - tan med to coarse sand	2.0/7.4	0.3 13.6 32.6 64.8 17.3		SED-44-10 for: TOC, grain size % solids @ 11:45
2					



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: SED-45 Page 1 of 1

Project Name: Textron Gorham Geologist: DLK

Project Number: 3650110222 Drilling Company: TG+B

Date Completed: 12-14-11 Drilling Method: vibracore

Total Depth: 8' Depth to Water: /

Comments: /

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 8 inches	Sample ID
0 1 1	0-1: Mostly brown dark brown - black organics + silt saturated	1.0 / 1.0	0.2 0.3 30.2 78.1	/	SED-45-01 for: Dioxins, Furans, AUS/SEM PP-13, 70 solids grain size, TC @ 15:20
2 1 7	0-0.6: Same as above, some sand poorly graded 0.6-5.0: Gray, tan poorly graded, cobbly coarse sand, some gravel	8.0 / 5.0	0.1 0.3 0.2	/	SED-45-18 70 solids, grain size, TOC @ 15:20



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: **SED - 46** Page 1 of 1

Project Name: **TEXTRON, Gorham** Geologist: **DLG**

Project Number: **3650110222** Drilling Company: **TG + B**

Date Completed: **12-20-11** Drilling Method: **TG + B**

Total Depth: **2'** Depth to Water: **/**

Comments: **/**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 Inches	Sample ID
0 ↓ 1	Mostly dark brown - black organic / silt mixture, saturated	1.0 / 1.0	20.1 0.2	/	SED-46-01 Dioxins / Furans PP-13 metals, AVS, SEM, TOC. % solids, grain size @ 15:05
0 2	Mostly dark brown - black organic / silt mixture, saturated		8.01 7.1	/	SED-46-18 % solids / grain size, TOC @ 15:25



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: SED-47	Page <u>1</u> of <u>1</u>
Project Name: Textron, Gorham	Geologist: DL
Project Number: 3650110222	Drilling Company: TC+B
Date Completed: 12-15-11	Drilling Method: vibracore
Total Depth: 8'	Depth to Water: /
Comments: /	

Depth (feet)	Stratigraphy Description	Penetration/Recovery (feet)	Headspace (ppm)	Blows/6 inches	Sample ID
0 1 2	Mostly dark brown/black organic / silt mixture saturated	1.0 / 1.0	0.2 0.4 0.6	/	SED-47-01 Diols/MS/Furans, AUS:SEM, TOC, PP-13 metals grain size, % soil @ 15:05
1 ↓ 8	0-7.2: Mostly same as above, but lighter brown, less saturated	8.0 / 7.2	0.3 2.1 17.6 13.7		SED-47-1B % solids, grain size, TOC @ 15:20 25



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: **SED-48**

Page 1 of 1

Project Name: **Texton**

Geologist: **DLC**

Project Number: **3650110222**

Drilling Company: **TG + B**

Date Completed: **12-14-11**

Drilling Method: **VIBROCORE**

Total Depth: **8'**

Depth to Water: **/**

Comments: **/**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 1 1	0-1: Mostly dark brown, black organics and silt, uniform, saturated, no odor	1.0/1.0	0.2 0.2 0.3	/	<u>SED-48-01</u> for DIASING/ FURANS, PP-13 METALS, AQS/SEM TOC, % SOLIDS, GRAIN SIZE @ 14:15
1 1 8	0-7.0: Same as above, but transitioning to brown, more organics	8.0/7.0	20.1		<u>SED-48-18</u> for: TOC, % SOLIDS, GRAIN SIZE @ 14:30



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: SED - 49

Page 1 of 1

Project Name: Tettron, Gorham

Geologist: DLC

Project Number: 3650110222

Drilling Company: TG + B

Date Completed: 12-13-11

Drilling Method: vibracore

Total Depth: 8.0'

Depth to Water: /

Comments:

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0	0 - 3.3 Mostly dark brown, loose, organic silt, some roots/leaves saturated No odor	8.0/7.2	20.1	/	SED-49-09 for 90 solid. grain size, TOC @ 11:50
	3.3 - 5.2: Brown, tan med sand, some what graded, wet No odor				
	5.2 - 7.2: Same as above, tan, coarse grained				
8					



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: SED-50 Page 1 of 1

Project Name: Textron, Gorham Geologist: DLC

Project Number: 2650110222 Drilling Company: TA + B

Date Completed: 12-13-11 Drilling Method: vibracore

Total Depth: 8.0' Depth to Water: /

Comments: /

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0	0 - 3.5 : Mostly dark brown organic silt, some leaves, some roots, saturated, loose no odor	8.0/7.1	20.1	/	SED-50-08 for 70 solids, TOC, grain size @ 10:30
	3.5 - 7.1 : Mostly tan-brown coarse grained sand, poorly graded, wet, no odor				
8	End of boring: <u>8.0'</u>				



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: SED-50 51

Page 1 of 1

Project Name: Textron, Gorham

Geologist: DLC

Project Number: 3650110222

Drilling Company: TC + B

Date Completed: 12-13-11

Drilling Method: vibracore

Total Depth: 8'

Depth to Water: /

Comments:

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0	0 - 2.0 : Mostly dark brown, loose, organic silt, some roots, leaves, saturated, no odor	8.0 / 5.2	20.1	0.1 0.3	SED-51-08 for: grain size, % solids, TOC @ 12:10
	2.0 - 3.3 : Mostly brown, tan med. coarse sand, some fines, band of darker material from 3.8 - 4.0, wet, no odor		1.0 1.9 0.9 1.0		
8			0.3 0.4		



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: **SED-52**

Page 1 of 1

Project Name: **Textron,
Gorham**

Geologist: **DL**

Project Number: **3650110822**

Drilling Company: **TG + B**

Date Completed: **12-16-11**

Drilling Method: **vibracore**

Total Depth: **4.1'**

Depth to Water: **/**

Comments: **/**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 ↓ 4	0-4: Mostly dark brown-black organic silt mixture, saturated uniform	4.0/4.0	1.7 2.2 1.3	/	SED-52-01 Dioxins/Furans, PP-13 metals, AUS:SEM, TOC, % solids, grain size @ 13:15



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakfield, MA

Boring Location: SED-53

Page 1 of 1

Project Name: Tetron,
Garham

Geologist: DL

Project Number: 3650110222

Drilling Company: TG+B

Date Completed: 12-16-11

Drilling Method: Vibracore

Total Depth: 4'

Depth to Water: /

Comments: /

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0	0-1.5: Mostly dark brown - black organic silt mixture, saturated	4.0 / 4.0	0.2	/	SED-53-01 Dioxins, Furans PP-13 metals, AUS: SEM, % silt grain size, TOC @ 13:35
	1.5-3.4: same as above, denser, browner		0.3		
	3.4-4.0: Gray-tan med-fine sand, poorly graded		0.5		
4					



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: SED-54-01

Page 1 of 1

Project Name: Textron, Garham

Geologist: DLK

Project Number: 3650110222

Drilling Company: TG+B

Date Completed: 12-16-11

Drilling Method: vibracore

Total Depth: 4'

Depth to Water: /

Comments: /

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0	0 - 2.5: Mostly brown-black organic silt mixture, some fine sand	4.0139	60.1	/	SED-54-01 Dioxins/Furans, AUS: SEM, PP-13 metals, TAC, grain size, % sands @ 13:45
	2.5 - 2.8: Tan med sand, some fines, poorly graded, some gravel		60.1		
	2.8 - 3.0: same as 0-2.5 above				
4					



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: **SED-55**

Page 1 of 1

Project Name: **Textron, Gorham**

Geologist: **DLC**

Project Number: **3650110222**

Drilling Company: **TC+S**

Date Completed: **12-16-11**

Drilling Method: **vibracore**

Total Depth: **4'**

Depth to Water: **✓**

Comments: **✓**

Depth (feet)	Stratigraphy Description	Penetration/Recovery (feet)	Headspace (ppm)	Blows/6 inches	Sample ID
0 ↓ 1	0-3.2 mostly brown, dark brown organic, silt mixture, loose, saturated	4.0/3.2	20.1 20.1 0.2	✓	SED-55-01 DIOMING / FUMPH. PP-13 METALS, AVS: SEM. % solids, TOC, GRAIN SIZE @ 14:30



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: **SED-56**

Page 1 of 1

Project Name: **Tettron, Gorham**

Geologist: **DLL**

Project Number: **3650110222**

Drilling Company: **T&B**

Date Completed: **12-16-11**

Drilling Method: **Vibracore**

Total Depth: **4'**

Depth to Water: **/**

Comments: **/**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 ↓ 1	0-4: Mostly dark brown-black organics, silt mixture, some fine sand	4.0/3.3	20.1 0.2 0.2	/	SED-56-01 Dioxins/Furans, PP-13 metals AUS: SEM, % Solids, grain size, TOC @ 14:45



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: **SED-57**

Page 1 of 1

Project Name: **Textron,
Gorham**

Geologist: **DLC**

Project Number: **3650110222**

Drilling Company: **TG+B**

Date Completed: **12-16-11**

Drilling Method: **vibracore**

Total Depth: **4'**

Depth to Water: **/**

Comments: **/**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0	0-1.5 : Mostly brown-dark brown-black organics/silt mix, some fine sand, saturated 1.5-2.0: Gray-tan med-coarse, poorly	4.0/3.5	0.1 0.2 0.4 0.2	/	SED-57-01 for: Diatoms/ Furans, PAHs Metals, AMS, SEM Grain Size, % Sand TOC @ 14:55
	graded sand 2.0-3.5: same as 0-1.5, but less saturated				
1					



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: **SED-58**

Page 1 of 1

Project Name: **Textron**

Geologist: **DL**

Project Number: **3650110222**

Drilling Company: **TC+B**

Date Completed: **12-16-11**

Drilling Method: **vibracore**

Total Depth: **4'**

Depth to Water: **/**

Comments: **/**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0	0 - 0.5: dark brown - black med. coarse sand	4.0 / 3.6	201	/	SED-58 Dioxins/Furans, ANS: SEM, PP-13 metals, TCL, % solids, grain size @ 15:10
	0.5 - 3.6: gray-tan coarse sand, some gravel, some sub-rounded cobble, loose, poorly graded		0.2		
4					



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: **SEP-59**

Page 1 of 1

Project Name: **Textron, Gorham**

Geologist: **DLG**

Project Number: **365P110222**

Drilling Company: **T&B**

Date Completed: **12-20-11**

Drilling Method: **Vibracore**

Total Depth: **2'**

Depth to Water: **/**

Comments: **/**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 ↓ 1	Mostly brown-tan coarse sand, poorly graded, some gravel, some cobble	1.0/0.9	20.1 20.1	/	SEP-59-01 Dioxins / Furans AUS: SEM, PP-13, Metals, % Solids, grain size, TOC @ 14140
0 2	Mostly brown-tan coarse-med poorly graded sand, some rounded cobble	8.0/6.3	0.2 0.2	/	SEP-59-18 % Solids, grain size, TOC @ 14150



Soil Boring Log

AMEC Environment & Infrastructure
107 Audubon Road
Wakefield, MA

Boring Location: **SB-60**

Page 1 of 1

Project Name: **Textron, Garham**

Geologist: **DLC**

Project Number: **3650110222**

Drilling Company: **T&B**

Date Completed: **12-20-11**

Drilling Method: **vibracore**

Total Depth: **8'**

Depth to Water: **/**

Comments: **/**

Depth (feet)	Stratigraphy Description	Penetration/ Recovery (feet)	Headspace (ppm)	Blows/ 6 inches	Sample ID
0 ↓ 2	Mostly brown-tan coarse sand, some med some gravel / cobble	1.0/1.0	0.1 0.1 0.2	/	SED-60-01 Dioxin/Furans, PP-13 metals, AVS; SEM, TOC, % solids, grain size @ 12:05
1 ↓ 8	1-2.5: Mostly brown-tan coarse-med sand well graded, some gravel 2.5-7.8: Gray-tan fine sandy silt-clay/silt mixture; semi-plastic, wet	8.0/7.8	0.1 0.2 0.1	/	SED-60-18 % solid, grain size; TOC @ 14:00

APPENDIX A - 6
SEDIMENT GRAIN SIZE ANALYSIS

Table
 Summary of 2011 Sediment Samples Grain Size Analysis
 Mashapaug Pond and Cove
 Former Gorham Manufacturing Facility
 333 Adelaide Avenue
 Providence, Rhode Island

chemical_name	Inner Cove			Outer Cove Study Area								
	SED-49-08 12/13/2011 0-8 ft	SED-50-08 12/13/2011 0-8 ft	SED-51-08 12/13/2011 0-8 ft	SED-33-01 12/19/2011 0-1 ft	SED-33-18 12/19/2011 1-8 ft	SED-34-01 12/20/2011 0-1 ft	SED-34-18 12/20/2011 1-8 ft	SED-35-01 12/16/2011 0-1 ft	SED-35-18 12/16/2011 1-8 ft	SED-36-01 12/14/2011 0-1 ft	SED-36-01 DUP 12/14/2011 0-1 ft	SED-36-18 12/14/2011 1-8 ft
Grain Size (% Passing)												
Sieve Size 3 inch	100	100	100	100	100	100	100	100	100	100	100	100
Sieve Size 2 inch	100	100	100	100	100	100	100	100	100	100	100	100
Sieve Size 1.5 inch	100	100	100	100	100	100	100	100	100	100	100	100
Sieve Size 1 inch	100	100	100	100	100	100	100	100	100	100	100	100
Sieve Size 0.75 inch	100	100	100	100	100	92.6	100	100	100	100	100	100
Sieve Size 0.5 inch	98.5	98.4	100	92.4	98.8	89.7	92.1	97.8	86.9	100	100	100
Sieve Size 0.375 inch	98.5	95.8	100	83.2	96	83	85.4	92.5	83.5	100	100	99.8
Sieve Size #4	94.1	91.4	97.3	68.4	87.3	75.8	76.6	85.2	74.6	99.7	100	93.3
Sieve Size #8	86.2	82.4	92.7	59.1	78.8	71.2	71.6	76.3	65.5	97.2	98	83.9
Sieve Size #16	70.7	69.4	81.6	48.4	66.8	62.5	64.2	62.9	55.5	91.8	93.5	71.6
Sieve Size #30	46.2	51.9	60.9	33	50.1	43.9	48.6	43.4	41.8	82.2	84.7	54.4
Sieve Size #50	20.7	29.3	26	10.9	20.1	16.6	22.4	17.7	18	56.2	60.5	32.7
Sieve Size #100	10.7	16.8	10	2.4	3.6	3.2	8.1	10.3	7.7	25.5	29.9	21.3
Sieve Size #200	7.7	11.8	6	1.2	1.2	1.3	5	4.2	4.5	14.2	18	16.3
Coarse (%)	5.9	8.6	2.7	31.6	12.7	24.2	23.4	14.8	25.4	0.3	0	6.7
Sand (%)	86.4	79.6	91.3	67.2	86.1	74.5	71.6	81	70.1	85.5	82	77
Fine (%)	7.7	11.8	6	1.2	1.2	1.3	5	4.2	4.5	14.2	18	16.3

Table
 Summary of 2011 Sediment Samples Grain Size Analysis
 Mashapaug Pond and Cove
 Former Gorham Manufacturing Facility
 333 Adelaide Avenue
 Providence, Rhode Island

Outer Cove Study Area												
chemical_name	SED-37-01 12/15/2011 0-1 ft	SED-37-18 12/15/2011 1-8 ft	SED-38-01 12/13/2011 0-1 ft	SED-38-18 12/13/2011 1-8 ft	SED-39-01 12/14/2011 0-1 ft	SED-39-18 12/14/2011 1-8 ft	SED-40-01 12/16/2011 0-1 ft	SED-40-18 12/16/2011 1-8 ft	SED-41-01 12/15/2011 0-1 ft	SED-41-18 12/15/2011 1-8 ft	SED-42-01 12/14/2011 0-1 ft	SED-42-18 12/14/2011 1-8 ft
Grain Size (% Passing)												
Sieve Size 3 inch	100	100	100	100	100	100	100	100	100	100	100	100
Sieve Size 2 inch	100	100	100	100	100	100	100	100	100	100	100	100
Sieve Size 1.5 inch	100	100	100	100	100	100	100	100	100	100	100	100
Sieve Size 1 inch	100	100	100	100	100	100	86.1	100	100	100	100	91.9
Sieve Size 0.75 inch	97.5	100	93.4	100	100	100	76.2	100	100	100	100	86.6
Sieve Size 0.5 inch	91.7	97.9	88.9	100	100	100	68.7	100	100	100	89.8	80.2
Sieve Size 0.375 inch	86.7	97.3	83	100	100	100	66.4	100	100	99.3	86.5	77.9
Sieve Size #4	79.5	93.7	78.9	100	100	99.8	58.2	100	100	86.8	76.6	66.5
Sieve Size #8	71.7	90.5	71.4	99.9	99.7	98.1	38.6	99.9	99.6	79.6	66.8	60.4
Sieve Size #16	62	86.6	60.4	97.5	98.4	93.4	38.3	99.5	99.1	69.7	54.3	52.6
Sieve Size #30	47.2	79.3	43	91	96.6	82.3	26.9	93.6	98.7	54.6	35.5	37.1
Sieve Size #50	21.9	61.5	19	77.5	94.4	54.7	11.2	60.3	97	27.4	13.2	13
Sieve Size #100	5.8	51.4	7.3	65.2	90.4	26	4.2	37.6	93.6	9.6	3.9	3.8
Sieve Size #200	2.5	49.5	5	59.4	76.4	13.7	2.3	33.9	83.8	4.8	2	2.1
Coarse (%)	20.5	6.3	21.1	0	0	0.2	41.8	0	0	13.2	23.4	33.5
Sand (%)	77	44.2	73.9	40.6	23.6	86.1	55.9	66.1	16.2	82	74.6	64.4
Fine (%)	2.5	49.5	5	59.4	76.4	13.7	2.3	33.9	83.8	4.8	2	2.1

Table
 Summary of 2011 Sediment Samples Grain Size Analysis
 Mashapaug Pond and Cove
 Former Gorham Manufacturing Facility
 333 Adelaide Avenue
 Providence, Rhode Island

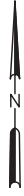
Outer Cove Study Area												
chemical_name	SED-43-01 12/19/2011 0-1 ft	SED-43-18 12/19/2011 1-8 ft	SED-44-01 12/15/2011 0-1 ft	SED-44-18 12/15/2011 1-8 ft	SED-45-01 12/14/2011 0-1 ft	SED-45-18 12/14/2011 1-8 ft	SED-46-01 12/20/2011 0-1 ft	SED-46-18 12/20/2011 1-8 ft	SED-47-01 12/15/2011 0-1 ft	SED-47-18 12/15/2011 1-8 ft	SED-48-01 12/14/2011 0-1 ft	SED-48-18 12/14/2011 1-8 ft
Grain Size (% Passing)												
Sieve Size 3 inch	100	100	100	100	100	100	100	100	100	100	100	100
Sieve Size 2 inch	100	100	100	100	100	100	100	100	100	100	100	100
Sieve Size 1.5 inch	100	100	100	100	100	100	100	100	100	100	100	100
Sieve Size 1 inch	100	100	100	100	100	100	100	100	100	100	100	100
Sieve Size 0.75 inch	100	100	100	100	100	100	100	100	100	100	100	100
Sieve Size 0.5 inch	100	100	100	100	100	99.1	100	100	100	100	100	100
Sieve Size 0.375 inch	100	100	100	100	100	95.9	100	100	100	100	100	100
Sieve Size #4	97.5	98.4	100	99.2	98.1	92.1	100	100	100	100	100	100
Sieve Size #8	93.3	95.1	100	97.1	91.7	86.8	100	99.5	100	100	100	100
Sieve Size #16	84.6	87.7	100	92.2	81.9	79.9	99	99	90.8	95.9	99.6	96.3
Sieve Size #30	70.5	76.1	99.5	81.7	64.5	71.3	99	98	72.4	87.2	96.7	72.9
Sieve Size #50	45.9	54.5	99	61.6	36.3	60	97.9	97	61.8	79	83.6	58.4
Sieve Size #100	30.6	38.5	98.4	39.2	16.1	52.6	96.9	96	53.3	72.8	77	44.7
Sieve Size #200	26.7	32.8	94.3	20.4	6.6	49	94.8	93.9	45.4	63.6	62.1	21.6
Coarse (%)	2.5	1.6	0	0.8	1.9	7.9	0	0	0	0	0	0
Sand (%)	70.8	65.6	5.7	78.8	91.5	43.1	5.2	6.1	54.6	36.4	37.9	78.4
Fine (%)	26.7	32.8	94.3	20.4	6.6	49	94.8	93.9	45.4	63.6	62.1	21.6

Table
 Summary of 2011 Sediment Samples Grain Size Analysis
 Mashapaug Pond and Cove
 Former Gorham Manufacturing Facility
 333 Adelaide Avenue
 Providence, Rhode Island

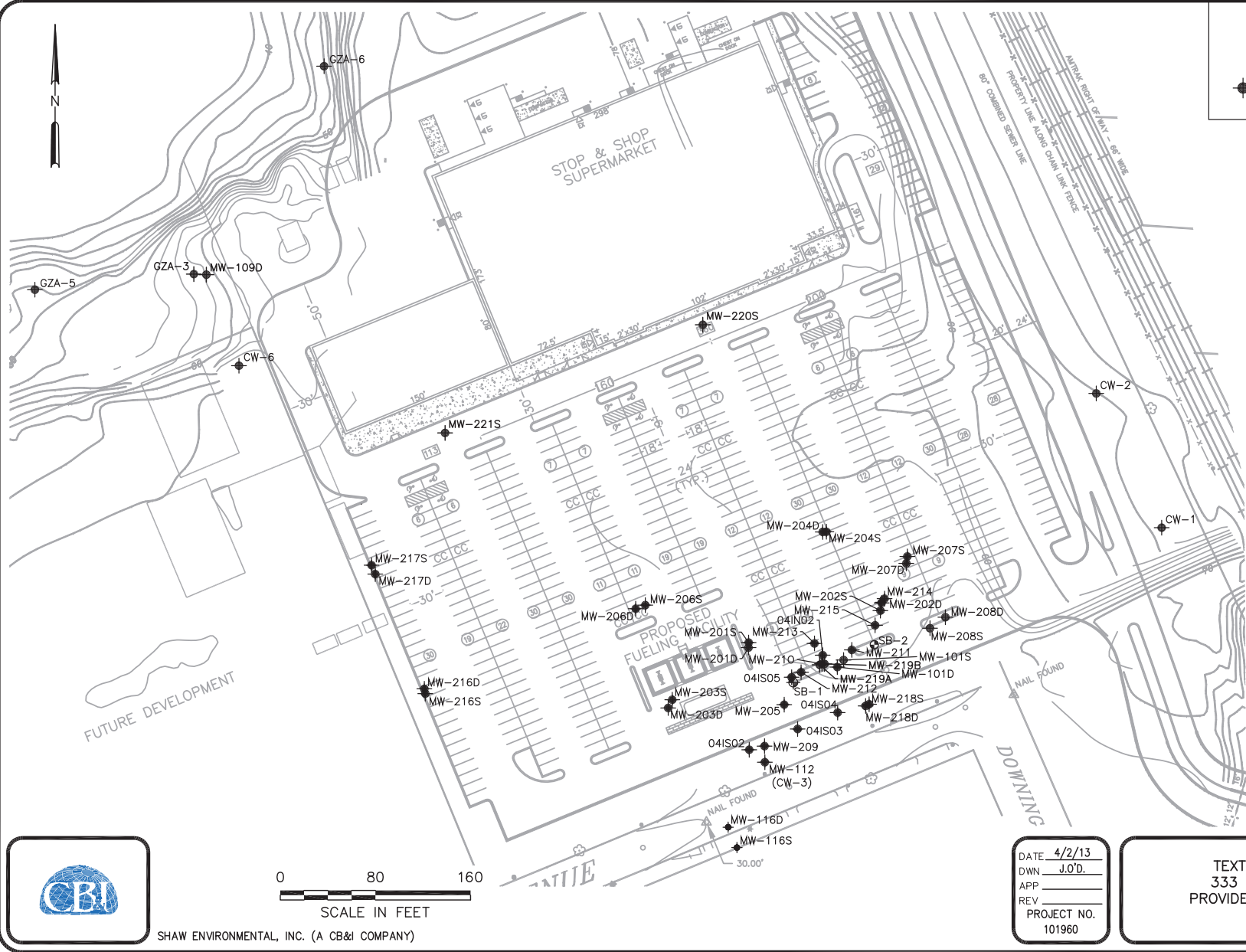
chemical_name	Outer Cove Study Area				Remainder of Pond							
	SED-59-01 12/20/2011 0-1 ft	SED-59-18 12/20/2011 1-8 ft	SED-60-01 12/20/2011 0-1 ft	SED-60-18 12/20/2011 1-8 ft	SED-52-01 12/16/2011 0-1 ft	SED-53-01 12/16/2011 0-1 ft	SED-54-01 12/16/2011 0-1 ft	SED-55-01 12/16/2011 0-1 ft	SED-56-01 12/16/2011 0-1 ft	SED-57-01 12/16/2011 0-1 ft	SED-58-01 12/16/2011 0-1 ft	
Grain Size (% Passing)												
Sieve Size 3 inch	100	100	100	100	100	100	100	100	100	100	100	100
Sieve Size 2 inch	100	100	100	100	100	100	100	100	100	100	100	100
Sieve Size 1.5 inch	100	100	100	100	100	100	100	100	100	100	100	100
Sieve Size 1 inch	100	100	100	100	100	100	100	100	100	100	100	90.9
Sieve Size 0.75 inch	94.9	100	96.5	100	100	100	100	100	100	100	100	90.9
Sieve Size 0.5 inch	88.9	100	74.8	100	100	100	100	100	100	100	100	85
Sieve Size 0.375 inch	81.9	95.5	69.6	100	100	100	100	100	100	100	100	77
Sieve Size #4	70.5	90.7	55.6	100	100	100	100	100	100	100	100	63.6
Sieve Size #8	61.8	83.6	45.9	99	99.6	100	100	100	100	100	100	53.4
Sieve Size #16	49.8	72.2	35.3	96.5	99.1	99.66	99.4	87.9	92.5	99.3	99.3	42
Sieve Size #30	31.8	53.5	22.9	92.9	98.7	98	98.7	55.3	78.1	96.6	96.6	27.9
Sieve Size #50	11.1	17.7	7.8	88.2	98.3	95.6	97.4	37.1	65.1	93.9	93.9	9.7
Sieve Size #100	3.3	3.4	2.7	83.7	91.3	90.9	93.6	27.3	54.8	91.2	91.2	3.4
Sieve Size #200	1.6	0.9	1	80.8	90.5	72.6	76.3	22	42.5	77.7	77.7	1.3
Coarse (%)	29.5	9.3	44.4	0	0	0	0	0	0	0	0	36.4
Sand (%)	68.9	89.8	54.6	19.2	9.5	27.4	23.7	78	57.5	22.3	22.3	62.3
Fine (%)	1.6	0.9	1	80.8	90.5	72.6	76.3	22	42.5	77.7	77.7	1.3

Prepared by / Date: KJC 12/17/13
 Checked by / Date:

APPENDIX B
GROUNDWATER ELEVATION DATA



LEGEND
 ● MW-101S MONITORING WELL

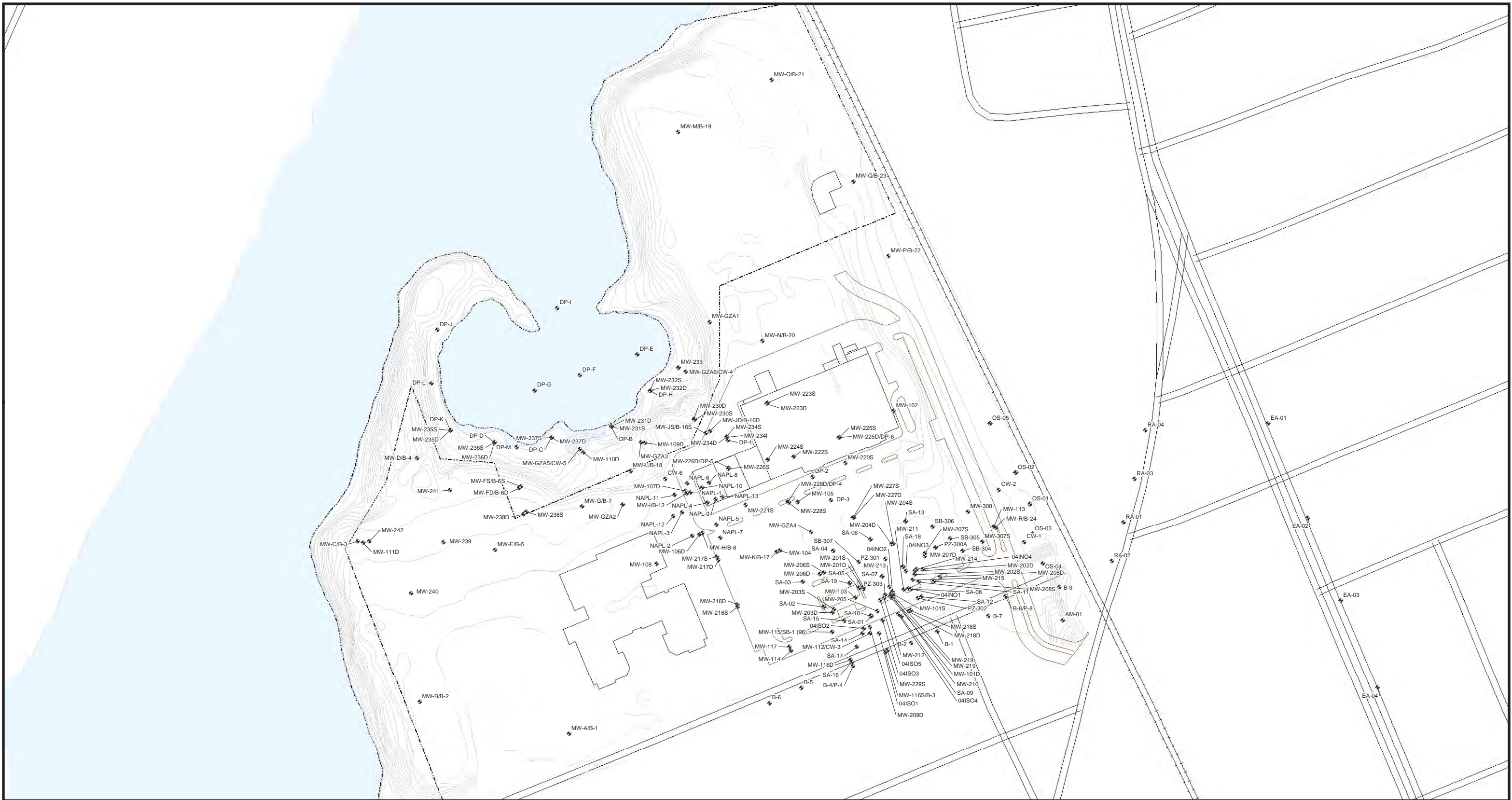


SHAW ENVIRONMENTAL, INC. (A CB&I COMPANY)

DATE 4/2/13
 DWN J.O'D.
 APP _____
 REV _____
 PROJECT NO.
 101960

FIGURE 1
 TETRON PROVIDENCE
 333 ADELAIDE AVENUE
 PROVIDENCE, RHODE ISLAND
SITE PLAN

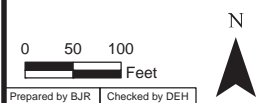
File: N:\dwg\Corham\entgl-02.dwg Layout: SP User: James O'Donnell Apr. 02, 2013 - 11:05am



Legend

- ◆ Groundwater Sample Location
- Elevation Contour
- +—+— Railroad
- Pavement
- ⋯ Park Parcel Boundary

Figure 3.8
Groundwater Sample Locations



333 Adelaide Avenue
Providence, Rhode Island

amec AMEC Environment & Infrastructure
107 Audubon Road, Suite 301
Wakefield, MA 01880

**TABLE 2
GROUNDWATER ELEVATION DATA
(03/06/14 - 05/02/14)**

05/23/14

**Textron Gorham
Providence, Rhode Island**

Location	Date	Reference Elevation (Feet)	Depth to Water (Feet)	Depth to LNAPL (Feet)	LNAPL Thickness (Feet)	Groundwater Elevation (Feet)	Notes
CW-01	05/02/14	99.52	24.71	--	--	74.81	DTB = 54.92'
CW-02	05/02/14	98.86	23.90	--	--	74.96	DTB = 54.41'
CW-06	05/02/14	99.52	24.28	--	--	75.24	DTB = 33.28'
GZA-3	03/06/14	NA	17.60	--	--	NA	DTB = 21.84'
GZA-3	05/02/14	NA	16.72	--	--	NA	DTB = 21.86'
MW-101D	05/01/14	98.91	22.96	--	--	75.95	DTB = 46.11'
MW-101S	05/01/14	98.90	22.71	--	--	76.19	DTB = 28.62'
MW-109D	03/06/14	NA	19.23	--	--	NA	DTB = 74.65'
MW-109D	05/02/14	NA	18.40	--	--	NA	DTB = 75.25'
MW-112	03/06/14	100.63	26.63	--	--	74.00	DTB = 34.58'
MW-112	04/04/14	100.63	26.31	--	--	74.32	DTB = 34.06'
MW-112	05/01/14	100.63	25.75	--	--	74.88	DTB = 34.43'
MW-116D	03/06/14	98.92	24.61	--	--	74.31	DTB = 44.20'
MW-116D	04/04/14	98.92	24.60	--	--	74.32	DTB = 44.23'
MW-116D	05/01/14	98.92	24.02	--	--	74.90	DTB = 44.22'
MW-116S	03/06/14	99.40	25.39	--	--	74.01	DTB = 28.59'
MW-116S	04/04/14	99.40	25.07	--	--	74.33	DTB = 28.60'
MW-116S	05/01/14	99.40	24.45	--	--	74.95	DTB = 28.61'
MW-201D	05/01/14	98.80	23.94	--	--	74.86	DTB = 47.33'
MW-202D	05/01/14	98.17	23.05	--	--	75.12	DTB = 48.00'
MW-202S	05/01/14	98.06	23.01	--	--	75.05	DTB = 38.25'
MW-207D	05/01/14	98.18	22.85	--	--	75.33	DTB = 51.58'
MW-207S	05/01/14	98.28	22.95	--	--	75.33	DTB = 38.31'
MW-209D	05/01/14	99.90	25.52	--	--	74.38	DTB = 62.20'
MW-216D	05/01/14	98.69	24.71	--	--	73.98	DTB = 39.41'
MW-216S	05/01/14	99.58	24.73	--	--	74.85	DTB = 29.63'
MW-217D	05/01/14	98.65	24.20	--	--	74.45	DTB = 46.83'
MW-217S	05/01/14	98.71	24.24	--	--	74.47	DTB = 29.50'
MW-218D	05/01/14	99.67	24.81	--	--	74.86	DTB = 46.69'
MW-218S	05/01/14	99.61	24.80	--	--	74.81	DTB = 29.43'
MW-220S	05/02/14	99.41	24.92	--	--	74.49	DTB = 31.80'
MW-221S	05/02/14	98.92	26.14	--	<0.01	72.78	

Notes:

feet = feet measured below ground surface

NA = Not Available

NM = Not Measured

**TABLE 2
GROUNDWATER ELEVATION DATA
(06/10/14 - 08/22/14)**

09/11/14

**Textron Gorham
Providence, Rhode Island**

Location	Date	Reference Elevation (Feet)	Depth to Water (Feet)	Depth to LNAPL (Feet)	LNAPL Thickness (Feet)	Groundwater Elevation (Feet)	Notes
CW-01	08/22/14	99.52	25.82	--	--	73.70	DTB = 54.26'
CW-02	08/22/14	98.86	25.03	--	--	73.83	DTB = 54.47'
CW-06	08/22/14	99.52	25.71	--	--	73.81	DTB = 33.25'
GZA-3	08/22/14	NA	17.58	--	--	NA	DTB = 21.90'
MW-101D	08/22/14	98.91	25.03	--	--	73.88	DTB = 46.11'
MW-101S	08/22/14	98.90	25.07	--	--	73.83	DTB = 28.53'
MW-109D	08/22/14	NA	19.32	--	--	NA	DTB = 74.66'
MW-112	06/10/14	100.63	26.36	--	--	74.27	DTB = 34.35'
MW-112	07/11/14	100.63	26.55	--	--	74.08	DTB = 34.35'
MW-112	08/22/14	100.63	26.92	--	--	73.71	DTB = 34.37'
MW-116D	06/10/14	98.92	24.53	--	--	74.39	DTB = 44.07'
MW-116D	07/11/14	98.92	24.63	--	--	74.29	DTB = 44.08'
MW-116D	08/22/14	98.92	25.19	--	--	73.73	DTB = 44.25'
MW-116S	06/10/14	99.40	24.85	--	--	74.55	DTB = 28.40'
MW-116S	07/11/14	99.40	25.25	--	--	74.15	DTB = 28.39'
MW-116S	08/22/14	99.40	25.64	--	--	73.76	DTB = 28.55'
MW-201D	08/22/14	98.80	25.02	--	--	73.78	DTB = 47.31'
MW-202D	08/22/14	98.17	24.31	--	--	73.86	DTB = 48.86'
MW-202S	08/22/14	98.06	24.38	--	--	73.68	DTB = 38.05'
MW-207D	08/22/14	98.18	24.41	--	--	73.77	DTB = 51.39'
MW-207S	08/22/14	98.28	24.48	--	--	73.80	DTB = 38.14'
MW-209D	08/22/14	99.90	26.64	--	--	73.26	DTB = 62.15'
MW-216D	08/22/14	98.69	25.79	--	--	72.90	DTB = 39.35'
MW-216S	08/22/14	99.58	25.79	--	--	73.79	DTB = 29.63'
MW-217D	08/22/14	98.65	25.17	--	--	73.48	DTB = 46.84'
MW-217S	08/22/14	98.71	25.22	--	--	73.49	DTB = 29.52'
MW-218D	08/22/14	99.67	25.87	--	--	73.80	DTB = 46.63'
MW-218S	08/22/14	99.61	25.81	--	--	73.80	DTB = 29.44'
MW-220S	08/22/14	99.41	25.59	--	--	73.82	DTB = 31.80'
MW-221S	08/22/14	98.92	27.03	26.01	1.02	72.84	

Notes:

feet = feet measured below ground surface

NA = Not Available

NM = Not Measured

**TABLE 2
GROUNDWATER ELEVATION DATA
(09/30/14 - 11/24/14)**

12/12/14

**Textron Gorham
Providence, Rhode Island**

Location	Date	Reference Elevation (Feet)	Depth to Water (Feet)	Depth to LNAPL (Feet)	LNAPL Thickness (Feet)	Groundwater Elevation (Feet)	Notes
CW-01	11/24/14	99.52	26.41	--	--	73.11	DTB = 54.30'
CW-02	11/24/14	98.86	25.59	--	--	73.27	DTB = 54.45'
CW-06	11/24/14	99.52	24.79	--	--	74.73	DTB = 33.26'
GZA-3	11/24/14	NA	17.53	--	--	NA	DTB = 21.90'
MW-101D	11/24/14	98.91	25.38	--	--	73.53	DTB = 46.11'
MW-101S	11/24/14	98.90	25.39	--	--	73.51	DTB = 28.54'
MW-109D	11/24/14	NA	19.92	--	--	NA	DTB = 74.65'
MW-112	09/30/14	100.63	27.53	--	--	73.10	DTB = 34.35'
MW-112	10/20/14	100.63	27.67	--	--	72.96	DTB = 34.63'
MW-112	11/24/14	100.63	27.18	--	--	73.45	DTB = 34.31'
MW-116D	09/30/14	98.92	25.79	--	--	73.13	DTB = 44.08'
MW-116D	10/20/14	98.92	25.93	--	--	72.99	DTB = 44.25'
MW-116D	11/24/14	98.92	25.44	--	--	73.48	DTB = 39.33'
MW-116S	09/30/14	99.40	26.26	--	--	73.14	DTB = 28.09'
MW-116S	10/20/14	99.40	26.37	--	--	73.03	DTB = 28.60'
MW-116S	11/24/14	99.40	25.90	--	--	73.50	DTB = 29.62'
MW-201D	11/24/14	98.80	25.85	--	--	72.95	DTB = 47.25'
MW-202D	11/24/14	98.17	23.98	--	--	74.19	DTB = 48.83'
MW-202S	11/24/14	98.06	24.01	--	--	74.05	DTB = 38.03'
MW-207D	11/24/14	98.18	25.03	--	--	73.15	DTB = 51.38'
MW-207S	11/24/14	98.28	25.17	--	--	73.11	DTB = 38.10'
MW-209D	11/24/14	99.90	27.21	--	--	72.69	DTB = 61.95'
MW-216D	11/24/14	98.69	26.19	--	--	72.50	DTB = 39.30'
MW-216S	11/24/14	99.58	26.18	--	--	73.40	DTB = 29.61'
MW-217D	11/24/14	98.65	25.36	--	--	73.29	DTB = 46.80'
MW-217S	11/24/14	98.71	25.38	--	--	73.33	DTB = 29.50'
MW-218D	11/24/14	99.67	26.02	--	--	73.65	DTB = 46.61'
MW-218S	11/24/14	99.61	25.98	--	--	73.63	DTB = 29.40'
MW-220S	11/24/14	99.41	26.15	--	--	73.26	DTB = 31.82'
MW-221S	11/24/14	98.92	25.68	--	--	73.24	DTB = 31.75'

Notes:

feet = feet measured below ground surface

NA = Not Available

NM = Not Measured

APPENDIX C

SEDIMENT, SOIL, SOIL GAS, SURFACE WATER AND GROUNDWATER ANALYTICAL DATA

APPENDIX C-1
INNER COVE SEDIMENT



SED 30

30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60

A photograph showing a sediment sample held between two metal rods. The sediment is dark, wet, and has a granular, somewhat clumpy texture. A small white paper label is attached to the sediment with the text "SED 31". The rods are positioned horizontally, one above and one below the sediment. The background consists of a wooden surface and some dark, rocky ground.

SED 31



SED 31

ESS LAB
#7

JUN-06
0118A



SED 18

10

10

16

25

26

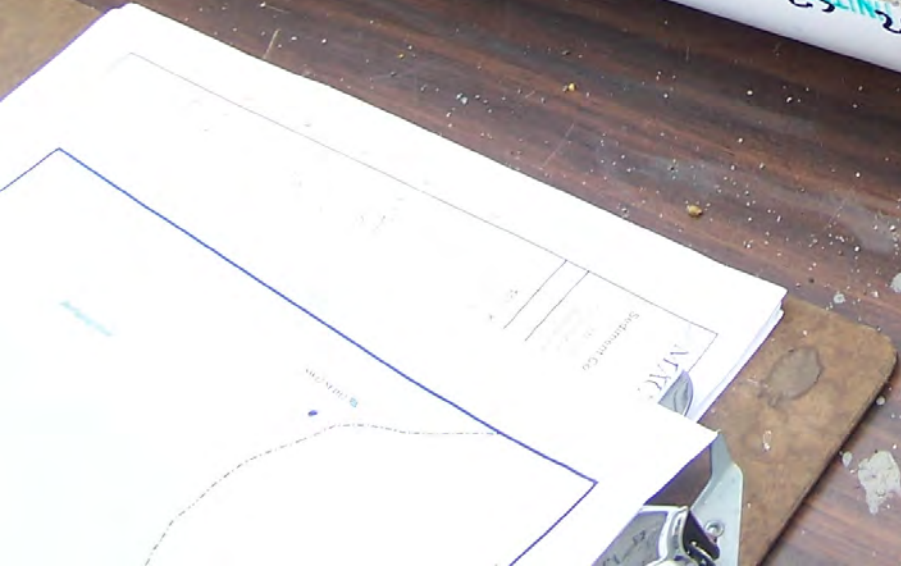
27

28

29

30

31



SED-22



SED27





333 Adelaide Avenue Site
Providence, Rhode Island



Figure 1
Phase II Pre-Design Sample Locations



Prepared/Date: BJR 12/06/12
 Checked/Date: MJM 12/06/12

333 Adelaide Avenue Site
 Providence, Rhode Island



Surface Water and Sediment Sample
 Locations 2005-2012
 Project 3650-11-0222

Figure 3.3

Table 6
Summary of Analytical Results in Sediment - April 2014
Former Textron Facility
Providence, Rhode Island

parameter_name	Frequency of Detection	Range of Non Detects	Range of Detected Concentrations	Average of All Samples	SED-17-0002 4/15/2014	SED-17-0208 4/15/2014	SED-22-0002 4/15/2014	SED-22-0208 4/15/2014	SED-27-0208 4/15/2014
Inorganics (mg/Kg)									
Antimony	0 / 5	2.3 : 11		2.97	2.3 U		3.6 U		
Arsenic	5 / 5		1 - 130	38.4	1		10		
Beryllium	1 / 5	0.23 : 1.1	1.1 - 1.1	0.419	0.23 U		0.36 U		
Cadmium	2 / 5	0.47 : 0.72	3.1 - 5	1.8	0.47 U		0.72 U		
Chromium	5 / 5		3.6 - 340	109.52	3.6		10		
Copper	5 / 5		2.8 - 1600	564.76	2.8		11		
Lead	4 / 5	2.3 : 2.3	4 - 810	291.03	2.3 U		4		
Mercury	3 / 5	0.08 : 0.12	0.12 - 2.2	0.764	0.08 U		0.12 U		
Nickel	5 / 5		6.4 - 340	109.38	6.4		9.5		
Selenium	1 / 5	0.94 : 4.5	5.9 - 5.9	1.984	0.94 U		1.4 U		
Silver	3 / 5	0.47 : 0.72	9.7 - 140	50.059	0.47 U		0.72 U		
Thallium	0 / 5	0.94 : 4.5		1.194	0.94 U		1.4 U		
Zinc	5 / 5		17 - 1400	519.2	19		17		
Percent Solid (%)	8 / 8		17 - 80.8	45.45	80.8	78.7	53.7	24.2	26
Total Organic Carbon (Rep1) (%)	4 / 5	0.01 : 0.01	1.88 - 25.2	11.297	0.01 U		1.88		
Total Organic Carbon (Rep2) (%)	5 / 5		0.015 - 21.8	10.811	0.015		2.04		
SPLP Metals (mg/L)									
Antimony	0 / 5	0.05 : 0.05		0.025	0.05 U		0.05 U		
Arsenic	4 / 5	0.005 : 0.005	0.0101 - 0.0641	0.03156	0.005 U		0.0347		
Beryllium	0 / 5	0.005 : 0.005		0.0025	0.005 U		0.005 U		
Cadmium	0 / 5	0.005 : 0.005		0.0025	0.005 U		0.005 U		
Chromium	0 / 5	0.01 : 0.01		0.005	0.01 U		0.01 U		
Copper	0 / 5	0.01 : 0.01		0.005	0.01 U		0.01 U		
Lead	1 / 5	0.01 : 0.01	0.0122 - 0.0122	0.00644	0.01 U		0.01 U		
Mercury	0 / 5	0.001 : 0.001		0.0005	0.001 U		0.001 U		
Nickel	2 / 5	0.025 : 0.025	0.0304 - 0.0569	0.02496	0.025 U		0.025 U		
Selenium	0 / 5	0.01 : 0.01		0.005	0.01 U		0.01 U		
Silver	0 / 5	0.007 : 0.007		0.0035	0.007 U		0.007 U		
Thallium	0 / 5	0.02 : 0.02		0.01	0.02 U		0.02 U		
Zinc	0 / 5	0.05 : 0.05		0.025	0.05 U		0.05 U		
Grain Size (Percent Passing)									
Cobbles	0 / 8	0.1 : 0.1		0.05	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Coarse Gravel	0 / 8	0.1 : 0.1		0.05	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Fine Gravel	5 / 8	0.1 : 0.1	0.22 - 32.3	9.2575	32.3	7.66	0.1 U	2.53	0.22
Coarse Sand	8 / 8		0.17 - 34.6	14.9225	14.4	6.89	0.17	34.6	12.7
Medium Sand	8 / 8		23 - 41.2	32.5875	28.3	41.2	23	28.8	39.6
Fine Sand	8 / 8		21.6 - 49.3	33.325	23.5	40.1	49.3	26.3	40.1

Table 6
Summary of Analytical Results in Sediment - April 2014
Former Textron Facility
Providence, Rhode Island

parameter_name	Frequency of Detection	Range of Non Detects	Range of Detected Concentrations	Average of All Samples	SED-17-0002 4/15/2014	SED-17-0208 4/15/2014	SED-22-0002 4/15/2014	SED-22-0208 4/15/2014	SED-27-0208 4/15/2014
Grain Size (Total Percent)									
Gravel	5 / 8	0.1 : 0.1	0.22 - 32.3	9.2575	32.3	7.66	0.1 U	2.53	0.22
Sand	8 / 8		66 - 92.5	80.8625	66.3	88.2	72.5	89.7	92.5
Fines	8 / 8		1.48 - 27.5	9.90875	1.48	4.11	27.5	7.76	7.32

mg/L = milligram per liter

U = not detected, value is the reporting limits

Table 6
Summary of Analytical Results in Sediment - April 2014
Former Textron Facility
Providence, Rhode Island

parameter_name	SED-49-0002 4/15/2014	SED-51-0002 4/15/2014	SED-61-0002 4/15/2014
Inorganics (mg/Kg)			
Antimony	11 U	9.8 U	3 U
Arsenic	38	130	13
Beryllium	1.1 U	1.1	0.3 U
Cadmium	3.1	5	0.61 U
Chromium	340	180	14
Copper	1100	1600	110
Lead	500	810	140
Mercury	1.4	2.2	0.12
Nickel	94	340	97
Selenium	4.5 U	5.9	1.2 U
Silver	100	140	9.7
Thallium	4.5 U	3.9 U	1.2 U
Zinc	990	1400	170
Percent Solid (%)	17	19.2	64
Total Organic Carbon (Rep1) (%)	15.6	13.8	25.2
Total Organic Carbon (Rep2) (%)	16.4	13.8	21.8
SPLP Metals (mg/L)			
Antimony	0.05 U	0.05 U	0.05 U
Arsenic	0.0101	0.0641	0.0464
Beryllium	0.005 U	0.005 U	0.005 U
Cadmium	0.005 U	0.005 U	0.005 U
Chromium	0.01 U	0.01 U	0.01 U
Copper	0.01 U	0.01 U	0.01 U
Lead	0.01 U	0.01 U	0.0122
Mercury	0.001 U	0.001 U	0.001 U
Nickel	0.025 U	0.0569	0.0304
Selenium	0.01 U	0.01 U	0.01 U
Silver	0.007 U	0.007 U	0.007 U
Thallium	0.02 U	0.02 U	0.02 U
Zinc	0.05 U	0.05 U	0.05 U
Grain Size (Percent Passing)			
Cobbles	0.1 U	0.1 U	0.1 U
Coarse Gravel	0.1 U	0.1 U	0.1 U
Fine Gravel	0.1 U	0.1 U	31.2
Coarse Sand	28.6	7.52	14.5
Medium Sand	35.4	34.5	29.9
Fine Sand	27.1	38.6	21.6

Table 6
Summary of Analytical Results in Sediment - April 2014
Former Textron Facility
Providence, Rhode Island

parameter_name	SED-49-0002 4/15/2014	SED-51-0002 4/15/2014	SED-61-0002 4/15/2014
Grain Size (Total Percent)			
Gravel	0.1 U	0.1 U	31.2
Sand	91.2	80.5	66
Fines	8.82	19.5	2.78

mg/L = milligram per liter

U = not detected, value is the reporting limits

Prepared by / Date: KJC 05/01/14

Checked by / Date:

SED 30

30
1017



Prepared/Date: BJR 05/08/14
 Checked/Date: DEH 05/08/14

Legend

- Sediment Sample Location (2005-2006)
- Surface Water and Sediment Sample Location (2006)
- Sediment Sample Location (2011-2014)
- Surface Water and Sediment Sample Location (2011)
- Approximate Site Boundary
- Approximate Pond

N

0 35 70 Feet

333 Adelaide Avenue Site
 Providence, Rhode Island



Figure 1
 Inner and Outer Cove Locations

Table
Summary of Analytical Results in Sediment - April 2014
Former Textron Facility
Providence, Rhode Island

parameter_name	Frequency of Detection	Range of Non Detects	Range of Detected Concentrations	Average of All Samples	SED-17-0002 4/15/2014	SED-17-0208 4/15/2014	SED-22-0002 4/15/2014	SED-22-0208 4/15/2014	SED-27-0208 4/15/2014
Inorganics (mg/L)									
Antimony	0 / 5	2.3 : 11		2.97	2.3 U		3.6 U		
Arsenic	5 / 5		1 - 130	38.4	1		10		
Beryllium	1 / 5	0.23 : 1.1	1.1 - 1.1	0.419	0.23 U		0.36 U		
Cadmium	2 / 5	0.47 : 0.72	3.1 - 5	1.8	0.47 U		0.72 U		
Chromium	5 / 5		3.6 - 340	109.52	3.6		10		
Copper	5 / 5		2.8 - 1600	564.76	2.8		11		
Lead	4 / 5	2.3 : 2.3	4 - 810	291.03	2.3 U		4		
Mercury	3 / 5	0.08 : 0.12	0.12 - 2.2	0.764	0.08 U		0.12 U		
Nickel	5 / 5		6.4 - 340	109.38	6.4		9.5		
Selenium	1 / 5	0.94 : 4.5	5.9 - 5.9	1.984	0.94 U		1.4 U		
Silver	3 / 5	0.47 : 0.72	9.7 - 140	50.059	0.47 U		0.72 U		
Thallium	0 / 5	0.94 : 4.5		1.194	0.94 U		1.4 U		
Zinc	5 / 5		17 - 1400	519.2	19		17		
Percent Solid (%)	8 / 8		17 - 80.8	45.45	80.8	78.7	53.7	24.2	26
Total Organic Carbon (Rep1) (%)	4 / 5	0.01 : 0.01	1.88 - 25.2	11.297	0.01 U		1.88		
Total Organic Carbon (Rep2) (%)	5 / 5		0.015 - 21.8	10.811	0.015		2.04		
SPLP Metals (mg/L)									
Antimony	0 / 5	0.05 : 0.05		0.025	0.05 U		0.05 U		
Arsenic	4 / 5	0.005 : 0.005	0.0101 - 0.0641	0.03156	0.005 U		0.0347		
Beryllium	0 / 5	0.005 : 0.005		0.0025	0.005 U		0.005 U		
Cadmium	0 / 5	0.005 : 0.005		0.0025	0.005 U		0.005 U		
Chromium	0 / 5	0.01 : 0.01		0.005	0.01 U		0.01 U		
Copper	0 / 5	0.01 : 0.01		0.005	0.01 U		0.01 U		
Lead	1 / 5	0.01 : 0.01	0.0122 - 0.0122	0.00644	0.01 U		0.01 U		
Mercury	0 / 5	0.001 : 0.001		0.0005	0.001 U		0.001 U		
Nickel	2 / 5	0.025 : 0.025	0.0304 - 0.0569	0.02496	0.025 U		0.025 U		
Selenium	0 / 5	0.01 : 0.01		0.005	0.01 U		0.01 U		
Silver	0 / 5	0.007 : 0.007		0.0035	0.007 U		0.007 U		
Thallium	0 / 5	0.02 : 0.02		0.01	0.02 U		0.02 U		
Zinc	0 / 5	0.05 : 0.05		0.025	0.05 U		0.05 U		
Grain Size (Percent Passing)									
Cobbles	0 / 8	0.1 : 0.1		0.05	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Coarse Gravel	0 / 8	0.1 : 0.1		0.05	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Fine Gravel	5 / 8	0.1 : 0.1	0.22 - 32.3	9.2575	32.3	7.66	0.1 U	2.53	0.22
Coarse Sand	8 / 8		0.17 - 34.6	14.9225	14.4	6.89	0.17	34.6	12.7
Medium Sand	8 / 8		23 - 41.2	32.5875	28.3	41.2	23	28.8	39.6
Fine Sand	8 / 8		21.6 - 49.3	33.325	23.5	40.1	49.3	26.3	40.1

Table
Summary of Analytical Results in Sediment - April 2014
Former Textron Facility
Providence, Rhode Island

parameter_name	Frequency of Detection	Range of Non Detects	Range of Detected Concentrations	Average of All Samples	SED-17-0002 4/15/2014	SED-17-0208 4/15/2014	SED-22-0002 4/15/2014	SED-22-0208 4/15/2014	SED-27-0208 4/15/2014
Grain Size (Total Percent)									
Gravel	5 / 8	0.1 : 0.1	0.22 - 32.3	9.2575	32.3	7.66	0.1 U	2.53	0.22
Sand	8 / 8		66 - 92.5	80.8625	66.3	88.2	72.5	89.7	92.5
Fines	8 / 8		1.48 - 27.5	9.90875	1.48	4.11	27.5	7.76	7.32

mg/L = milligram per liter

U = not detected, value is the reporting limits

Table
Summary of Analytical Results in Sediment - April 2014
Former Textron Facility
Providence, Rhode Island

parameter_name	SED-49-0002 4/15/2014	SED-51-0002 4/15/2014	SED-61-0002 4/15/2014
Inorganics (mg/L)			
Antimony	11 U	9.8 U	3 U
Arsenic	38	130	13
Beryllium	1.1 U	1.1	0.3 U
Cadmium	3.1	5	0.61 U
Chromium	340	180	14
Copper	1100	1600	110
Lead	500	810	140
Mercury	1.4	2.2	0.12
Nickel	94	340	97
Selenium	4.5 U	5.9	1.2 U
Silver	100	140	9.7
Thallium	4.5 U	3.9 U	1.2 U
Zinc	990	1400	170
Percent Solid (%)	17	19.2	64
Total Organic Carbon (Rep1) (%)	15.6	13.8	25.2
Total Organic Carbon (Rep2) (%)	16.4	13.8	21.8
SPLP Metals (mg/L)			
Antimony	0.05 U	0.05 U	0.05 U
Arsenic	0.0101	0.0641	0.0464
Beryllium	0.005 U	0.005 U	0.005 U
Cadmium	0.005 U	0.005 U	0.005 U
Chromium	0.01 U	0.01 U	0.01 U
Copper	0.01 U	0.01 U	0.01 U
Lead	0.01 U	0.01 U	0.0122
Mercury	0.001 U	0.001 U	0.001 U
Nickel	0.025 U	0.0569	0.0304
Selenium	0.01 U	0.01 U	0.01 U
Silver	0.007 U	0.007 U	0.007 U
Thallium	0.02 U	0.02 U	0.02 U
Zinc	0.05 U	0.05 U	0.05 U
Grain Size (Percent Passing)			
Cobbles	0.1 U	0.1 U	0.1 U
Coarse Gravel	0.1 U	0.1 U	0.1 U
Fine Gravel	0.1 U	0.1 U	31.2
Coarse Sand	28.6	7.52	14.5
Medium Sand	35.4	34.5	29.9
Fine Sand	27.1	38.6	21.6

Table
Summary of Analytical Results in Sediment - April 2014
Former Textron Facility
Providence, Rhode Island

parameter_name	SED-49-0002 4/15/2014	SED-51-0002 4/15/2014	SED-61-0002 4/15/2014
Grain Size (Total Percent)			
Gravel	0.1 U	0.1 U	31.2
Sand	91.2	80.5	66
Fines	8.82	19.5	2.78

mg/L = milligram per liter

U = not detected, value is the reporting limits

Prepared by / Date: KJC 05/01/14
Checked by / Date:



TCLP PARAMETERS AND REGULATORY LIMITS

	PARAMETER	REGULATORY LIMITS (mg/L)
Metals	Arsenic	5.0
	Barium	100
	Cadmium	1.0
	Chromium	5.0
	Lead	5.0
	Mercury	0.2
	Selenium	1.0
	Silver	5.0
Volatiles	Benzene	0.5
	Carbon Tetrachloride	0.5
	Chlorobenzene	100
	Chloroform	6.0
	1,4- Dichlorobenzene	7.5
	1,2- Dichloroethane	0.5
	1,1- Dichloroethene	0.7
	2- Butanone (MEK)	200
	Tetrachloroethene	0.7
	Trichloroethene	0.5
Vinyl Chloride	0.2	
Semi-Volatiles	2,4- Dinitrotoluene	0.13
	Hexachlorobenzene	0.13
	Hexachlorobutadiene	0.5
	Hexachloroethane	3.0
	2- Methylphenol	200
	3-,4- Methylphenol	400
	Nitrobenzene	2.0
	Pentachlorophenol	100
	Pyridine	5.0
	2,4,5- Trichlorophenol	400
2,4,6- Trichlorophenol	2.0	
Pesticides	Chlordane	0.03
	Endrin	0.02
	Heptachlor	0.008
	Heptachlor Epoxide	0.008
	Lindane	0.4
	Methoxychlor	10.0
	Toxaphene	0.5
Herbicides	2,4- D	0
	2,4,5- TP (Silvex)	1.0

Table
Summary of Grain Size Analysis in Sediment
Former Gorham Facility
Providence, Rhode Island

chemical_name	SED-17-0002 4/15/2014 0-2 ft	SED-17-0208 4/15/2014 2-8 ft	SED-22-0002 4/15/2014 0-2 ft	SED-22-0208 4/15/2014 2-8 ft	SED-27-0208 4/15/2014 2-8 ft	SED-33-01 12/19/2011 0-1 ft	SED-33-18 12/19/2011 1-8 ft	SED-34-01 12/20/2011 0-1 ft	SED-34-18 12/20/2011 1-8 ft	SED-35-01 12/16/2011 0-1 ft	SED-35-18 12/16/2011 1-8 ft	SED-36-01 12/14/2011 0-1 ft	SED-36-01 12/14/2011 0-1 ft
Percent Passing													
Sieve Size 0.375 inch						83.2	96	83	85.4	92.5	83.5	100	100
Sieve Size 0.5 inch						92.4	98.8	89.7	92.1	97.8	86.9	100	100
Sieve Size 0.75 inch	100	100	100	100	100	100	100	92.6	100	100	100	100	100
Sieve Size 1 inch						100	100	100	100	100	100	100	100
Sieve Size 1.5 inch						100	100	100	100	100	100	100	100
Sieve Size 2 inch						100	100	100	100	100	100	100	100
Sieve Size 3 inch						100	100	100	100	100	100	100	100
Sieve Size #4	67.74	92.34	100	97.47	99.78	68.4	87.3	75.8	76.6	85.2	74.6	99.7	100
Sieve Size #8	53.29	85.45	99.83	62.87	87.04	59.1	78.8	71.2	71.6	76.3	65.5	97.2	98
Sieve Size #10													
Sieve Size #16						48.4	66.8	62.5	64.2	62.9	55.5	91.8	93.5
Sieve Size #30						33	50.1	43.9	48.6	43.4	41.8	82.2	84.7
Sieve Size #40	24.95	44.24	76.82	34.02	47.4								
Sieve Size #50						10.9	20.1	16.6	22.4	17.7	18	56.2	60.5
Sieve Size #60	9.72	21.72	59.77	26.06	31.68								
Sieve Size #100						2.4	3.6	3.2	8.1	10.3	7.7	25.5	29.9
Sieve Size #140	2.37	8.24	35.22	15.36	12.14								
Sieve Size #200	1.48	4.11	27.48	7.76	7.32	1.2	1.2	1.3	5	4.2	4.5	14.2	18
Percent Total													
Coarse	32.3	7.66	0.1	2.53	0.22	31.6	12.7	24.2	23.4	14.8	25.4	0.3	0
Fine	1.48	4.11	27.5	7.76	7.32	1.2	1.2	1.3	5	4.2	4.5	14.2	18
Sand	66.3	88.2	72.5	89.7	92.5	67.2	86.1	74.5	71.6	81	70.1	85.5	82

Table
Summary of Grain Size Analysis in Sediment
Former Gorham Facility
Providence, Rhode Island

chemical_name	SED-36-18 12/14/2011 1-8 ft	SED-37-01 12/15/2011 0-1 ft	SED-37-18 12/15/2011 1-8 ft	SED-38-01 12/13/2011 0-1 ft	SED-38-18 12/13/2011 1-8 ft	SED-39-01 12/14/2011 0-1 ft	SED-39-18 12/14/2011 1-8 ft	SED-40-01 12/16/2011 0-1 ft	SED-40-18 12/16/2011 1-8 ft	SED-41-01 12/15/2011 0-1 ft	SED-41-18 12/15/2011 1-8 ft	SED-42-01 12/14/2011 0-1 ft	SED-42-18 12/14/2011 1-8 ft
Percent Passing													
Sieve Size 0.375 inch	99.8	86.7	97.3	83	100	100	100	66.4	100	100	99.3	86.5	77.9
Sieve Size 0.5 inch	100	91.7	97.9	88.9	100	100	100	68.7	100	100	100	89.8	80.2
Sieve Size 0.75 inch	100	97.5	100	93.4	100	100	100	76.2	100	100	100	100	86.6
Sieve Size 1 inch	100	100	100	100	100	100	100	86.1	100	100	100	100	91.9
Sieve Size 1.5 inch	100	100	100	100	100	100	100	100	100	100	100	100	100
Sieve Size 2 inch	100	100	100	100	100	100	100	100	100	100	100	100	100
Sieve Size 3 inch	100	100	100	100	100	100	100	100	100	100	100	100	100
Sieve Size #4	93.3	79.5	93.7	78.9	100	100	99.8	58.2	100	100	86.8	76.6	66.5
Sieve Size #8	83.9	71.7	90.5	71.4	99.9	99.7	98.1	38.6	99.9	99.6	79.6	66.8	60.4
Sieve Size #10													
Sieve Size #16	71.6	62	86.6	60.4	97.5	98.4	93.4	38.3	99.5	99.1	69.7	54.3	52.6
Sieve Size #30	54.4	47.2	79.3	43	91	96.6	82.3	26.9	93.6	98.7	54.6	35.5	37.1
Sieve Size #40													
Sieve Size #50	32.7	21.9	61.5	19	77.5	94.4	54.7	11.2	60.3	97	27.4	13.2	13
Sieve Size #60													
Sieve Size #100	21.3	5.8	51.4	7.3	65.2	90.4	26	4.2	37.6	93.6	9.6	3.9	3.8
Sieve Size #140													
Sieve Size #200	16.3	2.5	49.5	5	59.4	76.4	13.7	2.3	33.9	83.8	4.8	2	2.1
Percent Total													
Coarse	6.7	20.5	6.3	21.1	0	0	0.2	41.8	0	0	13.2	23.4	33.5
Fine	16.3	2.5	49.5	5	59.4	76.4	13.7	2.3	33.9	83.8	4.8	2	2.1
Sand	77	77	44.2	73.9	40.6	23.6	86.1	55.9	66.1	16.2	82	74.6	64.4

Table
Summary of Grain Size Analysis in Sediment
Former Gorham Facility
Providence, Rhode Island

Chemical_name	SED-43-01 12/19/2011 0-1 ft	SED-43-18 12/19/2011 1-8 ft	SED-44-01 12/15/2011 0-1 ft	SED-44-18 12/15/2011 1-8 ft	SED-45-01 12/14/2011 0-1 ft	SED-45-18 12/14/2011 1-8 ft	SED-46-01 12/20/2011 0-1 ft	SED-46-18 12/20/2011 1-8 ft	SED-47-01 12/15/2011 0-1 ft	SED-47-18 12/15/2011 1-8 ft	SED-48-01 12/14/2011 0-1 ft	SED-48-18 12/14/2011 1-8 ft	SED-49-0002 4/15/2014 0-2 ft
Percent Passing													
Sieve Size 0.375 inch	100	100	100	100	100	95.9	100	100	100	100	100	100	
Sieve Size 0.5 inch	100	100	100	100	100	99.1	100	100	100	100	100	100	
Sieve Size 0.75 inch	100	100	100	100	100	100	100	100	100	100	100	100	100
Sieve Size 1 inch	100	100	100	100	100	100	100	100	100	100	100	100	
Sieve Size 1.5 inch	100	100	100	100	100	100	100	100	100	100	100	100	
Sieve Size 2 inch	100	100	100	100	100	100	100	100	100	100	100	100	
Sieve Size 3 inch	100	100	100	100	100	100	100	100	100	100	100	100	
Sieve Size #4	97.5	98.4	100	99.2	98.1	92.1	100	100	100	100	100	100	100
Sieve Size #8	93.3	95.1	100	97.1	91.7	86.8	100	99.5	100	100	100	100	
Sieve Size #10													71.36
Sieve Size #16	84.6	87.7	100	92.2	81.9	79.9	99	99	90.8	95.9	99.6	96.3	
Sieve Size #30	70.5	76.1	99.5	81.7	64.5	71.3	99	98	72.4	87.2	96.7	72.9	
Sieve Size #40													35.95
Sieve Size #50	45.9	54.5	99	61.6	36.3	60	97.9	97	61.8	79	83.6	58.4	
Sieve Size #60													27.28
Sieve Size #100	30.6	38.5	98.4	39.2	16.1	52.6	96.9	96	53.3	72.8	77	44.7	
Sieve Size #140													15
Sieve Size #200	26.7	32.8	94.3	20.4	6.6	49	94.8	93.9	45.4	63.6	62.1	21.6	8.82
Percent Total													
Coarse	2.5	1.6	0	0.8	1.9	7.9	0	0	0	0	0	0	0.1
Fine	26.7	32.8	94.3	20.4	6.6	49	94.8	93.9	45.4	63.6	62.1	21.6	8.82
Sand	70.8	65.6	5.7	78.8	91.5	43.1	5.2	6.1	54.6	36.4	37.9	78.4	91.2

Table
Summary of Grain Size Analysis in Sediment
Former Gorham Facility
Providence, Rhode Island

chemical_name	SED-49-08 12/13/2011 0-8 ft	SED-50-08 12/13/2011 0-8 ft	SED-51-0002 4/15/2014 0-2 ft	SED-51-08 12/13/2011 0-8 ft	SED-52-01 12/16/2011 0-1 ft	SED-53-01 12/16/2011 0-1 ft	SED-54-01 12/16/2011 0-1 ft	SED-55-01 12/16/2011 0-1 ft	SED-56-01 12/16/2011 0-1 ft	SED-57-01 12/16/2011 0-1 ft	SED-58-01 12/16/2011 0-1 ft	SED-59-01 12/20/2011 0-1 ft	SED-59-18 12/20/2011 1-8 ft
Percent Passing													
Sieve Size 0.375 inch	98.5	95.8		100	100	100	100	100	100	100	77	81.9	95.5
Sieve Size 0.5 inch	98.5	98.4		100	100	100	100	100	100	100	85	88.9	100
Sieve Size 0.75 inch	100	100	100	100	100	100	100	100	100	100	90.9	94.9	100
Sieve Size 1 inch	100	100		100	100	100	100	100	100	100	90.9	100	100
Sieve Size 1.5 inch	100	100		100	100	100	100	100	100	100	100	100	100
Sieve Size 2 inch	100	100		100	100	100	100	100	100	100	100	100	100
Sieve Size 3 inch	100	100		100	100	100	100	100	100	100	100	100	100
Sieve Size #4	94.1	91.4		97.3	100	100	100	100	100	100	63.6	70.5	90.7
Sieve Size #8	86.2	82.4		92.7	99.6	100	100	100	100	100	53.4	61.8	83.6
Sieve Size #10			92.48										
Sieve Size #16	70.7	69.4		81.6	99.1	99.66	99.4	87.9	92.5	99.3	42	49.8	72.2
Sieve Size #30	46.2	51.9		60.9	98.7	98	98.7	55.3	78.1	96.6	27.9	31.8	53.5
Sieve Size #40			58.02										
Sieve Size #50	20.7	29.3		26	98.3	95.6	97.4	37.1	65.1	93.9	9.7	11.1	17.7
Sieve Size #60			47.59										
Sieve Size #100	10.7	16.8		10	91.3	90.9	93.6	27.3	54.8	91.2	3.4	3.3	3.4
Sieve Size #140			28.45										
Sieve Size #200	7.7	11.8		6	90.5	72.6	76.3	22	42.5	77.7	1.3	1.6	0.9
Percent Total													
Coarse	5.9	8.6	0.1	2.7	0	0	0	0	0	0	0	0	0
Fine	7.7	11.8	19.5	6	90.5	72.6	76.3	22	42.5	77.7	1.3	1.6	0.9
Sand	86.4	79.6	80.5	91.3	9.5	27.4	23.7	78	57.5	22.3	62.3	68.9	89.8

Table
Summary of Grain Size Analysis in Sediment
Former Gorham Facility
Providence, Rhode Island

chemical_name	SED-60-01 12/20/2011 0-1 ft	SED-60-18 12/20/2011 1-8 ft	SED-61- 0002 4/15/2014 0-2 ft
Percent Passing			
Sieve Size 0.375 inch	69.6	100	
Sieve Size 0.5 inch	74.8	100	
Sieve Size 0.75 inch	96.5	100	100
Sieve Size 1 inch	100	100	
Sieve Size 1.5 inch	100	100	
Sieve Size 2 inch	100	100	
Sieve Size 3 inch	100	100	100
Sieve Size #4	55.6	100	68.78
Sieve Size #8	45.9	99	54.25
Sieve Size #10			
Sieve Size #16	35.3	96.5	
Sieve Size #30	22.9	92.9	
Sieve Size #40			24.38
Sieve Size #50	7.8	88.2	
Sieve Size #60			12.3
Sieve Size #100	2.7	83.7	
Sieve Size #140			4.64
Sieve Size #200	1	80.8	2.78
Percent Total			
Coarse	44.4	0	31.2
Fine	1	80.8	2.78
Sand	54.6	19.2	66

Prepared by / Date: KJC 05/01/14
Checked by / Date:

Table 4.1
 Summary of Analytical Results for Surface Water - Inner Cove
 Phase II Area - Mashapaug Pond and Cove
 Former Gorham Manufacturing Facility
 333 Adelaide Avenue
 Providence, Rhode Island

Parameter	Frequency of Detection	Range of Reporting Limits for Non Detects	Range of Detected Concentrations	RIDEM AWQC				NRWOC Fresh Water Acute [3]	NRWOC Fresh Water Chronic [3]	NRWOC Water plus Organisms [3]	NRWOC Organisms Only [3]	NRWOC Organisms Only [3]	SW16 6/21/2006	SW17 6/21/2006	SW18 6/21/2006	SW19 6/21/2006	SW20 6/21/2006
				Average [1]	Fresh Water Acute [2]	Fresh Water Chronic [2]	Water plus Organisms [2]										
Volatiles Organic Compounds (mg/L)																	
1,1,1,2-Tetrachloroethane	0 / 12	0.001 - 0.001		0.0005	0.98	0.022						0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1,1-Trichloroethane	11 / 12	0.001 - 0.001	0.001 : 0.0018	0.0014								0.0016	0.0018	0.0013	0.0014	0.0014	0.001 U
1,1,2,2-Tetrachloroethane	0 / 12	0.0005 - 0.0005		0.00025	0.466	0.01	0.0017	0.04			0.00017	4	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
1,1,2-Trichloroethane	0 / 12	0.001 - 0.001		0.0005	0.9	0.02	0.0059	0.16			0.00059	16	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1-Dichloroethane	5 / 12	0.001 - 0.001	0.001 : 0.0014	0.00079								0.0011	0.0014	0.001 U	0.001 U	0.001 U	0.001 U
1,1-Dichloroethene	0 / 12	0.001 - 0.001		0.0005	0.58	0.013	0.33	7.1			0.33	7100	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1-Dichloropropane	0 / 12	0.002 - 0.002		0.001								0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
1,2,3-Trichlorobenzene	0 / 12	0.001 - 0.001		0.0005								0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2,3-Trichloropropane	0 / 12	0.001 - 0.001		0.0005								0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2,4-Trichlorobenzene	0 / 12	0.001 - 0.001		0.0005	0.075	0.0017	0.035	0.07			0.035	70	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2,4-Trimethylbenzene	2 / 12	0.001 - 0.001	0.001 : 0.0011	0.00059								0.001	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dibromo-3-chloropropane	0 / 12	0.005 - 0.005		0.0025								0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dibromoethane (EDB)	0 / 12	0.001 - 0.001		0.0005								0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dichlorobenzene	0 / 12	0.001 - 0.001		0.0005	0.079	0.0018	0.42	1.3			0.42	1300	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dichloroethane	0 / 12	0.001 - 0.001		0.0005	5.9	0.131	0.0038	0.37			0.00038	37	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dichloropropane	0 / 12	0.001 - 0.001		0.0005	2.625	0.058	0.005	0.15			0.0005	15	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,3,5-Trimethylbenzene	0 / 12	0.001 - 0.001		0.0005								0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,3-Dichlorobenzene	0 / 12	0.001 - 0.001		0.0005	0.39	0.0087	0.32	0.96			0.32	960	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,3-Dichloropropane	0 / 12	0.001 - 0.001		0.0005	0.303	0.0067	0.001	0.01				0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,4-Dichlorobenzene	0 / 12	0.001 - 0.001		0.0005	0.056	0.0012	0.063	0.19			0.063	190	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,4-Dioxane	0 / 12	0.5 - 0.5		0.25								0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1-Chlorobenzene	0 / 12	0.001 - 0.001		0.0005								0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
2,2-Dichloropropane	0 / 12	0.001 - 0.001		0.0005								0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
2-Butanone	0 / 12	0.025 - 0.025		0.0125								0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
2-Chlorotoluene	0 / 12	0.001 - 0.001		0.0005								0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
2-Hexanone	0 / 12	0.01 - 0.01		0.005								0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
4-Chlorotoluene	0 / 12	0.001 - 0.001		0.0005								0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
4-Propoxytoluene	0 / 12	0.001 - 0.001		0.0005								0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
4-Methyl-2-Pentanone	0 / 12	0.025 - 0.025		0.0125								0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Acetone	0 / 12	0.025 - 0.025		0.0125								0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Benzene	0 / 12	0.001 - 0.001		0.0005	0.265	0.0059	0.022	0.51			0.0022	51	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromobenzene	0 / 12	0.002 - 0.002		0.001								0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Bromochloromethane	0 / 12	0.001 - 0.001		0.0005								0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromodichloromethane	0 / 12	0.001 - 0.001		0.0005								0.00055	17	0.001 U	0.001 U	0.001 U	0.001 U
Bromodom	0 / 12	0.001 - 0.001		0.0005	1.465	0.033	0.043	1.4			0.0043	140	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromomethane	0 / 12	0.002 - 0.002		0.001								0.047	1500	0.002 U	0.002 U	0.002 U	0.002 U
Carbon disulfide	0 / 12	0.001 - 0.001		0.0005								0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Carbon tetrachloride	0 / 12	0.001 - 0.001		0.0005	1.365	0.03	0.0023	0.016			0.00023	1.6	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Chlorobenzene	0 / 12	0.001 - 0.001		0.0005	0.795	0.018	0.13	1.6			0.13	1600	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Chloroethane	0 / 12	0.002 - 0.002		0.001								0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Chlorodom	0 / 12	0.001 - 0.001		0.0005	1.445	0.032	0.067	4.7			0.0067	470	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Chloromethane	0 / 12	0.002 - 0.002		0.001								0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
cis-1,2-Dichloroethene	12 / 12	0.0005 - 0.0005	0.0025 : 0.0062	0.0048								0.0048	0.0048	0.0048	0.0048	0.0048	0.0048
cis-1,3-Dichloropropene	0 / 12	0.0005 - 0.0005		0.00025								0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Dibromochloromethane	0 / 12	0.001 - 0.001		0.0005			0.004	0.13			0.0004	13	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Dibromomethane	0 / 12	0.001 - 0.001		0.0005								0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Dichlorodifluoromethane	0 / 12	0.002 - 0.002		0.001								0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Diethyl ether	0 / 12	0.001 - 0.001		0.0005								0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Diisopropyl ether	0 / 12	0.001 - 0.001		0.0005								0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Ethyl tert-butyl ether	0 / 12	0.001 - 0.001		0.0005								0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Ethylbenzene	3 / 12	0.001 - 0.001	0.001 : 0.001	0.00063	1.6	0.036	0.53	2.1			0.53	2100	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Hexachlorobutadiene	0 / 12	0.0005 - 0.0005		0.0003			0.0044	0.18			0.0044	18	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U
Isopropylbenzene	0 / 12	0.001 - 0.001		0.0005								0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
m,p-Xylene [4]	5 / 12	0.002 - 0.002	0.002 : 0.0028	0.0016	0.133	0.003						0.0028	0.0024	0.002 U	0.002 U	0.002 U	0.002 U
Methylene chloride	0 / 12	0.005 - 0.005		0.0025	9.65	0.214	0.046	5.9			0.0046	590	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Methyl t-butyl ether	0 / 12	0.001 - 0.001		0.0005								0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Naphthalene	0 / 12	0.001 - 0.001		0.0005	0.115	0.0026						0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
n-Butylbenzene	0 / 12	0.001 - 0.001		0.0005								0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
n-Propyl Benzene	0 / 12	0.001 - 0.001		0.0005								0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
o-Xylene [4]	3 / 12	0.001 - 0.001	0.001 : 0.0012	0.00065	0.133	0.003						0.0011	0.001	0.001 U	0.001 U	0.001 U	0.001 U
sec-Butylbenzene	0 / 12	0.001 - 0.001		0.0005								0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Styrene	0 / 12	0.001 - 0.001		0.0005								0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
tert-Butylbenzene	0 / 12	0.001 - 0.001		0.0005								0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Tertiary amyl methyl ether	0 / 12	0.001 - 0.001		0.0005								0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Tetrachloroethane	1 / 12	0.001 - 0.001	0.0012 : 0.0012	0.00066	0.24	0.0053	0.0069	0.033									

Table 4.1
 Summary of Analytical Results for Surface Water - Inner Cove
 Phase II Area - Mashapaug Pond and Cove
 Former Gorham Manufacturing Facility
 333 Adelaide Avenue
 Providence, Rhode Island

Parameter	Frequency of Detection	Range of Reporting Limits for Non Detects	Range of Detected Concentrations	RIDEM AWQC				NRWQC Fresh Water Acute [3]	NRWQC Fresh Water Chronic [3]	NRWQC Water plus Organisms [3]	NRWQC Organisms Only [3]	SW16 6/21/2006	SW17 6/21/2006	SW18 6/21/2006	SW19 6/21/2006	SW20 6/21/2006
				Average [1]	Fresh Water Acute [2]	Fresh Water Chronic [2]	Water plus Organisms [2]									
Semi-Volatile Organic Compounds (mg/L)																
2-Methylnaphthalene	0 / 12	0.0002 - 0.0002		0.0001							0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	
Acenaphthene	0 / 12	0.0002 - 0.0002		0.0001	0.085	0.0019	0.67	0.99			0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	
Acenaphthylene	0 / 12	0.0002 - 0.0002		0.0001							0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	
Anthracene	0 / 12	0.0002 - 0.0002		0.0001							0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	
Benzofluoranthene	1 / 12	0.0002 - 0.0002	0.0002 ; 0.0002	0.00011			8.3	40		8.3	4000	0.0002 U	0.0002 U	0.0002 U	0.0002 U	
Benzofluoranthene	1 / 12	0.0002 - 0.0002	0.00024 ; 0.00024	0.00011			0.00038	0.00018		0.000038	0.018	0.0002 U	0.0002 U	0.0002 U	0.0002 U	
Benzofluoranthene	0 / 12	0.0002 - 0.0002		0.0001			0.00038	0.00018		0.000038	0.018	0.0002 U	0.0002 U	0.0002 U	0.0002 U	
Benzofluoranthene	1 / 12	0.0002 - 0.0002	0.00038 ; 0.00038	0.00012			0.00038	0.00018		0.000038	0.018	0.0002 U	0.0002 U	0.0002 U	0.0002 U	
Benzofluoranthene	0 / 12	0.0003 - 0.00031		0.00015			0.00038	0.00018		0.000038	0.018	0.0003 U	0.0003 U	0.0003 U	0.0003 U	
Chrysene	1 / 12	0.0002 - 0.0002	0.00023 ; 0.00023	0.00011			0.00038	0.00018		0.000038	0.018	0.0002 U	0.0002 U	0.0002 U	0.0002 U	
Fluorene	1 / 12	0.0002 - 0.0002	0.00031 ; 0.00031	0.00012			0.00038	0.00018		0.000038	0.018	0.0002 U	0.0002 U	0.0002 U	0.0002 U	
Fluoranthene	0 / 12	0.0002 - 0.0002		0.0001	0.199	0.0044	0.13	0.14		0.13	140	0.0002 U	0.0002 U	0.0002 U	0.0002 U	
Fluorene	0 / 12	0.0002 - 0.0002		0.0001			1.1	5.3		1.1	5300	0.0002 U	0.0002 U	0.0002 U	0.0002 U	
Indeno(1,2,3-cd)pyrene	0 / 12	0.0003 - 0.00031		0.00015			0.00038	0.00018		0.000038	0.018	0.0003 U	0.0003 U	0.0003 U	0.0003 U	
Naphthalene	4 / 12	0.0002 - 0.0002	0.0002 ; 0.0003	0.00015	0.115	0.0026						0.0002 U	0.0002 U	0.0002 U	0.0002 U	
Phenanthrene	0 / 12	0.0002 - 0.0002		0.0001								0.0002 U	0.0002 U	0.0002 U	0.0002 U	
Pyrene	0 / 12	0.0002 - 0.0002		0.0001			0.83	4		0.83	4000	0.0002 U	0.0002 U	0.0002 U	0.0002 U	
Pesticides (mg/L)																
4,4'-DDD	0 / 2	0.0005 - 0.0005		0.00025			0.000031	0.000031		0.000031	0.0031				0.0005 U	
4,4'-DDE	0 / 2	0.0005 - 0.0005		0.00025			0.000022	0.000022		0.000022	0.0022				0.0005 U	
4,4'-DDT	0 / 2	0.0005 - 0.0005		0.00025	0.011	0.00001	0.000022	0.000022	0.011	0.00001	0.000022	0.0022			0.0005 U	
Alrin	0 / 2	0.0005 - 0.0005		0.00025	0.003		0.000049	0.000049	0.003		0.000049	0.0005			0.0005 U	
alpha-BHC	0 / 2	0.0005 - 0.0005		0.00025			0.000026	0.000026			0.000026	0.0049			0.0005 U	
alpha-Chlordane	0 / 2	0.0005 - 0.0005		0.00025											0.0005 U	
beta-BHC	0 / 2	0.0005 - 0.0005		0.00025			0.000031	0.000031		0.000031	0.017				0.0005 U	
Chlordane	0 / 2	0.0005 - 0.0005		0.00025	0.024	0.000043	0.000038	0.000038	0.024	0.000043	0.000038	0.0051			0.0005 U	
delta-BHC	0 / 2	0.0005 - 0.0005		0.00025			0.000022	0.000022		0.000022	0.014				0.0005 U	
Dieldrin	0 / 2	0.0005 - 0.0005		0.00025	0.0024	0.00056	0.000062	0.000062	0.0024	0.00056	0.000062	0.00056			0.0005 U	
Endosulfan I	0 / 2	0.0005 - 0.0005		0.00025	0.0022	0.00056	0.062	0.089	0.0022	0.00056	0.062	89			0.0005 U	
Endosulfan II	0 / 2	0.0005 - 0.0005		0.00025	0.0022	0.00056	0.062	0.089	0.0022	0.00056	0.062	89			0.0005 U	
Endosulfan sulfate	0 / 2	0.0005 - 0.0005		0.00025			0.062	0.089		0.062	89				0.0005 U	
Endrin	0 / 2	0.0005 - 0.0005		0.00025	0.000086	0.000036	0.000059	0.000059	0.000086	0.000036	0.000059	0.06			0.0005 U	
Endrin aldehyde	0 / 2	0.0005 - 0.0005		0.00025			0.00029	0.0003		0.00029	0.3				0.0005 U	
Endrin ketone	0 / 2	0.0005 - 0.0005		0.00025											0.0005 U	
gamma-BHC (Lindane)	0 / 2	0.0005 - 0.0005		0.00025	0.00095	0.00016	0.00098	0.0018	0.00095		0.00098	1.8			0.0005 U	
gamma-Chlordane	0 / 2	0.0005 - 0.0005		0.00025											0.0005 U	
Hepachlor	0 / 2	0.0005 - 0.0005		0.00025	0.00052	0.000038	0.000079	0.000079	0.00052	0.000038	0.000079	0.00079			0.0005 U	
Hepachlor epoxide	0 / 2	0.0005 - 0.0005		0.00025	0.00052	0.000038	0.000039	0.000039	0.00052	0.000038	0.000039	0.00039			0.0005 U	
Hexachlorobenzene	0 / 2	0.0005 - 0.0005		0.00025			0.000028	0.000029			0.000028	0.00029			0.0005 U	
Methoxychlor	0 / 2	0.0005 - 0.0005		0.00025						0.0003	0.1				0.0005 U	
Toxaphene	0 / 2	0.0026 - 0.0026		0.00126	0.00073	0.000002	0.000028	0.000028	0.00073	0.000002	0.000028	0.0028			0.0026 U	
Polychlorinated Biphenyls (mg/L)																
Aroclor-1016	0 / 2	0.0001 - 0.0001		0.00005		0.000014	0.0000064	0.0000064							0.0001 U	
Aroclor-1221	0 / 2	0.0001 - 0.0001		0.00005		0.000014	0.0000064	0.0000064							0.0001 U	
Aroclor-1232	0 / 2	0.0001 - 0.0001		0.00005		0.000014	0.0000064	0.0000064							0.0001 U	
Aroclor-1242	0 / 2	0.0001 - 0.0001		0.00005		0.000014	0.0000064	0.0000064							0.0001 U	
Aroclor-1248	0 / 2	0.0001 - 0.0001		0.00005		0.000014	0.0000064	0.0000064							0.0001 U	
Aroclor-1254	0 / 2	0.0001 - 0.0001		0.00005		0.000014	0.0000064	0.0000064							0.0001 U	
Aroclor-1260	0 / 2	0.0001 - 0.0001		0.00005		0.000014	0.0000064	0.0000064							0.0001 U	
Aroclor-1262	0 / 2	0.0001 - 0.0001		0.00005		0.000014	0.0000064	0.0000064							0.0001 U	
Aroclor-1268	0 / 2	0.0001 - 0.0001		0.00005		0.000014	0.0000064	0.0000064							0.0001 U	
Dioxins/Furans (mg/L)																
1,2,3,4,6,7,8-HpCDD	2 / 2		0.00000043 ; 0.00000043	0.00000043											0.00000043 B1	
1,2,3,4,6,7,8-HpCDF	0 / 2	0.00000001 - 0.00000001		0.00000005											0.00000005 U	
1,2,3,4,7,8,9-HpCDF	0 / 2	0.00000001 - 0.00000001		0.00000005											0.00000005 U	
1,2,3,4,7,8,9-HxCDD	0 / 2	0.00000001 - 0.00000001		0.00000005											0.00000005 U	
1,2,3,6,7,8-HxCDF	1 / 2	0.00000001 - 0.00000001	0.000000013 ; 0.000000013	0.00000009											0.00000009 U	
1,2,3,6,7,8-HxCDF	0 / 2	0.00000001 - 0.00000001		0.00000005											0.00000005 U	
1,2,3,7,8,9-HxCDD	1 / 2	0.00000001 - 0.00000001	0.000000051 ; 0.000000051	0.00000028											0.00000028 U	
1,2,3,7,8,9-HxCDF	0 / 2	0.00000001 - 0.00000001		0.00000005											0.00000005 U	
1,2,3,7,8-PeCDD	1 / 2	0.00000001 - 0.00000001	0.000000046 ; 0.000000046	0.00000028											0.00000028 U	
1,2,3,7,8-PeCDF	0 / 2	0.00000001 - 0.00000001		0.00000005											0.00000005 U	
2,3,4,6,7,8-HxCDF	0 / 2	0.00000001 - 0.00000001		0.00000005											0.00000005 U	
2,3,4,7,8-PeCDF	0 / 2	0.00000001 - 0.00000001		0.00000005											0.00000005 U	
2,3,7,8-TCDD	1 / 2	0.00000002 - 0.00000002	0.000000031 ; 0.000000031	0.00000021			5E-11	5.1E-11		0.0000000005	0.000000051				0.00000002 U	
2,3,7,8-TCDF	1 / 2	0.00000002 - 0.00000002	0.000000089 ; 0.000000089	0.00000050											0.00000002 U	
OCDD	2 / 2		0.00000032 ; 0.00000032	0.00000034											0.00000034 B	
OCDF	0 / 2	0.00000002 - 0.00000002		0.0000001											0.00000002 U	
Dioxin Toxicity Equivalent (USEPA, 2010)	2 / 2			0.00000012 ; 0.00000012	0.00000081										0.00000012	
Total HpCDD	2 / 2			0.00000061 ; 0.00000061	0.00000072										0.00000072 B	
Total HpCDF	2 / 2			0.00000013 ; 0.00000013	0.00000021										0.00000021 J	
Total HxCDD	1 / 2	0.00000001 - 0.00000001	0.000000064 ; 0.000000064	0.00000035												

Table 4.1
 Summary of Analytical Results for Surface Water - Inner Cove
 Phase II Area - Mashapaug Pond and Cove
 Former Gorham Manufacturing Facility
 333 Adelaide Avenue
 Providence, Rhode Island

Parameter	Frequency of Detection	Range of Reporting Limits for Non Detects	Range of Detected Concentrations	Average [1]	RIDEM AWQC	RIDEM AWQC	RIDEM AWQC	RIDEM AWQC	NRWQC Fresh	NRWQC Fresh	NRWQC Water	NRWQC	SW16	SW17	SW18	SW19	SW20
					Fresh Water Acute [2]	Fresh Water Chronic [2]	Water plus Organisms [2]	Organisms Only [2]	Water Acute [3]	Water Chronic [3]	plus Organisms [3]	Organisms Only [3]	6/21/2006	6/21/2006	6/21/2006	6/21/2006	6/21/2006
Total PCDD	1 / 2	0.00000001 - 0.00000001	0.000000046 : 0.000000046	0.000000026													0.00000001 U
Total PCDF	1 / 2	0.00000001 - 0.00000001	0.000000029 : 0.000000029	0.000000017													0.00000001 U
Total TCDD	1 / 2	0.000000002 - 0.000000002	0.0000000031 : 0.0000000031	0.0000000021													0.000000002 U
Total TCDF	2 / 2		0.0000000034 : 0.0000000032	0.0000000018													0.0000000034 U
Metals, Total (6) (mg/L)																	
Antimony	0 / 12	0.005 - 0.005		0.0025	0.45	0.01	0.0056	0.84			0.0056	640	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Arsenic	0 / 12	0.005 - 0.005		0.0025	0.34	0.15	0.00018	0.0014	0.34	0.15	0.000018	0.14	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Barium	0 / 12	0.05 - 0.05		0.025							1		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Beryllium	0 / 12	0.001 - 0.001		0.0005	0.0075	0.00017					0.001		0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium	0 / 12	0.005 - 0.005		0.0025	0.0016	0.00021			0.002	0.00025			0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chromium	3 / 12	0.02 - 0.02	0.034 : 0.08	0.019	0.48	0.062					0.02		0.02 U	0.02 U	0.06	0.02 U	0.02 U
Copper	5 / 12	0.02 - 0.02	0.023 : 0.126	0.035	0.011	0.0075	1.3		0.013	0.009	1.3		0.02 U	0.02 U	0.099	0.02 U	0.02 U
Lead	5 / 12	0.005 - 0.005	0.0083 : 0.0318	0.011	0.051	0.0022			0.005	0.0025			0.005 U	0.005 U	0.0318	0.0121	0.005 U
Mercury	0 / 12	0.0005 - 0.0005		0.00025	0.0014	0.00077	0.0014	0.00015	0.0014	0.00077			0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Nickel	0 / 12	0.05 - 0.05		0.025	0.39	0.044	0.61	4.6	0.47	0.052	0.61	4600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Selenium	0 / 12	0.05 - 0.05		0.025	0.02	0.005	0.17	4.2		0.005	0.17	4200	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Silver	3 / 12	0.005 - 0.005	0.005 : 0.008	0.0005	0.0024				0.0032				0.005 U	0.005 U	0.008	0.005 U	0.005 U
Thallium	0 / 12	0.002 - 0.002		0.001	0.046	0.001	0.00024	0.00047			0.00024	0.47	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Zinc	4 / 12	0.05 - 0.05	0.068 : 0.146	0.051	0.098	0.099	7.4	26	0.12	0.12	7.4	26000	0.05 U	0.05 U	0.107	0.068	0.05 U
Metals, Dissolved (6) (mg/L)																	
Antimony	0 / 12	0.005 - 0.005		0.0025	0.45	0.01	0.0056	0.84			0.0056	640	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Arsenic	0 / 12	0.005 - 0.005		0.0025	0.34	0.15	0.00018	0.0014	0.34	0.15	0.000018	0.14	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Barium	0 / 12	0.05 - 0.05		0.025							1		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Beryllium	0 / 12	0.001 - 0.001		0.0005	0.0075	0.00017					0.001		0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium	0 / 12	0.005 - 0.005		0.0025	0.0016	0.00021			0.002	0.00025			0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chromium	0 / 12	0.02 - 0.02		0.01	0.48	0.062					0.02		0.02 U	0.02 U	0.06	0.02 U	0.02 U
Copper	0 / 12	0.02 - 0.02		0.01	0.011	0.0075	1.3		0.013	0.009	1.3		0.02 U	0.02 U	0.099	0.02 U	0.02 U
Lead	0 / 12	0.005 - 0.005		0.0025	0.051	0.0020			0.005	0.0025			0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Mercury	0 / 12	0.0005 - 0.0005		0.00025	0.0014	0.00077	0.0014	0.00015	0.0014	0.00077			0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Nickel	0 / 12	0.05 - 0.05		0.025	0.39	0.044	0.61	4.6	0.47	0.052	0.61	4600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Selenium	0 / 12	0.05 - 0.05		0.025	0.02	0.005	0.17	4.2		0.005	0.17	4200	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Silver	0 / 12	0.005 - 0.005		0.0025	0.0024				0.0032				0.005 U	0.005 U	0.008	0.005 U	0.005 U
Thallium	0 / 12	0.002 - 0.002		0.001	0.046	0.001	0.00024	0.00047			0.00024	0.47	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Zinc	0 / 12	0.05 - 0.05		0.025	0.098	0.099	7.4	26	0.12	0.12	7.4	26000	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Inorganics (mg/L)																	
Hardness	12 / 12		73.6 : 87.3	81									78.4	73.6	87.3	76.1	77.3

Notes:
 [1] Average calculated using 1/2 the reporting limit for non-detects
 [2] Values are the 2009 RIDEM Ambient Water Quality Criteria
<http://www.dem.n.gov/pub/regs/regs/water/h2oq10.pdf>
 [3] Values are the National Recommended Water Quality Criteria from USEPA.
<http://water.epa.gov/infect/swguidance/standards/criteria/current/index.cfm>
 [4] RIDEM AWQC values for Total Xylene was used for o-Xylenes and m,p-Xylenes
 [5] RIDEM AWQC values for Total PCBs was used for individual Aroclor mixtures
 [6] RIDEM AWQC values for Cadmium, Chromium (Chromium III) was used for Chromium, Copper, Lead, Nickel and Zinc were calculated for acute (CF x e^m x [In Hardness] + b₁) and chronic (CF x e^m x [In Hardness] + b₂) values for dissolved metals using the average hardness concentration. Values were also used for total metals
 mg/L - milligram per liter
 U - not detected, value is reporting limit
 J - value is estimated
 B - analyte detected in sample and the associated blank
 E - PCDE interference

Table 4.1
 Summary of Analytical Results for Surface Water - Inner Cove
 Phase II Area - Mashapaug Pond and Cove
 Former Gorham Manufacturing Facility
 333 Adelaide Avenue
 Providence, Rhode Island

Parameter	SW21 6/21/2006	SW22 6/21/2006	SW23 6/21/2006	SW24 6/21/2006	SW25 6/22/2006	SW26 6/21/2006	SW27 6/22/2006
Volatile Organic Compounds (mg/L)							
1,1,1,2-Tetrachloroethane	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1,1-Trichloroethane	0.0012	0.001	0.001	0.0013	0.0018	0.0015	0.0018
1,1,2,2-Tetrachloroethane	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
1,1,2-Trichloroethane	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1-Dichloroethane	0.001 U	0.001 U	0.001 U	0.001 U	0.0012	0.001	0.0013
1,1-Dichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1-Dichloropropene	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
1,2,3-Trichlorobenzene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2,3-Trichloropropane	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2,4-Trichlorobenzene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2,4-Trimethylbenzene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.0011
1,2-Dibromo-3-chloropropane	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dibromoethane (EDB)	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dichlorobenzene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dichloroethane	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dichloropropene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,3,5-Trimethylbenzene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,3-Dichlorobenzene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,3-Dichloropropene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,4-Dichlorobenzene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,4-Dioxane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1-Chlorobenzene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
2,2-Dichloropropane	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
2-Butanone	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
2-Chlorotoluene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
2-Hexanone	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
4-Chlorotoluene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
4-Propyltoluene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
4-Methyl-2-Pentanone	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Acetone	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Benzene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromobenzene	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Bromochloromethane	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromodichloromethane	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromodom	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromomethane	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Carbon disulfide	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Carbon tetrachloride	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Chlorobenzene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Chloroethane	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Chloroform	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Chloromethane	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
cis-1,2-Dichloroethene	0.0054	0.0044	0.0044	0.0059	0.0045	0.0025	0.0054
cis-1,3-Dichloropropene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Dibromochloromethane	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Dibromomethane	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Dichlorodifluoromethane	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Diethyl ether	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Diisopropyl ether	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Ethyl tertiary-butyl ether	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Ethylbenzene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001
Hexachlorobutadiene	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U
Isopropylbenzene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
m,p-Xylene [4]	0.002 U	0.002 U	0.002 U	0.002 U	0.0023	0.002	0.0028
Methylene chloride	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Methyl- <i>t</i> -butyl ether	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Naphthalene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
n-Butylbenzene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
n-Propyl Benzene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
o-Xylene [4]	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.0012
sec-Butylbenzene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Styrene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
tert-Butylbenzene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Tertiary amyl methyl ether	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Tetrachloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Tetrahydrofuran	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Toluene	0.0011	0.0014	0.0019	0.0029	0.0033	0.0015	0.0041
trans-1,2-Dichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
trans-1,3-Dichloropropene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Trichloroethene	0.0016	0.0013	0.0017	0.0014	0.0012	0.001	0.0014
Trichlorofluoromethane	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Vinyl acetate	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Vinyl chloride	0.0013	0.0011	0.001	0.0018	0.0015	0.001 U	0.002
Xylenes, Total	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.004

Table 4.1
 Summary of Analytical Results for Surface Water - Inner Cove
 Phase II Area - Mashapaug Pond and Cove
 Former Gorham Manufacturing Facility
 333 Adelaide Avenue
 Providence, Rhode Island

Parameter	SW21 6/21/2006	SW22 6/21/2006	SW23 6/21/2006	SW24 6/21/2006	SW25 6/22/2006	SW26 6/21/2006	SW27 6/22/2006
Semi-Volatile Organic Compounds (mg/L)							
2-Methylnaphthalene	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Acenaphthene	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Acenaphthylene	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Anthracene	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Benzofluoranthene	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Benzofluoranthene	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Benzofluoranthene	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Benzofluoranthene	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U
Chrysene	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Dibenzofluoranthene	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Fluoranthene	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Fluorene	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Indeno(1,2,3-cd)pyrene	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U	0.0003 U
Naphthalene	0.0002 U	0.0002 U	0.0002 U	0.0003 U	0.0002 U	0.0002 U	0.0002 U
Phenanthrene	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Pyrene	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Pesticides (mg/L)							
4,4'-DDD							0.0005 U
4,4'-DDE							0.0005 U
4,4'-DDT							0.0005 U
Aldrin							0.0005 U
alpha-BHC							0.0005 U
alpha-Chlordane							0.0005 U
beta-BHC							0.0005 U
Chlordane							0.0005 U
delta-BHC							0.0005 U
Dieldrin							0.0005 U
Endosulfan I							0.0005 U
Endosulfan II							0.0005 U
Endosulfan sulfate							0.0005 U
Erdrin							0.0005 U
Erdrin aldehyde							0.0005 U
Erdrin ketone							0.0005 U
gamma-BHC (lindane)							0.0005 U
gamma-Chlordane							0.0005 U
Heptachlor							0.0005 U
Heptachlor epoxide							0.0005 U
Hexachlorobenzene							0.0005 U
Methoxychlor							0.0005 U
Toxaphene							0.002 U
Polychlorinated Biphenyls (PCB) (mg/L)							
Aroclor-1016							0.0001 U
Aroclor-1221							0.0001 U
Aroclor-1232							0.0001 U
Aroclor-1242							0.0001 U
Aroclor-1248							0.0001 U
Aroclor-1254							0.0001 U
Aroclor-1260							0.0001 U
Aroclor-1262							0.0001 U
Aroclor-1268							0.0001 U
Dioxins/Furans (mg/L)							
1,2,3,4,6,7,8-HpCDD							0.000000043 BJ
1,2,3,4,6,7,8-HpCDF							0.00000001 U
1,2,3,4,7,8,9-HxCDD							0.00000001 U
1,2,3,4,7,8,9-HxCDF							0.00000001 U
1,2,3,6,7,8-HxCDD							0.00000013 J
1,2,3,6,7,8-HxCDF							0.00000001 U
1,2,3,7,8,9-HxCDD							0.00000051 J
1,2,3,7,8,9-HxCDF							0.00000001 U
1,2,3,7,8-PeCDD							0.000000046 J
1,2,3,7,8-PeCDF							0.00000001 U
2,3,4,6,7,8-HxCDD							0.00000001 U
2,3,4,6,7,8-HxCDF							0.00000001 U
2,3,7,8-TCDF							0.000000031 J
2,3,7,8-TCDF							0.000000031 J
OCDD							0.00000035 B
OCDF							0.00000002 U
Dioxin Toxicity Equivalent (USEPA, 2010)							
Total HpCDD							0.00000061
Total HpCDF							0.00000061 B
Total HxCDD							0.00000013 J
Total HxCDF							0.00000064
Total TCDF							0.00000001 U

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Table 4.1
 Summary of Analytical Results for Surface Water - Inner Cove
 Phase II Area - Mashapaug Pond and Cove
 Former Gorham Manufacturing Facility
 333 Adelaide Avenue
 Providence, Rhode Island

Parameter	SW21 6/21/2006	SW22 6/21/2006	SW23 6/21/2006	SW24 6/21/2006	SW25 6/22/2006	SW26 6/21/2006	SW27 6/22/2006
Total PeCDD							0.00000046 J
Total PeCDF							0.000000029 J
Total TCDD							0.000000031 J
Total TCDF							0.000000032 J
Metals, Total [6] (mg/L)							
Antimony	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Arsenic	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Barium	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Beryllium	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chromium	0.034	0.046	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Copper	0.071	0.126	0.023	0.02 U	0.02 U	0.02 U	0.02 U
Lead	0.0258	0.0309	0.0083	0.005 U	0.005 U	0.005 U	0.005 U
Mercury	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Nickel	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Selenium	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Silver	0.005	0.006	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Thallium	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Zinc	0.089	0.146	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Metals, Dissolved [6] (mg/L)							
Antimony	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Arsenic	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Barium	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Beryllium	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chromium	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Copper	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Lead	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Mercury	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Nickel	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Selenium	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Silver	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Thallium	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Zinc	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Inorganics (mg/L)							
Hardness	86.7	86.7	86.6	83.4	77.7	73.7	80

Notes:
 [1] Average calculated using 1/2 the reporting limit for non-detects
 [2] Values are the 2009 RI DEM Ambient Water Quality Criteria
<http://www.dem.ri.gov/pub/regs/regs/water/h2oq10.pdf>
 [3] Values are the National Recommended Water Quality Criteria from USEPA.
<http://water.epa.gov/scitech/sfguidance/stan/darc/criteria/criteriaindex.cfm>
 [4] RI DEM AWQC values for Total Xylene was used for o-Xylenes and m,p-Xylenes
 [5] RI DEM AWQC values for Total PCBs was used for individual Aroclor mixtures
 [6] RI DEM AWQC values for Cadmium, Chromium (Chromium III was used for Chromium), Copper, Lead, Nickel and Zinc were calculated for acute (CF x e^{-m} x [ln Hardness] + b₁) and chronic (CF x e^{-m} x [ln Hardness] + b₂) values for dissolved metals using the average hardness concentration. Values were also used for total metals
 mg/L - milligram per liter
 U - not detected, value is reporting limit
 J - value is estimated
 B - analyte detected in sample and the associated blank
 E - PCDE interference

Prepared By: EYM 12/6/12
 Checked By: KJC 12/6/12

Table 4.2
Summary of Analytical Results for Surface Water - Outer Cove Study Area
Phase II Area - Mashapaug Pond and Cove
Former Gorham Manufacturing Facility
333 Adelaide Avenue
Providence, Rhode Island

Parameter	Frequency of Detection	Range of Reporting Limits for Non Detects	Range of Detected Concentrations	Average [1]	RIDEM AWQC Fresh Water Acute [2]	RIDEM AWQC Fresh Water Chronic [2]	RIDEM AWQC Water plus Organisms [2]	RIDEM AWQC Organisms Only [2]	NRWQC Fresh Water Acute [3]	NRWQC Fresh Water Chronic [3]	NRWQC Water plus Organisms [3]	NRWQC Organisms Only [3]	SW11 6/21/2006	SW-33 12/19/2011	SW-34 12/20/2011	SW-35 12/16/2011	SW-36 12/14/2011	
Total PeCDD	0 / 1	0.00000001 - 0.00000001		0.00000005									0.00000001 U					
Total PeCDF	0 / 1	0.00000001 - 0.00000001		0.00000005									0.00000001 U					
Total TCDD	0 / 1	0.000000021 - 0.000000021		0.000000011									0.000000021 U					
Total TCDF	0 / 1	0.000000021 - 0.000000021		0.000000011									0.000000021 U					
Metals, Total (6)(mg/L)																		
Antimony	0 / 19	0.0025 - 0.005		0.0013	0.45	0.01	0.0056	0.64			0.0056	640	0.005 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	
Arsenic	0 / 19	0.0025 - 0.005		0.0013	0.34	0.15	0.00018	0.0014	0.34	0.15	0.000018	0.14	0.005 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	
Barium	0 / 1	0.05 - 0.05		0.025							1		0.05 U					
Beryllium	0 / 19	0.0005 - 0.001		0.00028	0.0075	0.00017					0.0017	0.001 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	
Cadmium	0 / 19	0.0025 - 0.005		0.0013	0.0013	0.00018			0.002	0.00025			0.005 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	
Chromium	0 / 19	0.01 - 0.02		0.0053	0.39	0.051							0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	
Copper	2 / 19	0.01 - 0.02	0.02 - 0.15	0.014	0.0087	0.0060	1.3		0.013	0.009	1.3		0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	
Lead	0 / 19	0.005 - 0.01		0.0049	0.039	0.0016			0.065	0.0025			0.005 U	0.01 U	0.01 U	0.01 U	0.01 U	
Mercury	0 / 19	0.0005 - 0.0005		0.00025	0.0014	0.00077	0.00014	0.00015	0.0014	0.00077			0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	
Nickel	0 / 19	0.025 - 0.05		0.013	0.316742764	0.035180342	0.61	4.6	0.47	0.052	0.61	4600	0.05 U	0.025 U	0.025 U	0.025 U	0.025 U	
Selenium	0 / 19	0.025 - 0.05		0.013	0.02	0.005	0.17	4.2	0.02	0.005	0.17	4200	0.05 U	0.025 U	0.025 U	0.025 U	0.025 U	
Silver	0 / 19	0.025 - 0.005		0.0025	0.00155842				0.0032				0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	
Thallium	0 / 19	0.001 - 0.002		0.00053	0.046	0.001	0.00024	0.00047			0.00024	0.47	0.002 U	0.001 U	0.001 U	0.001 U	0.001 U	
Zinc	11 / 19	0.025 - 0.05	0.026 - 0.059	0.025	0.079220289	0.079868308	7.4	26	0.12	0.12	7.4	26000	0.05 U	0.025 U	0.025 U	0.025 U	0.025 U	
Metals, Dissolved (6) (mg/L)																		
Antimony	0 / 19	0.0025 - 0.005		0.0013	0.45	0.01	0.0056	0.64			0.0056	640	0.005 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	
Arsenic	0 / 19	0.0025 - 0.005		0.0013	0.34	0.15	0.00018	0.0014	0.34	0.15	0.000018	0.14	0.005 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	
Barium	0 / 1	0.05 - 0.05		0.025							1		0.05 U					
Beryllium	0 / 19	0.0005 - 0.001		0.00028	0.0075	0.00017					0.0017	0.001 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	
Cadmium	0 / 19	0.0025 - 0.005		0.0013	0.0013	0.00018			0.002	0.00025			0.005 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	
Chromium	0 / 19	0.01 - 0.02		0.0053	0.39	0.051							0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	
Copper	0 / 19	0.01 - 0.02		0.0053	0.0087	0.0060	1.3		0.013	0.009	1.3		0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	
Lead	0 / 19	0.005 - 0.01		0.0049	0.039	0.0016			0.065	0.0025			0.005 U	0.01 U	0.01 U	0.01 U	0.01 U	
Mercury	0 / 19	0.0005 - 0.0005		0.00025	0.0014	0.00077	0.00014	0.00015	0.0014	0.00077			0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	
Nickel	0 / 19	0.025 - 0.05		0.013	0.32	0.035	0.61	4.6	0.47	0.052	0.61	4600	0.05 U	0.025 U	0.025 U	0.025 U	0.025 U	
Selenium	0 / 19	0.025 - 0.05		0.013	0.02	0.005	0.17	4.2	0.02	0.005	0.17	4200	0.05 U	0.025 U	0.025 U	0.025 U	0.025 U	
Silver	0 / 19	0.025 - 0.005		0.0025	0.00155842				0.0032				0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	
Thallium	0 / 19	0.0015 - 0.002		0.00076	0.046	0.001	0.00024	0.00047			0.00024	0.47	0.002 U	0.0015 U	0.0015 U	0.0015 U	0.0015 U	
Zinc	9 / 19	0.025 - 0.05	0.025 - 0.032	0.021	0.079	0.080	7.4	26	0.12	0.12	7.4	26000	0.05 U	0.025 U	0.025 U	0.031	0.025 U	
Inorganics (mg/L)																		
Dissolved Organic Carbon	18 / 18			2.7	4.8									2.6 B	2.6 B		3.7	3.8
Hardness	19 / 19		58.5 - 171.9	63										61.1	60.1		65.7	67.2

Notes:
[1] Average calculated using 1/2 the reporting limit for non-detects
[2] Values are the 2009 RIDEM Ambient Water Quality Criteria.
<http://www.dem.ri.gov/pub/regs/water/tb0010.pdf>
[3] Values are the National Recommended Water Quality Criteria from USEPA.
<http://water.epa.gov/controlling/wq/criteria/criteria/current/index.cfm>
[4] RIDEM AWQC values for Total Xylene was used for o-Xylenes and m,p-Xylenes
[5] RIDEM AWQC values for Total PCBs was used for individual Aroclor mixtures
[6] RIDEM AWQC values for Cadmium, Chromium (Chromium III) was used for Chromium, Copper, Lead, Nickel and Zinc were calculated for acute (CF × e^{1/n} × [ln Hardness] + b₁) and chronic (CF × e^{1/n} × [ln Hardness] + b₂) values for dissolved metals using the average hardness concentration. Values were also used for total metals
mg/L - milligram per liter
U - not detected, value is reporting limit
J - value is estimated
B - analyte detected in sample and the associated blank
A - detection limit based on signal-to-noise measurement

Table 4.2
 Summary of Analytical Results for Surface Water - Outer Cove Study Area
 Phase II Area - Mashapaug Pond and Cove
 Former Gorham Manufacturing Facility
 333 Adelaide Avenue
 Providence, Rhode Island

Parameter	SW-37 12/15/2011	SW-38 12/13/2011	SW-39 12/14/2011	SW-40 12/16/2011	SW-41 12/15/2011	SW-42 12/19/2011	SW-43 12/19/2011	SW-44 12/15/2011	SW-45 12/14/2011	SW-46 12/20/2011	SW-47 12/16/2011	SW-48 12/14/2011	SW-59 12/20/2011	SW-60 12/20/2011
Volatile Organic Compounds (mg/L)														
1,1,1,2-Tetrachloroethane														
1,1,1-Trichloroethane														
1,1,2,2-Tetrachloroethane														
1,1,2-Trichloroethane														
1,1-Dichloroethane														
1,1-Dichloroethene														
1,1-Dichloropropene														
1,2,3-Trichlorobenzene														
1,2,3-Trichloropropane														
1,2,4-Trichlorobenzene														
1,2,4-Trimethylbenzene														
1,2-Dibromo-3-chloropropane														
1,2-Dibromoethane (EDB)														
1,2-Dichlorobenzene														
1,2-Dichloroethane														
1,2-Dichloropropane														
1,3,5-Trimethylbenzene														
1,3-Dichlorobenzene														
1,3-Dichloropropane														
1,4-Dichlorobenzene														
1,4-Dioxane														
1-Chlorobenzene														
2,2-Dichloropropane														
2-Butanone														
2-Chlorotoluene														
2-Hexanone														
4-Chlorotoluene														
4-Isopropyltoluene														
4-Methyl-2-Pentanone														
Acetone														
Benzene														
Bromobenzene														
Bromochloromethane														
Bromodichloromethane														
Bromofom														
Bromomethane														
Carbon disulfide														
Carbon tetrachloride														
Chlorobenzene														
Chloroethane														
Chloroform														
Chloromethane														
cis-1,2-Dichloroethene														
cis-1,3-Dichloropropene														
Dibromochloromethane														
Dibromomethane														
Dichlorodifluoromethane														
Diethyl ether														
Diisopropyl ether														
Ethyl isobutyl ether														
Ethylbenzene														
Hexachlorobutadiene														
Isopropylbenzene														
m,p-Xylene [4]														
Methylene chloride														
Methyl isobutyl ether														
Naphthalene														
n-Butylbenzene														
n-Propyl Benzene														
o-Xylene [4]														
sec-Butylbenzene														
Styrene														
tert-Butylbenzene														
Tertiary amyl methyl ether														
Tetrachloroethene														
Tetrahydrofuran														
Toluene														
trans-1,2-Dichloroethene														
trans-1,3-Dichloropropene														
Trichloroethene														
Trichlorofluoromethane														
Vinyl acetate														
Vinyl chloride														
Xylenes, Total														

Table 4.2
 Summary of Analytical Results for Surface Water - Outer Cove Study Area
 Phase II Area - Mashapaug Pond and Cove
 Former Gorham Manufacturing Facility
 333 Adelaide Avenue
 Providence, Rhode Island

Parameter	SW-37 12/15/2011	SW-38 12/13/2011	SW-39 12/14/2011	SW-40 12/16/2011	SW-41 12/15/2011	SW-42 12/13/2011	SW-43 12/19/2011	SW-44 12/15/2011	SW-45 12/14/2011	SW-46 12/20/2011	SW-47 12/16/2011	SW-48 12/14/2011	SW-59 12/20/2011	SW-60 12/20/2011
Semi-Volatile Organic Compounds (mg/L)														
2-Methylnaphthalene														
Acenaphthene														
Acenaphthylene														
Anthracene														
Benzo(a)anthracene														
Benzo(a)pyrene														
Benzo(b)fluoranthene														
Benzo(g,h,i)perylene														
Benzo(k)fluoranthene														
Chrysene														
Dibenz(a,h)anthracene														
Fluoranthene														
Fluorene														
Indeno(1,2,3-cd)pyrene														
Naphthalene														
Phenanthrene														
Pyrene														
Pesticides (mg/L)														
4,4'-DDD														
4,4'-DDE														
4,4'-DDT														
Aldrin														
alpha-BHC														
alpha-Chlordane														
beta-BHC														
Chlordane														
delta-BHC														
Delalin														
Endosulfan I														
Endosulfan II														
Endosulfan sulfate														
Endrin														
Endrin aldehyde														
Endrin ketone														
gamma-BHC (Lindane)														
gamma-Chlordane														
Heptachlor														
Heptachlor epoxide														
Hexachlorobenzene														
Methoxychlor														
Toxaphene														
Polychlorinated Biphenyls (9) (mg/L)														
Aroclor-1016														
Aroclor-1221														
Aroclor-1232														
Aroclor-1242														
Aroclor-1248														
Aroclor-1254														
Aroclor-1260														
Aroclor-1262														
Aroclor-1268														
Dioxins/Furans (pg/L)														
1,2,3,4,6,7,8-HpCDD														
1,2,3,4,6,7,8-HpCDF														
1,2,3,4,7,8,9-HpCDD														
1,2,3,4,7,8,9-HxCDD														
1,2,3,4,7,8-HxCDF														
1,2,3,6,7,8-HxCDD														
1,2,3,6,7,8-HxCDF														
1,2,3,7,8,9-HxCDD														
1,2,3,7,8,9-HxCDF														
1,2,3,7,8-PeCDD														
1,2,3,7,8-PeCDF														
2,3,4,6,7,8-HxCDF														
2,3,4,7,8-PeCDF														
2,3,7,8-TCDD														
2,3,7,8-TCDF														
OCDD														
OCDF														
Dioxin Toxicity Equivalent (USEPA, 2010)														
Total HpCDD														
Total HpCDF														
Total HxCDD														
Total HxCDF														

Table 4.2
 Summary of Analytical Results for Surface Water - Outer Cove Study Area
 Phase II Area - Mashapaug Pond and Cove
 Former Gorham Manufacturing Facility
 333 Adelaide Avenue
 Providence, Rhode Island

Parameter	SW-37 12/15/2011	SW-38 12/13/2011	SW-39 12/14/2011	SW-40 12/16/2011	SW-41 12/15/2011	SW-42 12/13/2011	SW-43 12/19/2011	SW-44 12/15/2011	SW-45 12/14/2011	SW-46 12/20/2011	SW-47 12/16/2011	SW-48 12/14/2011	SW-59 12/20/2011	SW-60 12/20/2011
Total PeCDD														
Total TCDD														
Total TCDF														
Metals, Total (6)(mg/L)														
Antimony	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U
Arsenic	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U
Barium														
Beryllium	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Cadmium	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U
Chromium	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Copper	0.01 U	0.01 U	0.01 U	0.01 U	0.15	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02	0.01 U	0.01 U	0.01 U
Lead	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Mercury	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Nickel	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Selenium	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Silver	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Thallium	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Zinc	0.029	0.025 U	0.028	0.027	0.059	0.025 U	0.025 U	0.03	0.025 U	0.033	0.037	0.025 U	0.029	0.025 U
Metals, Dissolved (6)(mg/L)														
Antimony	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U
Arsenic	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U
Barium														
Beryllium	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Cadmium	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0025 U
Chromium	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Copper	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Lead	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Mercury	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Nickel	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Selenium	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Silver	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Thallium	0.0015 U	0.0015 U	0.0015 U	0.0015 U	0.0015 U	0.0015 U	0.0015 U	0.0015 U	0.0015 U	0.0015 U	0.0015 U	0.0015 U	0.0015 U	0.0015 U
Zinc	0.028	0.025 U	0.025 U	0.028	0.031	0.025 U	0.029	0.032	0.025 U	0.025	0.025	0.025 U	0.032	0.025 U
Inorganics (mg/L)														
Dissolved Organic Carbon	4	4.8	3.7	4.3	4	4	2.9 B	3.8	3.8	2.8 B	3.7	4	2.8 B	2.7 B
Hardness	60.7	60.7	65.7	58.5	61.4	60.1	61.4	60.4	65.6	61.5	60.4	65.5	59.3	61.9

Notes:
 [1] Average calculated using 1/2 the reporting limit for non-detects
 [2] Values are the 2009 RIDEM Ambient Water Quality Criteria.
<http://www.dem.ri.gov/pubs/regs/water/wqcr10.pdf>
 [3] Values are the National Recommended Water Quality Criteria from USEPA.
<http://water.epa.gov/criteria/wqcr/criteria/criteria/criteria/current/index.cfm>
 [4] RIDEM AWQC values for Total Xylene was used for o-Xylenes and m,p-Xylenes
 [5] RIDEM AWQC values for Total PCBs was used for individual Aroclor mixtures
 [6] RIDEM AWQC values for Cadmium, Chromium (Chromium III) was used for Chromium, Copper, Lead, Nickel and Zinc were calculated for acute (CF x e^{-m} × [In Hardness] + b₁) and chronic (CF x e^{-m} × [In Hardness] + b₂) values for dissolved metals using the average hardness concentration. Values were also used for total metals
 mg/L - milligram per liter
 U - not detected, value is reporting limit
 J - value is estimated
 B - analyte detected in sample and the associated blank
 A - detection limit based on signal-to-noise measurement

Prepared by: EYM 12/6/12
 Checked by: KJC 12/6/12

Table 4.3
 Summary of Analytical Results for Surface Water - Remainder of the Pond
 Phase II Area - Mashapaug Pond and Cove
 Former Gorham Manufacturing Facility
 333 Adelaide Avenue
 Providence, Rhode Island

Parameter	Frequency of Detection	Range of Reporting Limits for Non Detects	Range of Detected Concentrations	Average [1]	RIDEM AWQC Fresh Water Acute [2]	RIDEM AWQC Fresh Water Chronic [2]	RIDEM AWQC Water plus Organisms [2]	RIDEM AWQC Organisms Only [2]	NRWQC Fresh Water Acute [3]	NRWQC Fresh Water Chronic [3]	NRWQC Water plus Organisms [3]	NRWQC Organisms Only [3]	SW10 6/21/2006	SW12 6/21/2006
Volatile Organic Compounds (mg/L)														
1,1,1,2-Tetrachloroethane	0 / 2	0.001 - 0.001		0.0005	0.98	0.022							0.001 U	0.001 U
1,1,1-Trichloroethane	0 / 2	0.001 - 0.001		0.0005									0.001 U	0.001 U
1,1,2,2-Tetrachloroethane	0 / 2	0.0005 - 0.0005		0.00025	0.466	0.01	0.0017	0.04			0.00017	4	0.0005 U	0.0005 U
1,1,2-Trichloroethane	0 / 2	0.001 - 0.001		0.0005	0.9	0.02	0.0059	0.16			0.00059	16	0.001 U	0.001 U
1,1-Dichloroethane	0 / 2	0.001 - 0.001		0.0005									0.001 U	0.001 U
1,1-Dichloroethene	0 / 2	0.001 - 0.001		0.0005	0.58	0.013	0.33	7.1			0.33	7100	0.001 U	0.001 U
1,1-Dichloropropene	0 / 2	0.002 - 0.002		0.001									0.002 U	0.002 U
1,2,3-Trichlorobenzene	0 / 2	0.001 - 0.001		0.0005									0.001 U	0.001 U
1,2,3-Trichloropropane	0 / 2	0.001 - 0.001		0.0005									0.001 U	0.001 U
1,2,4-Trichlorobenzene	0 / 2	0.001 - 0.001		0.0005	0.075	0.0017	0.035	0.07			0.035	70	0.001 U	0.001 U
1,2,4-Trimethylbenzene	0 / 2	0.001 - 0.001		0.0005									0.001 U	0.001 U
1,2-Dibromo-3-chloropropane	0 / 2	0.005 - 0.005		0.0025									0.005 U	0.005 U
1,2-Dibromoethane (EDB)	0 / 2	0.001 - 0.001		0.0005									0.001 U	0.001 U
1,2-Dichlorobenzene	0 / 2	0.001 - 0.001		0.0005	0.079	0.0018	0.42	1.3			0.42	1300	0.001 U	0.001 U
1,2-Dichloroethane	0 / 2	0.001 - 0.001		0.0005	5.9	0.131	0.0038	0.37			0.00038	37	0.001 U	0.001 U
1,2-Dichloropropane	0 / 2	0.001 - 0.001		0.0005	2.625	0.058	0.005	0.15			0.0005	15	0.001 U	0.001 U
1,3,5-Trimethylbenzene	0 / 2	0.001 - 0.001		0.0005									0.001 U	0.001 U
1,3-Dichlorobenzene	0 / 2	0.001 - 0.001		0.0005	0.39	0.0087	0.32	0.96			0.32	960	0.001 U	0.001 U
1,3-Dichloropropane	0 / 2	0.001 - 0.001		0.0005	0.303	0.0067							0.001 U	0.001 U
1,4-Dichlorobenzene	0 / 2	0.001 - 0.001		0.0005	0.056	0.0012	0.063	0.19			0.063	190	0.001 U	0.001 U
1,4-Dioxane	0 / 2	0.5 - 0.5		0.25									0.5 U	0.5 U
1-Chlorohexane	0 / 2	0.001 - 0.001		0.0005									0.001 U	0.001 U
2,2-Dichloropropane	0 / 2	0.001 - 0.001		0.0005									0.001 U	0.001 U
2-Butanone	0 / 2	0.025 - 0.025		0.013									0.025 U	0.025 U
2-Chlorotoluene	0 / 2	0.001 - 0.001		0.0005									0.001 U	0.001 U
2-Hexanone	0 / 2	0.01 - 0.01		0.005									0.01 U	0.01 U
4-Chlorotoluene	0 / 2	0.001 - 0.001		0.0005									0.001 U	0.001 U
4-Isopropyltoluene	0 / 2	0.001 - 0.001		0.0005									0.001 U	0.001 U
4-Methyl-2-Pentanone	0 / 2	0.025 - 0.025		0.013									0.025 U	0.025 U
Acetone	0 / 2	0.025 - 0.025		0.013									0.025 U	0.025 U
Benzene	0 / 2	0.001 - 0.001		0.0005	0.265	0.0059	0.022	0.51			0.0022	51	0.001 U	0.001 U
Bromobenzene	0 / 2	0.002 - 0.002		0.001									0.002 U	0.002 U
Bromochloromethane	0 / 2	0.001 - 0.001		0.0005									0.001 U	0.001 U
Bromodichloromethane	0 / 2	0.001 - 0.001		0.0005			0.0055	0.17			0.00055	17	0.001 U	0.001 U
Bromoform	0 / 2	0.001 - 0.001		0.0005	1.465	0.033	0.043	1.4			0.0043	140	0.001 U	0.001 U
Bromomethane	0 / 2	0.002 - 0.002		0.001			0.047	1.5			0.047	1500	0.002 U	0.002 U
Carbon disulfide	0 / 2	0.001 - 0.001		0.0005									0.001 U	0.001 U
Carbon tetrachloride	0 / 2	0.001 - 0.001		0.0005	1.365	0.03	0.0023	0.016			0.00023	1.6	0.001 U	0.001 U
Chlorobenzene	0 / 2	0.001 - 0.001		0.0005	0.795	0.018	0.13	1.6			0.13	1600	0.001 U	0.001 U
Chloroethane	0 / 2	0.002 - 0.002		0.001									0.002 U	0.002 U
Chloroform	0 / 2	0.001 - 0.001		0.0005	1.445	0.032	0.057	4.7			0.0057	470	0.001 U	0.001 U
Chloromethane	0 / 2	0.002 - 0.002		0.001									0.002 U	0.002 U
cis-1,2-Dichloroethene	2 / 2		0.0015 - 0.0022	0.0019									0.0022	0.0015
cis-1,3-Dichloropropene	0 / 2	0.0005 - 0.0005		0.00025									0.0005 U	0.0005 U
Dibromochloromethane	0 / 2	0.001 - 0.001		0.0005			0.004	0.13			0.0004	13	0.001 U	0.001 U
Dibromomethane	0 / 2	0.001 - 0.001		0.0005									0.001 U	0.001 U
Dichlorodifluoromethane	0 / 2	0.002 - 0.002		0.001									0.002 U	0.002 U
Diethyl ether	0 / 2	0.001 - 0.001		0.0005									0.001 U	0.001 U
Diisopropyl ether	0 / 2	0.001 - 0.001		0.0005									0.001 U	0.001 U
Ethyl tertiary-butyl ether	0 / 2	0.001 - 0.001		0.0005									0.001 U	0.001 U
Ethylbenzene	0 / 2	0.001 - 0.001		0.0005	1.6	0.036	0.53	2.1			0.53	2100	0.001 U	0.001 U
Hexachlorobutadiene	0 / 2	0.0006 - 0.0006		0.0003			0.0044	0.18			0.00044	18	0.0006 U	0.0006 U

Table 4.3
 Summary of Analytical Results for Surface Water - Remainder of the Pond
 Phase II Area - Mashapaug Pond and Cove
 Former Gorham Manufacturing Facility
 333 Adelaide Avenue
 Providence, Rhode Island

Parameter	Frequency of Detection	Range of Reporting Limits for Non Detects	Range of Detected Concentrations	Average [1]	RIDEM AWQC Fresh Water Acute [2]	RIDEM AWQC Fresh Water Chronic [2]	RIDEM AWQC Water plus Organisms [2]	RIDEM AWQC Organisms Only [2]	NRWQC Fresh Water Acute [3]	NRWQC Fresh Water Chronic [3]	NRWQC Water plus Organisms [3]	NRWQC Organisms Only [3]	SW10 6/21/2006	SW12 6/21/2006
Isopropylbenzene	0 / 2	0.001 - 0.001		0.0005									0.001 U	0.001 U
m,p-Xylene [4]	0 / 2	0.002 - 0.002		0.001	0.133	0.003							0.002 U	0.002 U
Methylene chloride	0 / 2	0.005 - 0.005		0.0025	9.65	0.214	0.046	5.9			0.0046	590	0.005 U	0.005 U
Methyl-t-butyl ether	0 / 2	0.001 - 0.001		0.0005									0.001 U	0.001 U
Naphthalene	0 / 2	0.001 - 0.001		0.0005	0.115	0.0026							0.001 U	0.001 U
n-Butylbenzene	0 / 2	0.001 - 0.001		0.0005									0.001 U	0.001 U
n-Propyl Benzene	0 / 2	0.001 - 0.001		0.0005									0.001 U	0.001 U
o-Xylene [4]	0 / 2	0.001 - 0.001		0.0005	0.133	0.003							0.001 U	0.001 U
sec-Butylbenzene	0 / 2	0.001 - 0.001		0.0005									0.001 U	0.001 U
Styrene	0 / 2	0.001 - 0.001		0.0005									0.001 U	0.001 U
tert-Butylbenzene	0 / 2	0.001 - 0.001		0.0005									0.001 U	0.001 U
Tertiary-amyl methyl ether	0 / 2	0.001 - 0.001		0.0005									0.001 U	0.001 U
Tetrachloroethene	0 / 2	0.001 - 0.001		0.0005	0.24	0.0053	0.0069	0.033			0.00069	3.3	0.001 U	0.001 U
Tetrahydrofuran	0 / 2	0.005 - 0.005		0.0025									0.005 U	0.005 U
Toluene	0 / 2	0.001 - 0.001		0.0005	0.635	0.014	1.3	15			1.3	15000	0.001 U	0.001 U
trans-1,2-Dichloroethene	0 / 2	0.001 - 0.001		0.0005			0.14	10			0.14	10000	0.001 U	0.001 U
trans-1,3-Dichloropropene	0 / 2	0.0005 - 0.0005		0.00025									0.0005 U	0.0005 U
Trichloroethene	0 / 2	0.001 - 0.001		0.0005	1.95	0.043	0.025	0.3			0.0025	30	0.001 U	0.001 U
Trichlorofluoromethane	0 / 2	0.002 - 0.002		0.001									0.002 U	0.002 U
Vinyl acetate	0 / 2	0.005 - 0.005		0.0025									0.005 U	0.005 U
Vinyl chloride	0 / 2	0.001 - 0.001		0.0005			0.000025	0.0024			0.000025	2.4	0.001 U	0.001 U
Xylenes, Total	0 / 2	0.003 - 0.003		0.0015	0.133	0.003							0.003 U	0.003 U
Semi-Volatile Organic Compounds (mg/L)														
2-Methylnaphthalene	0 / 2	0.0002 - 0.0002		0.0001									0.0002 U	0.0002 U
Acenaphthene	0 / 2	0.0002 - 0.0002		0.0001	0.085	0.0019	0.67	0.99			0.67	990	0.0002 U	0.0002 U
Acenaphthylene	0 / 2	0.0002 - 0.0002		0.0001									0.0002 U	0.0002 U
Anthracene	0 / 2	0.0002 - 0.0002		0.0001			8.3	40			8.3	40000	0.0002 U	0.0002 U
Benzo(a)anthracene	0 / 2	0.0002 - 0.0002		0.0001			0.000038	0.00018			0.000038	0.018	0.0002 U	0.0002 U
Benzo(a)pyrene	0 / 2	0.0002 - 0.0002		0.0001			0.000038	0.00018			0.000038	0.018	0.0002 U	0.0002 U
Benzo(b)fluoranthene	0 / 2	0.0002 - 0.0002		0.0001			0.000038	0.00018			0.000038	0.018	0.0002 U	0.0002 U
Benzo(g,h,i)perylene	0 / 2	0.0002 - 0.0002		0.0001									0.0002 U	0.0002 U
Benzo(k)fluoranthene	0 / 2	0.0003 - 0.0003		0.00015			0.000038	0.00018			0.000038	0.018	0.0003 U	0.0003 U
Chrysene	0 / 2	0.0002 - 0.0002		0.0001			0.000038	0.00018			0.000038	0.018	0.0002 U	0.0002 U
Dibenzo(a,h)anthracene	0 / 2	0.0002 - 0.0002		0.0001			0.000038	0.00018			0.000038	0.018	0.0002 U	0.0002 U
Fluoranthene	0 / 2	0.0002 - 0.0002		0.0001	0.199	0.0044	0.13	0.14			0.13	140	0.0002 U	0.0002 U
Fluorene	0 / 2	0.0002 - 0.0002		0.0001			1.1	5.3			1.1	5300	0.0002 U	0.0002 U
Indeno(1,2,3-cd)pyrene	0 / 2	0.0003 - 0.0003		0.00015			0.000038	0.00018			0.000038	0.018	0.0003 U	0.0003 U
Naphthalene	0 / 2	0.0002 - 0.0002		0.0001	0.115	0.0026							0.0002 U	0.0002 U
Phenanthrene	0 / 2	0.0002 - 0.0002		0.0001									0.0002 U	0.0002 U
Pyrene	0 / 2	0.0002 - 0.0002		0.0001			0.83	4			0.83	4000	0.0002 U	0.0002 U
Metals, Total (6) (mg/L)														
Antimony	0 / 2	0.005 - 0.005		0.0025	0.45	0.01	0.0056	0.64			0.0056	640	0.005 U	0.005 U
Arsenic	0 / 2	0.005 - 0.005		0.0025	0.34	0.15	0.00018	0.0014	0.34	0.15	0.000018	0.14	0.005 U	0.005 U
Barium	0 / 2	0.05 - 0.05		0.025							1		0.05 U	0.05 U
Beryllium	0 / 2	0.001 - 0.001		0.0005	0.0075	0.00017							0.001 U	0.001 U
Cadmium	0 / 2	0.005 - 0.005		0.0025	0.0014	0.00019			0.002	0.00025			0.005 U	0.005 U
Chromium	0 / 2	0.02 - 0.02		0.01	0.42	0.055							0.02 U	0.02 U
Copper	0 / 2	0.02 - 0.02		0.01	0.0095	0.0065	1.3		0.013	0.009	1.3		0.02 U	0.02 U
Lead	0 / 2	0.005 - 0.005		0.0025	0.043	0.0018			0.065	0.0025			0.005 U	0.005 U
Mercury	0 / 2	0.0005 - 0.0005		0.00025	0.0014	0.00077	0.00014	0.00015	0.0014	0.00077			0.0005 U	0.0005 U
Nickel	0 / 2	0.05 - 0.05		0.025	0.34	0.038	0.61	4.6	0.47	0.052	0.61	4600	0.05 U	0.05 U
Selenium	0 / 2	0.05 - 0.05		0.025	0.02	0.005	0.17	4.2		0.005	0.17	4200	0.05 U	0.05 U
Silver	0 / 2	0.005 - 0.005		0.0025	0.0018				0.0032				0.005 U	0.005 U

**Table 4.3
Summary of Analytical Results for Surface Water - Remainder of the Pond
Phase II Area - Mashapaug Pond and Cove
Former Gorham Manufacturing Facility
333 Adelaide Avenue
Providence, Rhode Island**

Parameter	Frequency of Detection	Range of Reporting Limits for Non Detects	Range of Detected Concentrations	Average [1]	RIDEM AWQC Fresh Water Acute [2]	RIDEM AWQC Fresh Water Chronic [2]	RIDEM AWQC Water plus Organisms [2]	RIDEM AWQC Organisms Only [2]	NRWQC Fresh Water Acute [3]	NRWQC Fresh Water Chronic [3]	NRWQC Water plus Organisms [3]	NRWQC Organisms Only [3]	SW10 6/21/2006	SW12 6/21/2006
Thallium	0 / 2	0.002 - 0.002		0.001	0.046	0.001	0.00024	0.00047					0.47	0.002 U
Zinc	0 / 2	0.05 - 0.05		0.025	0.086	0.086	7.4	26	0.12	0.12	7.4	26000	0.05 U	0.05 U
Metals, Dissolved [6] (mg/L)														
Antimony	0 / 2	0.005 - 0.005		0.0025	0.45	0.01	0.0056	0.64			0.0056	640	0.005 U	0.005 U
Arsenic	0 / 2	0.005 - 0.005		0.0025	0.34	0.15	0.00018	0.0014	0.34	0.15	0.000018	0.14	0.005 U	0.005 U
Barium	0 / 2	0.05 - 0.05		0.025							1		0.05 U	0.05 U
Beryllium	0 / 2	0.001 - 0.001		0.0005	0.0075	0.00017							0.001 U	0.001 U
Cadmium	0 / 2	0.005 - 0.005		0.0025	0.0014	0.00019			0.002	0.00025			0.005 U	0.005 U
Chromium	0 / 2	0.02 - 0.02		0.01	0.42	0.055							0.02 U	0.02 U
Copper	0 / 2	0.02 - 0.02		0.01	0.0095	0.0065	1.3		0.013	0.009	1.3		0.02 U	0.02 U
Lead	0 / 2	0.005 - 0.005		0.0025	0.043	0.0017			0.065	0.0025			0.005 U	0.005 U
Mercury	0 / 2	0.0005 - 0.0005		0.00025	0.0014	0.00077	0.00014	0.00015	0.0014	0.00077			0.0005 U	0.0005 U
Nickel	0 / 2	0.05 - 0.05		0.025	0.34	0.038	0.61	4.6	0.47	0.052	0.61	4600	0.05 U	0.05 U
Selenium	0 / 2	0.05 - 0.05		0.025	0.02	0.005	0.17	4.2		0.005	0.17	4200	0.05 U	0.05 U
Silver	0 / 2	0.005 - 0.005		0.0025	0.0018				0.0032				0.005 U	0.005 U
Thallium	0 / 2	0.002 - 0.002		0.001	0.046	0.001	0.00024	0.00047					0.002 U	0.002 U
Zinc	0 / 2	0.05 - 0.05		0.025	0.086	0.086	7.4	26	0.12	0.12	7.4	26000	0.05 U	0.05 U
Inorganics (mg/L)														
Hardness	2 / 2		67 - 70.8	69									70.8	67

Notes:
 [1] Average calculated using 1/2 the reporting limit for non-detects
 [2] Values are the 2009 RIDEM Ambient Water Quality Criteria.
<http://www.dem.ri.gov/pubs/regs/regs/water/h20q10.pdf>
 [3] Values are the National Recommended Water Quality Criteria from USEPA.
<http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm>
 [4] RIDEM AWQC values for Total Xylene was used for o-Xylenes and m,p-Xylenes
 [5] RIDEM AWQC values for Total PCBs was used for individual Aroclor mixtures
 [6] RIDEM AWQC values for Cadmium, Chromium (Chromium III was used for Chromium), Copper, Lead, Nickel and Zinc were calculated for acute ($CF \times e^{\frac{1}{2} \times [(\ln \text{Hardness}) + b_1]}$) and chronic ($CF \times e^{\frac{1}{2} \times [(\ln \text{Hardness}) + b_2]}$) values for dissolved metals using the average hardness concentration. Values were also used for total metals
 mg/L - milligram per liter
 U - not detected, value is reporting limit

Prepared By: EYM 12/6/12
 Checked By: KJC 12/6/12

Table 4.4
Summary of Analytical Results Detected in Shallow Sediment (0-1 ft) - Inner Cove
Phase II Area - Mashapaug Pond and Cove
Former Gorham Manufacturing Facility
333 Adelaide Avenue
Providence, Rhode Island

Parameter	Frequency of Detection	Range of Reporting Limits for Non Detects	Range of Detected Concentrations	Average [1]	SD-1001 12/28/2005 0 - 2 ft	SD-1002 12/28/2005 0 - 2 ft	SD-1003 12/28/2005 0 - 2 ft	SD-1004 12/28/2005 0 - 2 ft	SD-1005 12/28/2005 0 - 2 ft	SED1601 6/22/2006 0 - 1 ft	SED1701 6/22/2006 0.5 - 1 ft
Volatile Organic Compound (mg/kg)											
1,1,1-Trichloroethane	4 / 22	0.0041 - 0.15	0.3 : 1.3	0.14	0.013 U	0.0098 U	0.15 U	1.3	0.3	0.0235 U	0.732 E
1,1-Dichloroethane	8 / 22	0.0041 - 1.1	0.011 : 7.92	0.81	0.013 U	0.0098 U	1.4	1.1 U	0.012 U	0.0235 U	0.137
1,1-Dichloroethene	4 / 22	0.0041 - 1.1	0.014 : 11.3	0.66	0.013 U	0.0098 U	0.15 U	1.1 U	0.014	0.0235 U	0.0555
Acetone	10 / 22	0.039 - 4.6	0.0856 : 1.9	0.36	0.052 U	0.039 U	0.87	4.6 U	0.048 U	0.235 U	0.0463 U
Carbon disulfide	4 / 22	0.0041 - 1.1	0.007 : 0.0576	0.039	0.013 U	0.0098 U	0.15 U	1.1 U	0.012 U	0.0235 U	0.007
cis-1,2-Dichloroethene	8 / 22	0.0043 - 1.1	0.0091 : 175	13.7	0.013 U	0.0098 U	0.42	1.1 U	0.016	0.0235 U	0.0298
Isopropylbenzene	1 / 22	0.0041 - 1.1	0.0514 : 0.0514	0.037	0.013 U	0.0098 U	0.15 U	1.1 U	0.012 U	0.0235 U	0.0046 U
sec-Butylbenzene	2 / 22	0.0041 - 1.1	0.0197 : 0.0303	0.037	0.013 U	0.0098 U	0.15 U	1.1 U	0.012 U	0.0235 U	0.0046 U
Tetrachloroethene	3 / 22	0.0043 - 1.1	0.0081 : 18.1	0.90	0.013 U	0.0098 U	0.15 U	1.1 U	0.012 U	0.0235 U	0.0081
Toluene	1 / 22	0.0041 - 1.1	1.92 : 1.92	0.12	0.013 U	0.0098 U	0.15 U	1.1 U	0.012 U	0.0235 U	0.0046 U
trans-1,2-Dichloroethene	2 / 22	0.0041 - 1.1	2.79 : 3.62	0.33	0.013 U	0.0098 U	0.15 U	1.1 U	0.012 U	0.0235 U	0.0046 U
Trichloroethene	8 / 22	0.0043 - 0.15	0.176 : 58.4	3.7	0.013 U	0.0098 U	0.15 U	5.6	0.21	0.0235 U	1.22
Vinyl chloride	7 / 22	0.0081 - 2.3	0.0218 : 24.8	2.2	0.026 U	0.02 U	5	2.3 U	0.024 U	0.047 U	0.0093 U
Semivolatile Organic Compounds (mg/kg)											
Acenaphthene	5 / 22	0.03 - 0.183	0.024 : 0.26	0.068	0.25	0.26	0.039 U	0.03 U	0.024	0.179 U	0.035 U
Acenaphthylene	3 / 22	0.0079 - 0.183	0.026 : 0.781	0.072	0.07	0.026	0.039 U	0.03 U	0.0079 U	0.179 U	0.035 U
Anthracene	12 / 22	0.0322 - 0.183	0.04 : 3.09	0.29	0.83	0.36	0.11	0.04	0.079	0.179 U	0.035 U
Benzo(a)anthracene	17 / 22	0.0322 - 0.183	0.0896 : 15.1	1.1	2	0.69	0.29	0.16	0.15	0.179 U	0.035 U
Benzo(a)pyrene	16 / 22	0.0322 - 0.183	0.0707 : 7.87	0.68	1.8	0.59	0.24	0.15	0.12	0.179 U	0.035 U
Benzo(b)fluoranthene	18 / 22	0.0322 - 0.183	0.0732 : 14.8	1.2	2.9	0.86	0.34	0.25	0.17	0.201	0.035 U
Benzo(g,h,i)perylene	13 / 22	0.0322 - 0.183	0.046 : 2.54	0.25	0.73	0.26	0.11	0.088	0.046	0.179 U	0.035 U
Benzo(k)fluoranthene	11 / 22	0.0322 - 0.183	0.065 : 5.1	0.41	0.97	0.25	0.18	0.11	0.065	0.179 U	0.035 U
Chrysene	16 / 22	0.0322 - 0.183	0.0896 : 8.94	0.80	2.4	0.84	0.43	0.24	0.16	0.179 U	0.035 U
Dibenzo(a,h)anthracene	5 / 22	0.0079 - 0.183	0.0404 : 1.45	0.11	0.22	0.013 U	0.039 U	0.03 U	0.0079 U	0.179 U	0.035 U
Di-n-butylphthalate	2 / 5	0.2 - 0.74	0.48 : 1.1	0.44	0.48	0.33 U	1.1	0.74 U	0.2 U		
Fluoranthene	19 / 22	0.0322 - 0.035	0.211 : 28.8	2.2	4.3	1.6	0.71	0.45	0.39	0.33	0.035 U
Fluorene	8 / 22	0.018 - 0.183	0.022 : 0.863	0.091	0.018 U	0.022	0.081	0.036	0.025	0.179 U	0.035 U
Indeno(1,2,3-cd)pyrene	12 / 22	0.03 - 0.183	0.046 : 2.47	0.24	0.74	0.22	0.11	0.03 U	0.046	0.179 U	0.035 U
Naphthalene	5 / 22	0.03 - 0.183	0.0342 : 0.28	0.060	0.21	0.28	0.039 U	0.03 U	0.045	0.179 U	0.035 U
Phenanthrene	16 / 22	0.0322 - 0.183	0.121 : 11.8	1.2	4	2.1	0.48	0.23	0.41	0.179 U	0.035 U
Pyrene	18 / 22	0.0322 - 0.0794	0.177 : 15.2	1.5	5.3	2.3	0.76	0.45	0.4	0.244	0.035 U
Pesticides/PCBs (mg/kg)											
4,4'-DDD	2 / 22	0.00081 - 0.0481	0.0292 : 0.0301	0.011	0.0017 U	0.0013 U	0.004 U	0.003 U	0.00081 U	0.0357 U	0.00671 U
4,4'-DDE	1 / 22	0.00081 - 0.0481	0.0109 : 0.0109	0.0088	0.0017 U	0.0013 U	0.004 U	0.003 U	0.00081 U	0.0357 U	0.00671 U
4,4'-DDT	1 / 22	0.00081 - 0.0481	0.0635 : 0.0635	0.011	0.0017 U	0.0013 U	0.004 U	0.003 U	0.00081 U	0.0357 U	0.00671 U
Endrin ketone	1 / 22	0.00081 - 0.0481	0.0431 : 0.0431	0.0098	0.0017 U	0.0013 U	0.004 U	0.003 U	0.00081 U	0.0357 U	0.00671 U
Aroclor-1254	2 / 22	0.016 - 0.404	0.207 : 0.528	0.098	0.034 U	0.066 U	0.04 U	0.03 U	0.016 U	0.357 U	0.067 U
Aroclor-1260	1 / 22	0.016 - 0.404	0.605 : 0.605	0.091	0.034 U	0.066 U	0.04 U	0.03 U	0.016 U	0.357 U	0.067 U
Dioxins/Furans (mg/kg)											
1,2,3,4,6,7,8-HpCDD	21 / 22	0.0000068 - 0.0000068	0.0000045 : 0.00064	0.00018	0.00011	0.000059	0.00013	0.00014	0.000017	0.00048	0.000021
1,2,3,4,6,7,8-HpCDF	21 / 22	0.0000068 - 0.0000068	0.0000059 : 0.001	0.00026	0.000092	0.00016	0.00027	0.00021	0.00003	0.00057 A	0.000035
1,2,3,4,7,8,9-HpCDF	20 / 22	0.0000068 - 0.0000014	0.0000012 : 0.00017	0.000047	0.000099	0.000014	0.000049	0.000047	0.0000041	0.000092 A	0.000065
1,2,3,4,7,8-HxCDD	15 / 22	0.0000068 - 0.0000021	0.0000013 : 0.000074	0.000018	0.000049	0.000061	0.000016	0.000014 U	0.000018 U	0.000041	0.000022 J
1,2,3,4,7,8-HxCDF	21 / 22	0.0000068 - 0.0000068	0.0000024 : 0.00067	0.00015	0.00003	0.000057	0.00017	0.00011	0.000017	0.00033 A	0.000017
1,2,3,6,7,8-HxCDD	21 / 22	0.0000068 - 0.0000068	0.0000013 : 0.00019	0.000049	0.000013	0.000012	0.000042	0.000039	0.000047	0.00012 A	0.000057
1,2,3,6,7,8-HxCDF	20 / 22	0.0000068 - 0.0000014	0.0000073 : 0.0013	0.00025	0.000037	0.000059	0.00023	0.00026	0.000033	0.00057 A	0.00003
1,2,3,7,8,9-HxCDD	18 / 22	0.0000068 - 0.000018	0.0000017 : 0.000097	0.000025	0.000082	0.000008	0.000021	0.00002	0.000027 U	0.000056	0.000033 J
1,2,3,7,8,9-HxCDF	16 / 22	0.0000068 - 0.0000071	0.0000024 : 0.00042	0.000091	0.000031 U	0.000028 U	0.000086	0.0000071 U	0.0000091 U	0.00019 A	0.000013
1,2,3,7,8-PeCDD	19 / 22	0.0000068 - 0.000003	0.00000095 : 0.00012	0.000032	0.000097	0.000074	0.000031	0.000033	0.000003 U	0.000056	0.000033 J
1,2,3,7,8-PeCDF	11 / 22	0.0000068 - 0.000018	0.0000023 : 0.00023	0.000023	0.000016	0.000028	0.00006	0.000055	0.000083	0.000034 UEA	0.000081 A
2,3,4,6,7,8-HxCDF	20 / 22	0.0000068 - 0.0000014	0.0000012 : 0.00091	0.00021	0.000036	0.000051	0.00018	0.00022	0.000028	0.0004 A	0.000075
2,3,4,7,8-PeCDF	21 / 22	0.0000068 - 0.0000068	0.0000017 : 0.0062	0.0010	0.000036	0.000043	0.00016	0.00017	0.000023	0.0028 A	0.00019 A
2,3,7,8-TCDD	19 / 22	0.0000014 - 0.0000028	0.00000052 : 0.000033	0.000093	0.000053	0.000025	0.000095	0.000092	0.0000098	0.000016 A	0.000011 A

Table 4.4
Summary of Analytical Results Detected in Shallow Sediment (0-1 ft) - Inner Cove
Phase II Area - Mashapaug Pond and Cove
Former Gorham Manufacturing Facility
333 Adelaide Avenue
Providence, Rhode Island

Parameter	Frequency of Detection	Range of Reporting Limits for Non Detects	Range of Detected Concentrations	Average [1]	SD-1001 12/28/2005 0 - 2 ft	SD-1002 12/28/2005 0 - 2 ft	SD-1003 12/28/2005 0 - 2 ft	SD-1004 12/28/2005 0 - 2 ft	SD-1005 12/28/2005 0 - 2 ft	SED1601 6/22/2006 0 - 1 ft	SED1701 6/22/2006 0.5 - 1 ft
2,3,7,8-TCDF	17 / 22	0.00000014 - 0.0000042	0.0000016 : 0.00012	0.000030	0.000018	0.000015	0.000027	0.000029	0.000043	0.000082 A	0.00000014 UEA
OCDD	22 / 22		0.0000035 : 0.0029	0.00083	0.00075	0.00024	0.00042	0.00048	0.000077	0.0023	0.00007
OCDF	21 / 22	0.0000014 - 0.0000014	0.0000022 : 0.0003	0.00011	0.000075	0.00019	0.00019	0.00007	0.0000076	0.00025	0.000008
Dioxin Toxicity Equivalent (USEPA, 2010)	22 / 22		0.00000078 : 0.0024	0.00044	0.000044	0.000047	0.00016	0.00017	0.000019	0.0011	0.000077
Total HpCDD	21 / 22	0.00000068 - 0.00000068	0.0000088 : 0.0013	0.00036	0.0002	0.00012	0.00027	0.00026	0.000036	0.00097	0.000044
Total HpCDF	21 / 22	0.00000068 - 0.00000068	0.0000059 : 0.0028	0.00067	0.00018	0.00024	0.00062	0.00055	0.000073	0.0014	0.000087
Total HxCDD	21 / 22	0.00000068 - 0.00000068	0.000013 : 0.0026	0.00063	0.00012	0.00013	0.00049	0.00042	0.000048	0.0014	0.00007
Total HxCDF	22 / 22		0.0000017 : 0.025	0.0062	0.00078	0.001	0.0055	0.0058	0.00079	0.016	0.0009
Total PeCDD	21 / 22	0.00000068 - 0.00000068	0.0000081 : 0.002	0.00046	0.000074	0.000056	0.00031	0.00029	0.000022	0.001	0.000041
Total PeCDF	22 / 22		0.0000044 : 0.04	0.0075	0.00068	0.00088	0.0051	0.0054	0.00075	0.0073	0.0021
Total TCDD	21 / 22	0.00000014 - 0.00000014	0.0000036 : 0.0008	0.00020	0.000077	0.000045	0.00012	0.00011	0.000011	0.00038	0.000023
Total TCDF	22 / 22		0.0000012 : 0.015	0.0033	0.00029	0.00029	0.0013	0.0013	0.00017	0.0069	0.0006
Inorganics (mg/kg)											
Antimony	2 / 22	0.54 - 25.7	1.6 : 2.7	6.0	2.7	1.6	2.7 U	2 U	0.54 U	22.6 U	7.6 U
Arsenic	18 / 22	0.4 - 1.8	2.1 : 45	17.9	19	12	45	32	3.8	20	0.4 U
Barium	22 / 22		12.4 : 466	141	190	76	250	69	19	194	12.4
Beryllium	19 / 22	0.07 - 0.13	0.075 : 3.5	0.64	1.1	0.46	1.4	3.5	0.075	0.6	0.08 U
Cadmium	18 / 22	0.74 - 1.31	0.14 : 7.11	2.9	1.8	0.91	4.1	3.2	0.14	5.66	0.76 U
Chromium	22 / 22		4.8 : 640	231	71	12	100	59	4.8	565	11.1
Copper	22 / 22		8.6 : 2670	1185	1200	180	740	1500	19	2050	34.8
Lead	21 / 22	7.4 - 7.4	12.2 : 1120	423	340	140	590	140	23	763	20.9
Mercury	17 / 22	0.043 - 0.12	0.031 : 2.52	0.50	0.3	0.087	1.3	0.2	0.031	0.162	0.047 U
Nickel	20 / 22	3.7 - 6.6	5.7 : 853	161	48	20	120	810	10	130	5.7
Selenium	3 / 22	0.54 - 25.7	1.8 : 17.9	6.6	3.2	1.8	2.7 U	2 U	0.54 U	22.6 U	7.6 U
Silver	20 / 22	0.74 - 1.31	2.77 : 227	83	120	15	95	24	2.9	164	5.27
Zinc	22 / 22		9.5 : 1940	947	570	200	770	1200	34	1630	39.3
Total Organic Carbon (TOC)	17 / 17		2800 : 115000	35994						73000	5800
AVS/SEM (umol/kg)											
Antimony	4 / 4		0.76 : 45.46	13.8							
Copper	4 / 4		2223.92 : 88206.4	26600							
Lead	4 / 4		657.89 : 3249.11	1671							
Silver	4 / 4		94.46 : 529.87	219							
Zinc	4 / 4		3446.37 : 20240.53	11595							
AVS	4 / 4		87.4 : 594.29	253							
SEM	4 / 4		7627.21 : 32436.04	20098							
Total Petroleum Hydrocarbon (mg/kg)											
Total Petroleum Hydrocarbon	19 / 22	50.1 - 291	57.8 : 2600	677	1900	2600	1700	740	370	275 U	83.4

Notes:
[1] Average calculated using one-half the reporting limit for non-detects
AVS/SEM - Acid Volatile Sulfide/Simultaneously Extracted Metals
mg/kg - milligram per kilogram
umol/kg - micromole per kilogram
U - not detected, value is reporting limit
J - value is estimated
B - analyte detected in sample and the associated blank
E - for dioxin/furan - PCDE interference
E - for other analytes - exceeds calibration range
A - detection limit based on signal-to-noise measurement
I - interference
N2 - value obtained from additional analysis

Table 4.4
Summary of Analytical Results Detected in Shallow Sediment (0-1 ft) - Inner Cove
Phase II Area - Mashapaug Pond and Cove
Former Gorham Manufacturing Facility
333 Adelaide Avenue
Providence, Rhode Island

Parameter	SED1801 6/22/2006 0 - 1 ft	SED1901 6/22/2006 0 - 1 ft	SED20 6/29/2006	SED2001 6/22/2006 0.5 - 1 ft	SED2101 6/22/2006 0 - 1 ft	SED22 6/29/2006	SED2201 6/22/2006 0 - 1 ft	SED2301 6/22/2006 0 - 1 ft	SED24 6/29/2006	SED2401 6/22/2006 0 - 1 ft	SED2501 6/22/2006 0 - 1 ft
Volatile Organic Compound (mg/kg)											
1,1,1-Trichloroethane	0.0506 U	0.635		0.0149 U	0.0044 U		0.0126 U	0.0041 U		0.0079 U	0.0088 U
1,1-Dichloroethane	0.0506 U	7.92		0.0149 U	0.0044 U		0.0126 U	0.0041 U		0.011	1.09
1,1-Dichloroethene	0.0506 U	11.3		0.0149 U	0.0044 U		0.0126 U	0.0041 U		0.0079 U	0.0088 U
Acetone	1.9	0.242		0.421	0.0445 U		0.294	0.0406 U		0.0791 U	0.128
Carbon disulfide	0.0506 U	0.0576		0.0149 U	0.0044 U		0.0126 U	0.0041 U		0.0079 U	0.0111
cis-1,2-Dichloroethene	0.0506 U	175		0.0149 U	0.0044 U		0.0126 U	0.0091		0.0079 U	11.5
Isopropylbenzene	0.0506 U	0.017 U		0.0149 U	0.0044 U		0.0126 U	0.0041 U		0.0079 U	0.0088 U
sec-Butylbenzene	0.0506 U	0.0197		0.0149 U	0.0044 U		0.0126 U	0.0041 U		0.0079 U	0.0088 U
Tetrachloroethene	0.0506 U	18.1		0.0149 U	0.0044 U		0.0126 U	1.04		0.0079 U	0.0088 U
Toluene	0.0506 U	0.017 U		0.0149 U	0.0044 U		0.0126 U	0.0041 U		0.0079 U	0.0088 U
trans-1,2-Dichloroethene	0.0506 U	2.79		0.0149 U	0.0044 U		0.0126 U	0.0041 U		0.0079 U	0.0088 U
Trichloroethene	0.0506 U	58.4		0.0149 U	0.0044 U		0.0126 U	0.176		0.0079 U	0.276
Vinyl chloride	0.101 U	0.148		0.0298 U	0.0089 U		0.0253 U	0.0081 U		0.0218	24.8
Semivolatile Organic Compounds (mg/kg)											
Acenaphthene	0.183 U	0.124 U		0.153	0.0328 U		0.0794 U	0.0322 U		0.0631 U	0.0829 U
Acenaphthylene	0.183 U	0.124 U		0.781	0.0328 U		0.0794 U	0.0322 U		0.0631 U	0.0829 U
Anthracene	0.183 U	0.124 U		3.09 E	0.0328 U		0.0794 U	0.0322 U		0.0631 U	0.163
Benzo(a)anthracene	0.183 U	0.218		15.1 E	0.0328 U		0.108	0.0322 U		0.0896	0.541
Benzo(a)pyrene	0.183 U	0.151		7.87 E	0.0328 U		0.102	0.0322 U		0.0707	0.483
Benzo(b)fluoranthene	0.183 U	0.32		14.8 E	0.0328 U		0.114	0.0322 U		0.0732	0.516
Benzo(g,h,i)perylene	0.183 U	0.124 U		2.54	0.0328 U		0.0794 U	0.0322 U		0.0631 U	0.27
Benzo(k)fluoranthene	0.183 U	0.124 U		5.1	0.0328 U		0.0794 U	0.0322 U		0.0631 U	0.0829 U
Chrysene	0.183 U	0.201		8.94 E	0.0328 U		0.119	0.0322 U		0.0896	0.534
Dibenzo(a,h)anthracene	0.183 U	0.124 U		1.45	0.0328 U		0.0794 U	0.0322 U		0.0631 U	0.0829 U
Di-n-butylphthalate											
Fluoranthene	0.267	0.533		28.8 E	0.0328 U		0.235	0.0322 U		0.211	3.17
Fluorene	0.183 U	0.124 U		0.863	0.0328 U		0.0794 U	0.0322 U		0.0631 U	0.0829 U
Indeno(1,2,3-cd)pyrene	0.183 U	0.124 U		2.47	0.0328 U		0.0794 U	0.0322 U		0.0631 U	0.27
Naphthalene	0.183 U	0.124 U		0.0612 U	0.0328 U		0.0794 U	0.0322 U		0.0631 U	0.0829 U
Phenanthrene	0.183 U	0.218		11.8 E	0.0328 U		0.121	0.0322 U		0.169	2.46
Pyrene	0.187	0.35		15.2 E	0.0328 U		0.0794 U	0.0322 U		0.177	2.4
Pesticides/PCBs (mg/kg)											
4,4'-DDD	0.0405 U	0.0247 U		0.0292	0.00692 U		0.0327 U	0.00685 U		0.0229 U	0.0309 U
4,4'-DDE	0.0405 U	0.0247 U		0.0112 U	0.00692 U		0.0327 U	0.00685 U		0.0229 U	0.0309 U
4,4'-DDT	0.0405 U	0.0247 U		0.0112 U	0.00692 U		0.0327 U	0.00685 U		0.0229 U	0.0309 U
Endrin ketone	0.0405 U	0.0431		0.0112 U	0.00692 U		0.0327 U	0.00685 U		0.0229 U	0.0309 U
Aroclor-1254	0.404 U	0.246 U		0.112 U	0.0691 U		0.163 U	0.0685 U		0.207	0.168 U
Aroclor-1260	0.404 U	0.605		0.112 U	0.0691 U		0.163 U	0.0685 U		0.125 U	0.168 U
Dioxins/Furans (mg/kg)											
1,2,3,4,6,7,8-HpCDD	0.00064 A	0.00027		0.00009 A	0.0000045		0.00011	0.0000068 U		0.000029	0.00032
1,2,3,4,6,7,8-HpCDF	0.001 A	0.00051 A		0.0002 A	0.0000065		0.00016	0.0000068 U		0.000029	0.00044 A
1,2,3,4,7,8,9-HpCDF	0.00017 A	0.00011 A		0.000041 A	0.0000012 J		0.000025	0.0000068 U		0.0000045 J	0.000079
1,2,3,4,7,8-HxCDD	0.000074 A	0.000051		0.000015 A	0.00000084 U		0.000018 U	0.0000068 U		0.0000013 J	0.00003 A
1,2,3,4,7,8-HxCDF	0.00067	0.00039 A		0.00014 A	0.0000034 J		0.000068	0.0000068 U		0.000012	0.00031 A
1,2,3,6,7,8-HxCDD	0.00019 A	0.00012 A		0.000035 A	0.0000013 J		0.000028	0.0000068 U		0.0000054 J	0.000083 A
1,2,3,6,7,8-HxCDF	0.0013 A	0.00062 A		0.00014 A	0.0000073		0.00016	0.0000068 U		0.000016	0.00038 A
1,2,3,7,8,9-HxCDD	0.000097 A	0.000059		0.000016 A	0.00000084 U		0.000018 U	0.0000068 U		0.0000028 J	0.000038
1,2,3,7,8,9-HxCDF	0.00039 A	0.00025 A		0.000052 A	0.0000024 J		0.000062	0.0000068 U		0.000007	0.00018
1,2,3,7,8-PeCDD	0.000098 A	0.000069 A		0.00003 A	0.00000095 J		0.000018	0.0000068 U		0.0000024 J	0.000063 A
1,2,3,7,8-PeCDF	0.000032 UEA	0.000027 UEA		0.0000012 UEA	0.0000023 JA		0.000041	0.0000068 U		0.0000055 J	0.000049 UEA
2,3,4,6,7,8-HxCDF	0.00091 A	0.00054 A		0.00012 A	0.000016		0.00015	0.0000068 U		0.000012	0.00031 A
2,3,4,7,8-PeCDF	0.0062 A	0.0035 A		0.00014 A	0.000044		0.0013	0.0000068 U		0.000095	0.0022 A
2,3,7,8-TCDD	0.00003 A	0.000021 A		0.0000073 A	0.00000017 UI		0.0000068 A	0.00000014 U		0.0000072 J	0.000018 A

Table 4.4
Summary of Analytical Results Detected in Shallow Sediment (0-1 ft) - Inner Cove
Phase II Area - Mashapaug Pond and Cove
Former Gorham Manufacturing Facility
333 Adelaide Avenue
Providence, Rhode Island

Parameter	SED1801 6/22/2006 0 - 1 ft	SED1901 6/22/2006 0 - 1 ft	SED20 6/29/2006	SED2001 6/22/2006 0.5 - 1 ft	SED2101 6/22/2006 0 - 1 ft	SED22 6/29/2006	SED2201 6/22/2006 0 - 1 ft	SED2301 6/22/2006 0 - 1 ft	SED24 6/29/2006	SED2401 6/22/2006 0 - 1 ft	SED2501 6/22/2006 0 - 1 ft
2,3,7,8-TCDF	0.00012 A	0.000058 A		0.0000093 A	0.0000017 UE		0.000027 A	0.00000014 U		0.0000026 UE	0.000053 A
OCDD	0.0027	0.00093		0.00024 A	0.000025 B		0.0005	0.0000035 BJ		0.00017	0.0019 A
OCDF	0.0003	0.0001		0.000082 A	0.000022 J		0.000044	0.0000014 U		0.000017	0.00017
Dioxin Toxicity Equivalent (USEPA, 2010)	0.0024	0.0014		0.00014	0.000018		0.00047	0.0000078		0.000038	0.00089
Total HpCDD	0.0013	0.00058		0.00019	0.000088		0.00024	0.0000068 U		0.000058	0.00065
Total HpCDF	0.0028	0.0014		0.0005	0.000017		0.00042	0.0000068 U		0.000066	0.0011
Total HxCDD	0.0026	0.0016		0.00047	0.000013		0.00031	0.0000068 U		0.00005	0.0011
Total HxCDF	0.023	0.012		0.0046	0.0002		0.0055	0.0000017 J		0.00049	0.012
Total PeCDD	0.002	0.0014		0.00039	0.000081		0.0002	0.0000068 U		0.000029	0.00091
Total PeCDF	0.0096	0.0088		0.0069	0.00046		0.014	0.0000044		0.0011	0.012
Total TCDD	0.0008	0.00051		0.00016	0.000036		0.00015	0.00000014 U		0.000017	0.0005
Total TCDF	0.012	0.0065		0.0014	0.00014		0.0045	0.0000012		0.00032	0.0069
Inorganics (mg/kg)											
Antimony	25.7 U	23.6 U		13.1 U	7.4 U		15.9 U	7.4 U		9.8 U	13.1 U
Arsenic	22.2	36		0.7 U	2.1		12	1.8 U		9.3	22.4
Barium	278	224		25.3	13		125	13.1		82.4	207
Beryllium	0.72	1.03		0.13 U	0.14		0.32	0.07 U		0.28	0.58
Cadmium	6.9	7.11		1.31 U	0.74 U		2.8	0.74 U		2.87	4.56
Chromium	640	387		7.5	7.1		616	333		532	300
Copper	2590	1880		14.6	20.1		1970	8.6		1930	1890
Lead	961	927		34.1	12.2		426	7.4 U		520	672
Mercury	0.163	2.52		0.067 U	0.043 U		0.677	0.044 U		0.653	0.159
Nickel	157	433		6.6 U	6.8		86	3.7 U		55.6	113
Selenium	25.7 U	23.6 U		13.1 U	7.4 U		15.9 U	7.4 U		9.8 U	13.1 U
Silver	227	192		1.31 U	2.77		163	0.74 U		107	140
Zinc	1940	1830		38.8	71.6		1360	9.5		1920	1360
Total Organic Carbon (TOC)	115000 >	69600 >		26000	5300		24000	2800		23000	46100 >
AVS/SEM (umol/kg)											
Antimony			0.93			0.76			8.16		
Copper			2223.92			88206.4			7597.52		
Lead			1835.4			940.87			657.89		
Silver			120.59			131.14			94.46		
Zinc			3446.37			14376.89			8314.74		
AVS			237.81			93.06			87.4		
SEM			7627.21			23656.05			16672.77		
Total Petroleum Hydrocarbon (mg/kg)											
Total Petroleum Hydrocarbon	291 U	756		1810	57.8		190	50.1 U		226	380

Notes:
 [1] Average calculated using one-half the reporting limit for non-detects
 AVS/SEM - Acid Volatile Sulfide/Simultaneously Extracted Metals
 mg/kg - milligram per kilogram
 umol/kg - micromole per kilogram
 U - not detected, value is reporting limit
 J - value is estimated
 B - analyte detected in sample and the associated blank
 E - for dioxin/furan - PCDE interference
 E - for other analytes - exceeds calibration range
 A - detection limit based on signal-to-noise measurement
 I - interference
 N2 - value obtained from additional analysis

Table 4.4
Summary of Analytical Results Detected in Shallow Sediment (0-1 ft) - Inner Cove
Phase II Area - Mashapaug Pond and Cove
Former Gorham Manufacturing Facility
333 Adelaide Avenue
Providence, Rhode Island

Parameter	SED26 6/29/2006	SED2601 6/22/2006 0 - 1 ft	SED2701 6/22/2006 0 - 1 ft	SED2801 6/21/2006 0.5 - 1 ft	SED2901 6/21/2006 0.5 - 1 ft	SED3001 6/21/2006 0.5 - 1 ft	SED3101 6/21/2006 0.5 - 1 ft	SED3201 6/21/2006 0.5 - 1 ft
Volatile Organic Compound (mg/kg)								
1,1,1-Trichloroethane		0.008 U	0.0198 U	0.0226 U	0.025 U	0.0043 U	0.0289 U	0.005 U
1,1-Dichloroethane		0.008 U	4.67	0.0266	0.025 U	0.0043 U	1.92	0.005 U
1,1-Dichloroethene		0.008 U	2.34	0.0226 U	0.025 U	0.0043 U	0.0289 U	0.005 U
Acetone		0.0856	0.198 U	0.384	0.27	0.0434 U	0.522	0.0496 U
Carbon disulfide		0.008 U	0.0398	0.0226 U	0.025 U	0.0043 U	0.0289 U	0.005 U
cis-1,2-Dichloroethene		0.008 U	103	0.0226 U	0.025 U	0.0043 U	10.6	0.005 U
Isopropylbenzene		0.008 U	0.0198 U	0.0514	0.025 U	0.0043 U	0.0289 U	0.005 U
sec-Butylbenzene		0.008 U	0.0198 U	0.0303	0.025 U	0.0043 U	0.0289 U	0.005 U
Tetrachloroethene		0.008 U	0.0198 U	0.0226 U	0.025 U	0.0043 U	0.0289 U	0.005 U
Toluene		0.008 U	0.0198 U	0.0226 U	0.025 U	0.0043 U	1.92	0.005 U
trans-1,2-Dichloroethene		0.008 U	3.62	0.0226 U	0.025 U	0.0043 U	0.0289 U	0.005 U
Trichloroethene		0.008 U	15.1	0.0226 U	0.025 U	0.0043 U	0.797	0.005 U
Vinyl chloride		0.016 U	5.42	0.0499	0.05 U	0.0087 U	11.7	0.0099 U
Semivolatile Organic Compounds (mg/kg)								
Acenaphthene		0.0463 U	0.124 U	0.0912 U	0.101 U	0.0311 U	0.109 U	0.12
Acenaphthylene		0.0463 U	0.124 U	0.0912 U	0.101 U	0.0311 U	0.109 U	0.034 U
Anthracene		0.0463 U	0.124 U	0.403	0.169	0.0852	0.171	0.438
Benzo(a)anthracene		0.241	0.134	1.29	0.687	0.376	0.671	0.64
Benzo(a)pyrene		0.273	0.124 U	0.993	0.543	0.239	0.503	0.497
Benzo(b)fluoranthene		0.256	0.285	1.49	0.882	0.433	1.18	0.892
Benzo(g,h,i)perylene		0.144	0.124 U	0.296	0.117	0.152	0.124	0.191
Benzo(k)fluoranthene		0.0463 U	0.124 U	0.668	0.396	0.137	0.326	0.43
Chrysene		0.227	0.124 U	1.16	0.617	0.299	0.579	0.551
Dibenzo(a,h)anthracene		0.0463 U	0.124 U	0.0912	0.101 U	0.0404	0.109 U	0.0667
Di-n-butylphthalate								
Fluoranthene		0.419	0.354	2.31	1.34	0.535	1.51	1.56
Fluorene		0.0463 U	0.124 U	0.135	0.101 U	0.0802	0.109 U	0.156
Indeno(1,2,3-cd)pyrene		0.133	0.124 U	0.314	0.125	0.124	0.128	0.207
Naphthalene		0.0463 U	0.124 U	0.0912 U	0.101 U	0.0342	0.109 U	0.0456
Phenanthrene		0.158	0.124 U	1.14	0.689	0.466	0.757	1.23
Pyrene		0.348	0.196	1.29	0.874	0.81 E	0.953	1.07
Pesticides/PCBs (mg/kg)								
4,4'-DDD		0.0189 U	0.0481 U	0.0193 U	0.0211 U	0.00635 U	0.0207 U	0.0301
4,4'-DDE		0.0189 U	0.0481 U	0.0193 U	0.0211 U	0.00635 U	0.0207 U	0.0109
4,4'-DDT		0.0189 U	0.0481 U	0.0193 U	0.0211 U	0.00635 U	0.0207 U	0.0635
Endrin ketone		0.0189 U	0.0481 U	0.0193 U	0.0211 U	0.00635 U	0.0207 U	0.00678 U
Aroclor-1254		0.093 U	0.245 U	0.193 U	0.21 U	0.528	0.207 U	0.0677 U
Aroclor-1260		0.093 U	0.245 U	0.193 U	0.21 U	0.0634 U	0.207 U	0.0677 U
Dioxins/Furans (mg/kg)								
1,2,3,4,6,7,8-HpCDD		0.00002	0.00018	0.00049	0.00018	0.000066	0.00043	0.000074
1,2,3,4,6,7,8-HpCDF		0.0000059 J	0.00023	0.00064	0.00035	0.000036	0.00071	0.00004
1,2,3,4,7,8,9-HpCDF		0.0000014 U	0.000036	0.000099	0.000069 A	0.0000061	0.00017	0.0000051
1,2,3,4,7,8-HxCDD		0.0000014 U	0.000021 U	0.000039	0.000018 A	0.0000034 J	0.000055	0.0000018 J
1,2,3,4,7,8-HxCDF		0.0000024 J	0.00013	0.0003	0.00021 A	0.000018	0.00032	0.000011
1,2,3,6,7,8-HxCDD		0.0000036 J	0.000037	0.00011	0.00007 A	0.000012	0.00015	0.0000048
1,2,3,6,7,8-HxCDF		0.0000014 U	0.00015	0.00052	0.00029 A	0.000014	0.00075	0.000012
1,2,3,7,8,9-HxCDD		0.0000017 J	0.000022	0.000068	0.000031	0.0000072	0.000078	0.0000028 J
1,2,3,7,8,9-HxCDF		0.0000014 U	0.000075	0.0002	0.00014 A	0.0000096	0.00042	0.0000053
1,2,3,7,8-PeCDD		0.0000014 U	0.000029	0.000076	0.000041	0.0000052	0.00012	0.0000022 J
1,2,3,7,8-PeCDF		0.0000014 U	0.000035	0.000018 UE	0.0000018 UEA	0.0000007 UEA	0.00023 AN2	0.00000073 UEA
2,3,4,6,7,8-HxCDF		0.0000014 U	0.00018	0.00042	0.00023 A	0.000013	0.00064	0.000012
2,3,4,7,8-PeCDF		0.0000017 J	0.00091	0.0031	0.00016 A	0.000076	0.0016 A	0.000028
2,3,7,8-TCDD		0.00000028 UA	0.0000081 A	0.000022 A	0.000012 A	0.0000062 JA	0.000033 A	0.0000052 JA

Table 4.4
Summary of Analytical Results Detected in Shallow Sediment (0-1 ft) - Inner Cove
Phase II Area - Mashapaug Pond and Cove
Former Gorham Manufacturing Facility
333 Adelaide Avenue
Providence, Rhode Island

Parameter	SED26 6/29/2006	SED2601 6/22/2006 0 - 1 ft	SED2701 6/22/2006 0 - 1 ft	SED2801 6/21/2006 0.5 - 1 ft	SED2901 6/21/2006 0.5 - 1 ft	SED3001 6/21/2006 0.5 - 1 ft	SED3101 6/21/2006 0.5 - 1 ft	SED3201 6/21/2006 0.5 - 1 ft
2,3,7,8-TCDF		0.000016	0.000042 UE	0.000084 A	0.000032 A	0.000047 A	0.000076 A	0.000006 A
OCDD		0.000043	0.00083	0.0029	0.00084	0.00054	0.0016	0.00081
OCDF		0.000062 J	0.00013	0.00021	0.00017	0.000037	0.00019	0.00008
Dioxin Toxicity Equivalent (USEPA, 2010)		0.0000029	0.00038	0.0012	0.00021	0.000038	0.0009	0.000018
Total HpCDD		0.000033	0.00038	0.001	0.0004	0.00013	0.00094	0.00017
Total HpCDF		0.0000059 J	0.00051	0.0016	0.00087	0.000094	0.002	0.00012
Total HxCDD		0.000064	0.00045	0.0014	0.0009	0.00013	0.002	0.000051
Total HxCDF		0.0000054 J	0.0048	0.01	0.0083	0.00038	0.025	0.00032
Total PeCDD		0.000022	0.00024	0.00095	0.00053	0.000055	0.0016	0.000025
Total PeCDF		0.0000061 J	0.0098	0.024	0.014	0.00059	0.04	0.0005
Total TCDD		0.000021	0.00013	0.00042	0.00027	0.000021	0.00064	0.000012
Total TCDF		0.000021	0.003	0.0088	0.0037	0.00017	0.015	0.00016
Inorganics (mg/kg)								
Antimony		10.1 U	16.6 U	19.7 U	20.4 U	7 U	21.3 U	7.4 U
Arsenic		36.1	36.6	33.8	31.7	2.2	14.8	1.8 U
Barium		466	123	202	372	25.1	113	13.4
Beryllium		0.87	0.85	0.64	0.65	0.11	0.61	0.1
Cadmium		1.57	4.39	4.73	6.44	0.75	4.13	0.93
Chromium		18.8	148	372	252	172	449	28.9
Copper		180	892	1930	1260	1320	1790	2670
Lead		219	507	659	772	159	1120	304
Mercury		0.637	0.12 U	1.21	1.53	0.113	1.11	0.061
Nickel		274	853	118	147	19.2	99.8	22.8
Selenium		17.9	16.6 U	19.7 U	20.4 U	7 U	21.3 U	7.4 U
Silver		37.9	78.3	132	130	38.4	131	30.3
Zinc		209	1300	1420	1480	893	1440	1110
Total Organic Carbon (TOC)		29600 >	46000	41000	45000	6700	46000	7000
AVS/SEM (umol/kg)								
Antimony	45.46							
Copper	8371.08							
Lead	3249.11							
Silver	529.87							
Zinc	20240.53							
AVS	594.29							
SEM	32436.04							
Total Petroleum Hydrocarbon (mg/kg)								
Total Petroleum Hydrocarbon		88.8	413	394	459	1240	961	209

Notes:

- [1] Average calculated using one-half the reporting limit for non-detects
- AVS/SEM - Acid Volatile Sulfide/Simultaneously Extracted Metals
- mg/kg - milligram per kilogram
- umol/kg - micromole per kilogram
- U - not detected, value is reporting limit
- J - value is estimated
- B - analyte detected in sample and the associated blank
- E - for dioxin/furan - PCDE interference
- E - for other analytes - exceeds calibration range
- A - detection limit based on signal-to-noise measurement
- I - interference
- N2 - value obtained from additional analysis

Prepared By: EYM 12/6/12
Checked By: KJC 12/6/12

Table 4.5
Summary of Analytical Results Detected in Shallow Sediment (0-1 ft) - Outer Cove Study Area
Phase II Area - Mashapaug Pond and Cove
Former Gorham Manufacturing Facility
333 Adelaide Avenue
Providence, Rhode Island

Parameter	Frequency of Detection	Range of Reporting Limits for Non Detects	Range of Detected Concentrations	Average [1]	SED1101 6/22/2006 0 - 1 ft	SED1301 6/22/2006 0 - 0.5 ft	SED1401 6/22/2006 0 - 1 ft	SED1501 6/22/2006 0 - 1 ft	SED-33-01 12/19/2011 0 - 1 ft
Volatile Organic Compound (mg/kg)									
1,1,1-Trichloroethane	1 / 4	0.0045 - 0.0427	0.863 : 0.863	0.22	0.0427 U	0.0045 U	0.012 U	0.863	
1,1-Dichloroethane	1 / 4	0.0045 - 0.0427	0.0518 : 0.0518	0.020	0.0427 U	0.0045 U	0.012 U	0.0518	
1,1-Dichloroethene	1 / 4	0.0045 - 0.0427	0.0467 : 0.0467	0.019	0.0427 U	0.0045 U	0.012 U	0.0467	
Acetone	3 / 4	0.0461 - 0.0461	0.105 : 0.649	0.24	0.649	0.105	0.202	0.0461 U	
Carbon disulfide	2 / 4	0.012 - 0.0427	0.0046 : 0.021	0.013	0.0427 U	0.0046	0.012 U	0.021	
cis-1,2-Dichloroethene	1 / 4	0.0045 - 0.0427	0.296 : 0.296	0.081	0.0427 U	0.0045 U	0.012 U	0.296	
Tetrachloroethene	1 / 4	0.0045 - 0.0427	0.0161 : 0.0161	0.011	0.0427 U	0.0045 U	0.012 U	0.0161	
trans-1,2-Dichloroethene	1 / 4	0.0045 - 0.0427	0.0053 : 0.0053	0.0087	0.0427 U	0.0045 U	0.012 U	0.0053	
Trichloroethene	1 / 4	0.0045 - 0.0427	1.47 : 1.47	0.37	0.0427 U	0.0045 U	0.012 U	1.47	
Semivolatile Organic Compound (mg/kg)									
Benzo(b)fluoranthene	2 / 4	0.0315 - 0.0943	0.0378 : 0.245	0.086	0.245	0.0378	0.0943 U	0.0315 U	
Fluoranthene	3 / 4	0.0315 - 0.0315	0.0833 : 0.327	0.16	0.327	0.0833	0.204	0.0315 U	
Phenanthrene	2 / 4	0.0315 - 0.163	0.0333 : 0.0999	0.058	0.163 U	0.0333	0.0999	0.0315 U	
Pyrene	3 / 4	0.0315 - 0.0315	0.0513 : 0.258	0.12	0.258	0.0513	0.153	0.0315 U	
Dioxins/Furans (mg/kg)									
1,2,3,4,6,7,8-HpCDD	12 / 22	0.0000008 - 0.000005	0.0000022 : 0.00059	0.00011	0.00028	0.0000022 J	0.000071	0.000008 U	0.000005 U
1,2,3,4,6,7,8-HpCDF	11 / 22	0.00000076 - 0.000005	0.0000075 : 0.00028	0.000057	0.00014	0.00000076 U	0.000037	0.000008 U	0.000005 U
1,2,3,4,7,8,9-HpCDF	8 / 22	0.00000076 - 0.000005	0.0000044 : 0.000024	0.0000071	0.000018	0.00000076 U	0.0000044 J	0.0000008 U	0.000005 U
1,2,3,4,7,8-HxCDD	8 / 22	0.00000076 - 0.000005	0.0000033 : 0.000014	0.0000046	0.0000095 J	0.00000076 U	0.0000033 J	0.0000008 U	0.000005 U
1,2,3,4,7,8-HxCDF	6 / 22	0.00000076 - 0.000005	0.000018 : 0.000075	0.000015	0.000036 A	0.00000076 U	0.0000017 UE	0.0000008 U	0.000005 U
1,2,3,6,7,8-HxCDD	8 / 22	0.00000076 - 0.000005	0.0000068 : 0.000044	0.000011	0.000025	0.00000076 U	0.0000068 J	0.0000008 U	0.000005 U
1,2,3,6,7,8-HxCDF	9 / 22	0.00000076 - 0.000005	0.0000058 : 0.00015	0.000028	0.000086 A	0.00000076 U	0.000026	0.0000008 U	0.000005 U
1,2,3,7,8,9-HxCDD	8 / 22	0.00000076 - 0.000005	0.0000034 : 0.000031	0.0000080	0.000017	0.00000076 U	0.0000034 J	0.0000008 U	0.000005 U
1,2,3,7,8,9-HxCDF	6 / 22	0.00000076 - 0.000005	0.0000084 : 0.000041	0.0000077	0.00003 A	0.00000076 U	0.0000084 J	0.0000008 U	0.000005 U
1,2,3,7,8-PeCDD	8 / 22	0.00000076 - 0.000005	0.0000048 : 0.000022	0.0000062	0.000011 J	0.00000076 U	0.0000048 J	0.0000008 U	0.000005 U
1,2,3,7,8-PeCDF	5 / 22	0.00000076 - 0.000005	0.0000084 : 0.000043	0.0000074	0.000032 A	0.00000076 U	0.0000084 JA	0.0000008 U	0.000005 U
2,3,4,6,7,8-HxCDF	10 / 22	0.00000076 - 0.000005	0.0000053 : 0.00011	0.000028	0.00008	0.00000076 U	0.000051	0.0000008 U	0.000005 U
2,3,4,7,8-PeCDF	12 / 22	0.0000008 - 0.000005	0.0000086 : 0.00066	0.00010	0.00043 A	0.00000086 J	0.00015 A	0.0000008 U	0.000005 U
2,3,7,8-TCDD	8 / 22	0.00000015 - 0.000001	0.0000014 : 0.00001	0.0000019	0.0000042 A	0.00000015 U	0.0000014 JA	0.00000016 U	0.000001 U
2,3,7,8-TCDF	11 / 22	0.00000016 - 0.000001	0.0000019 : 0.00012	0.000018	0.0000057 UEA	0.00000019 J	0.0000076 A	0.00000016 U	0.000001 U
OCDD	13 / 22	0.00001 - 0.00001	0.0000044 : 0.0045	0.00081	0.0018	0.000016 B	0.00047	0.0000044 BJ	0.00001 U
OCDF	10 / 22	0.0000016 - 0.00001	0.0000016 : 0.00027	0.000048	0.000087	0.0000016 J	0.000036	0.0000016 U	0.00001 U
Dioxin Toxicity Equivalent (USEPA, 2010)	13 / 22	0.0000057 - 0.0000057	0.00000091 : 0.00027	0.000052	0.00018	0.000001	0.000063	0.00000091	0.0000057 U
Total HpCDD	12 / 22	0.0000008 - 0.000005	0.0000039 : 0.0014	0.00027	0.00063	0.00000039	0.00014	0.0000008 U	0.000005 U
Total HpCDF	12 / 22	0.0000008 - 0.000005	0.0000011 : 0.00056	0.00011	0.00033	0.0000011 J	0.000089	0.0000008 U	0.000005 U
Total HxCDD	10 / 22	0.00000076 - 0.000005	0.000007 : 0.00056	0.00012	0.0003	0.00000076 U	0.000087	0.0000008 U	0.000005 U
Total HxCDF	13 / 22	0.000005 - 0.000005	0.0000011 : 0.0038	0.00085	0.0023	0.000003 J	0.00051	0.0000011 J	0.000005 U
Total PeCDD	8 / 22	0.00000076 - 0.000005	0.000047 : 0.00023	0.000052	0.00014	0.00000076 U	0.000047	0.0000008 U	0.000005 U
Total PeCDF	13 / 22	0.000005 - 0.000005	0.0000031 : 0.0075	0.0016	0.0055	0.00000074	0.0013	0.0000031 J	0.000005 U
Total TCDD	10 / 22	0.00000015 - 0.000001	0.000001 : 0.00012	0.000027	0.000089	0.00000015 U	0.000029	0.00000016 U	0.000001 U
Total TCDF	13 / 22	0.000001 - 0.000001	0.0000013 : 0.0022	0.00054	0.0016	0.00000031	0.00042	0.0000013	0.000001 U
Inorganics (mg/kg)									
Arsenic	21 / 22	2 - 2	3.7 : 47.6	16.4	4.8	11.5	47.6	12.6	5
Barium	4 / 4		9.7 : 156	77	156	11.5	130	9.7	
Beryllium	18 / 22	0.07 - 0.08	0.1 : 0.91	0.34	0.47	0.07 U	0.35	0.07 U	0.16
Cadmium	8 / 22	0.35 - 0.71	1.57 : 3.24	1.1	3.24	0.67 U	2.26	0.66 U	0.38 U
Chromium	22 / 22		1.8 : 213	56	213	4.7	49.1	2.9	4.3
Copper	21 / 22	2 - 2	3.1 : 423	131	423	5.3	215	5.8	18

Table 4.5
Summary of Analytical Results Detected in Shallow Sediment (0-1 ft) - Outer Cove Study Area
Phase II Area - Mashapaug Pond and Cove
Former Gorham Manufacturing Facility
333 Adelaide Avenue
Providence, Rhode Island

Parameter	Frequency of Detection	Range of Reporting Limits for Non Detects	Range of Detected Concentrations	Average [1]	SED1101 6/22/2006 0 - 1 ft	SED1301 6/22/2006 0 - 0.5 ft	SED1401 6/22/2006 0 - 1 ft	SED1501 6/22/2006 0 - 1 ft	SED-33-01 12/19/2011 0 - 1 ft
Lead	17 / 22	3.9 - 6.7	3.5 : 611	191	590	6.7 U	250	6.6 U	127
Mercury	9 / 22	0.015 - 0.208	0.07 : 1.32	0.30	0.208 U	0.04 U	0.116 U	0.041 U	0.018 U
Nickel	22 / 22		2.1 : 85.7	28	85.7	22.5	31.4	6.8	41
Silver	13 / 22	0.35 - 0.67	0.38 : 29.7	8.0	29.7	0.67 U	18.5	0.66 U	0.38
Zinc	22 / 22		10.5 : 620	194	620	41.4	363	12.6	35.1
Percent Solid (%)	6 / 6		14.7 : 83.8	64					76.7
Total Organic Carbon	21 / 22	1200 - 1200	1500 : 140000	44330	65000	2700	31000	7000	8870 H
AVS/SEM (umol/kg)									
Arsenic	12 / 18	38.3 - 41.6	44.6 : 372	117					40 U
Beryllium	12 / 18	6.44 - 6.92	7.69 : 75.4	28					10.9
Cadmium	7 / 18	2.55 - 5.11	5.01 : 33	9.3					2.67 U
Chromium	14 / 18	22.3 - 24	24.1 : 1780	539					23.1 U
Copper	18 / 18		26 : 4960	1424					119
Lead	18 / 18		12.3 : 3070	934					170
Nickel	9 / 18	48.8 - 97.8	138 : 767	250					733
Silver	9 / 18	5.31 - 10.6	8.11 : 81.6	24					13.1
Zinc	18 / 18		94.4 : 8540	2863					581
AVS	14 / 18	1.83 - 3.39	7.91 : 15600	2532					18.3

Notes:
[1] Average calculated using one-half the reporting limit for non-detects
AVS/SEM - Acid Volatile Sulfide/Simultaneously Extracted Metals
mg/kg - milligram per kilogram
umol/kg - micromole per kilogram
U - not detected, value is reporting limit
J - value is estimated
B - analyte detected in sample and the associated blank
H - holding time exceeded
E - PCDE interference
A - detection limit based on signal-to-noise measurement
D - value is from a diluted analyses

Table 4.5
Summary of Analytical Results Detected in Shallow Sediment (0-1 ft) - Outer Cove Study Area
Phase II Area - Mashapaug Pond and Cove
Former Gorham Manufacturing Facility
333 Adelaide Avenue
Providence, Rhode Island

Parameter	SED-34-01 12/20/2011 0 - 1 ft	SED-35-01 12/16/2011 0 - 1 ft	SED-36-01 12/14/2011 0 - 1 ft	SED-37-01 12/15/2011 0 - 1 ft	SED-38-01 12/13/2011 0 - 1 ft	SED-39-01 12/14/2011 0 - 1 ft	SED-40-01 12/16/2011 0 - 1 ft	SED-41-01 12/15/2011 0 - 1 ft	SED-42-01 12/14/2011 0 - 1 ft	SED-43-01 12/19/2011 0 - 1 ft
Volatile Organic Compound (mg/kg)										
1,1,1-Trichloroethane										
1,1-Dichloroethane										
1,1-Dichloroethene										
Acetone										
Carbon disulfide										
cis-1,2-Dichloroethene										
Tetrachloroethene										
trans-1,2-Dichloroethene										
Trichloroethene										
Semivolatle Organic Compound (mg/kg)										
Benzo(b)fluoranthene										
Fluoranthene										
Phenanthrene										
Pyrene										
Dioxins/Furans (mg/kg)										
1,2,3,4,6,7,8-HpCDD	0.000005 U	0.000005 U	0.000014	0.000005 U	0.000005 U	0.0003	0.000005 U	0.00032	0.000005 U	0.000018
1,2,3,4,6,7,8-HpCDF	0.000005 U	0.000005 U	0.000013	0.000005 U	0.000005 U	0.00018	0.000005 U	0.00018	0.000005 U	0.0000095
1,2,3,4,7,8,9-HpCDF	0.000005 U	0.000005 U	0.000005 U	0.000005 U	0.000005 U	0.000023	0.000005 U	0.00002	0.000005 U	0.000005 U
1,2,3,4,7,8-HxCDD	0.000005 U	0.000005 U	0.000005 U	0.000005 U	0.000005 U	0.00001	0.000005 U	0.00001	0.000005 U	0.000005 U
1,2,3,4,7,8-HxCDF	0.000005 U	0.000005 U	0.000005 U	0.000005 U	0.000005 U	0.000005 U	0.000005 U	0.0000075	0.000005 U	0.000005 U
1,2,3,6,7,8-HxCDD	0.000005 U	0.000005 U	0.000005 U	0.000005 U	0.000005 U	0.000033	0.000005 U	0.000032	0.000005 U	0.000005 U
1,2,3,6,7,8-HxCDF	0.000005 U	0.000005 U	0.0000058	0.000005 U	0.000005 U	0.00015	0.000005 U	0.00013	0.000005 U	0.0000066
1,2,3,7,8,9-HxCDD	0.000005 U	0.000005 U	0.000005 U	0.000005 U	0.000005 U	0.000021	0.000005 U	0.000022	0.000005 U	0.000005 U
1,2,3,7,8,9-HxCDF	0.000005 U	0.000005 U	0.000005 U	0.000005 U	0.000005 U	0.000013	0.000005 U	0.000041	0.000005 U	0.000005 U
1,2,3,7,8-PeCDD	0.000005 U	0.000005 U	0.000005 U	0.000005 U	0.000005 U	0.00002	0.000005 U	0.000018	0.000005 U	0.000005 U
1,2,3,7,8-PeCDF	0.000005 U	0.000005 U	0.000005 U	0.000005 U	0.000005 U	0.000005 U	0.000005 U	0.000043	0.000005 U	0.000005 U
2,3,4,6,7,8-HxCDF	0.000005 U	0.000005 U	0.0000056	0.000005 U	0.000005 U	0.00011	0.000005 U	0.000082	0.000005 U	0.0000053
2,3,4,7,8-PeCDF	0.000005 U	0.000005 U	0.000009	0.000005 U	0.000005 U	0.00011	0.000005 U	0.00006	0.000005 U	0.0000082
2,3,7,8-TCDD	0.000001 U	0.000001 U	0.000001 U	0.000001 U	0.000001 U	0.00001	0.000001 U	0.000052	0.000001 U	0.000001 U
2,3,7,8-TCDF	0.000001 U	0.000001 U	0.0000041	0.000001 U	0.000001 U	0.000054	0.000001 U	0.000054	0.000001 U	0.0000036
OCDD	0.00001 U	0.00001 U	0.0001	0.00001 U	0.00001 U	0.0021	0.00001 U	0.0021	0.00001 U	0.00012
OCDF	0.00001 U	0.00001 U	0.000014	0.00001 U	0.00001 U	0.00014	0.00001 U	0.00012	0.00001 U	0.00001 U
Dioxin Toxicity Equivalent (USEPA, 2010)	0.0000057 U	0.0000057 U	0.0000089	0.0000057 U	0.0000057 U	0.00011	0.0000057 U	0.00027	0.0000057 U	0.0000087
Total HpCDD	0.000005 U	0.000005 U	0.000028	0.000005 U	0.000005 U	0.00071	0.000005 U	0.00078	0.000005 U	0.00004
Total HpCDF	0.000005 U	0.000005 U	0.000021	0.000005 U	0.000005 U	0.00045	0.000005 U	0.00022	0.000005 U	0.000019
Total HxCDD	0.000005 U	0.000005 U	0.000007	0.000005 U	0.000005 U	0.00042	0.000005 U	0.00043	0.000005 U	0.0000087
Total HxCDF	0.000005 U	0.000005 U	0.000014	0.000005 U	0.000005 U	0.00038	0.000005 U	0.00038	0.000005 U	0.00015
Total PeCDD	0.000005 U	0.000005 U	0.000005 U	0.000005 U	0.000005 U	0.00023	0.000005 U	0.00018	0.000005 U	0.000005 U
Total PeCDF	0.000005 U	0.000005 U	0.000026	0.000005 U	0.000005 U	0.0075 E	0.000005 U	0.0062 E	0.000005 U	0.00023
Total TCDD	0.000001 U	0.000001 U	0.0000026	0.000001 U	0.000001 U	0.00011	0.000001 U	0.00012	0.000001 U	0.000001 U
Total TCDF	0.000001 U	0.000001 U	0.000013	0.000001 U	0.000001 U	0.0021 E	0.000001 U	0.0022 E	0.000001 U	0.00011
Inorganics (mg/kg)										
Arsenic	3.7	18.5	16.3	4.6	4.1	24.7	5.6	25.2	2 U	20.2
Barium										
Beryllium	0.11	0.18	0.32	0.13	0.1	0.77	0.17	0.83	0.08 U	0.2
Cadmium	0.42 U	0.58 U	0.71 U	0.39 U	0.39 U	2.11	0.54 U	2.27	0.4 U	0.63 U
Chromium	4.5	7.6	27.9	3.5	3.7	127	3.2	150	1.8	12.7
Copper	210	5.9	82.7	3.1	6.6	328	4.6	333	2 U	24.7

Table 4.5
Summary of Analytical Results Detected in Shallow Sediment (0-1 ft) - Outer Cove Study Area
Phase II Area - Mashapaug Pond and Cove
Former Gorham Manufacturing Facility
333 Adelaide Avenue
Providence, Rhode Island

Parameter	SED-34-01	SED-35-01	SED-36-01	SED-37-01	SED-38-01	SED-39-01	SED-40-01	SED-41-01	SED-42-01	SED-43-01
	12/20/2011	12/16/2011	12/14/2011	12/15/2011	12/13/2011	12/14/2011	12/16/2011	12/15/2011	12/14/2011	12/19/2011
	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
Lead	23.6	8.1	88.1	3.9 U	6.6	475	5.4 U	467	4 U	43.4
Mercury	0.015 U	0.023 U	0.141	0.018 U	0.019 U	1.32	0.02 U	1.01	0.016 U	0.102
Nickel	3.8	8.5	18.7	3.3	7	50.7	3.2	58.8	2.1	6.4
Silver	6.79	0.58 U	6.38	0.39 U	0.39 U	23.8	0.54 U	22.9	0.4 U	1.12
Zinc	30.7	17.4	157	10.5	37.8	491	13.1	494	10.7	40.8
Percent Solid (%)	83.8									45.4
Total Organic Carbon	1500	10000	37000	6700	5400	140000	2000	130000	4300	37700 H
AVS/SEM (umol/kg)										
Arsenic	40.6 U	104	125	41.6 U	44.6	186	38.8 U	197	40.7 U	118
Beryllium	6.75 U	6.8 U	21.7	6.92 U	6.6 U	60.9	6.44 U	58.1	7.69	17.6
Cadmium	2.71 U	2.73 U	5.01	2.77 U	2.65 U	20.2	2.58 U	24.1	2.71 U	5.11 U
Chromium	27.5	28.1	229	24 U	22.9 U	1370	22.3 U	1780	24.1	105
Copper	482	47.6	674	26	48.7	3870	33	4130	27.6	274
Lead	79.6	17.4	313	12.9	18.4	2320	13.2	2460	12.3	265
Nickel	51.8 U	52.2 U	149	53.1 U	138	416	49.5 U	502	51.9 U	97.8 U
Silver	8.11	5.68 U	19.4	5.78 U	5.51 U	64.2	5.38 U	75.8	5.65 U	10.6 U
Zinc	415	157	1880	94.4	775	7640	123	8090	319	727
AVS	80.2	8.46	3.39 U	7.91	14.8	4160 D	1.83 U	6490 D	1.93 U	2180 D

Notes:
[1] Average calculated using one-half the reporting limit for non-detects
AVS/SEM - Acid Volatile Sulfide/Simultaneously Extracted Metals
mg/kg - milligram per kilogram
umol/kg - micromole per kilogram
U - not detected, value is reporting limit
J - value is estimated
B - analyte detected in sample and the associated blank
H - holding time exceeded
E - PCDE interference
A - detection limit based on signal-to-noise measurement
D - value is from a diluted analyses

Table 4.5
Summary of Analytical Results Detected in Shallow Sediment (0-1 ft) - Outer Cove Study Area
Phase II Area - Mashapaug Pond and Cove
Former Gorham Manufacturing Facility
333 Adelaide Avenue
Providence, Rhode Island

Parameter	SED-44-01 12/15/2011 0 - 1 ft	SED-45-01 12/14/2011 0 - 1 ft	SED-46-01 12/20/2011 0 - 1 ft	SED-47-01 12/15/2011 0 - 1 ft	SED-48-01 12/14/2011 0 - 1 ft	SED-59-01 12/20/2011 0 - 1 ft	SED-60-01 12/20/2011 0 - 1 ft
Volatile Organic Compound (mg/kg)							
1,1,1-Trichloroethane							
1,1-Dichloroethane							
1,1-Dichloroethene							
Acetone							
Carbon disulfide							
cis-1,2-Dichloroethene							
Tetrachloroethene							
trans-1,2-Dichloroethene							
Trichloroethene							
Semivolatile Organic Compound (mg/kg)							
Benzo(b)fluoranthene							
Fluoranthene							
Phenanthrene							
Pyrene							
Dioxins/Furans (mg/kg)							
1,2,3,4,6,7,8-HpCDD	0.00023	0.000014	0.00032	0.00034	0.00059	0.000005 U	0.000005 U
1,2,3,4,6,7,8-HpCDF	0.00014	0.0000075	0.00011	0.00014	0.00028	0.000005 U	0.000005 U
1,2,3,4,7,8,9-HpCDF	0.000016	0.000005 U	0.000009	0.000012	0.000024	0.000005 U	0.000005 U
1,2,3,4,7,8-HxCDD	0.000077	0.000005 U	0.0000065	0.0000092	0.000014	0.000005 U	0.000005 U
1,2,3,4,7,8-HxCDF	0.000056	0.000005 U	0.000018	0.000036	0.00007	0.000005 U	0.000005 U
1,2,3,6,7,8-HxCDD	0.000023	0.000005 U	0.000018	0.000024	0.000044	0.000005 U	0.000005 U
1,2,3,6,7,8-HxCDF	0.000099	0.000005 U	0.000037	0.000058	0.000005 U	0.000005 U	0.000005 U
1,2,3,7,8,9-HxCDD	0.000016	0.000005 U	0.000016	0.000019	0.000031	0.000005 U	0.000005 U
1,2,3,7,8,9-HxCDF	0.00003	0.000005 U	0.000005 U	0.000012	0.000005 U	0.000005 U	0.000005 U
1,2,3,7,8-PeCDD	0.000012	0.000005 U	0.0000074	0.00001	0.000022	0.000005 U	0.000005 U
1,2,3,7,8-PeCDF	0.000023	0.000005 U	0.000005 U	0.000018	0.000005 U	0.000005 U	0.000005 U
2,3,4,6,7,8-HxCDF	0.000084	0.000005 U	0.000025	0.000046	0.000096	0.000005 U	0.000005 U
2,3,4,7,8-PeCDF	0.00045	0.0000057	0.000038	0.00021	0.00014	0.000005 U	0.000005 U
2,3,7,8-TCDD	0.0000031	0.000001 U	0.0000024	0.0000024	0.000006 A	0.000001 U	0.000001 U
2,3,7,8-TCDF	0.000038	0.0000029	0.000043	0.000057	0.00012 A	0.000001 U	0.000001 U
OCDD	0.0015	0.00012	0.0025	0.0025	0.0045	0.00001 U	0.00001 U
OCDF	0.000081	0.00001 U	0.00014	0.00012	0.00027	0.00001 U	0.00001 U
Dioxin Toxicity Equivalent (USEPA, 2010)	0.00019	0.0000071	0.000043	0.00011	0.00012	0.0000057 U	0.0000057 U
Total HpCDD	0.00056	0.000031	0.00073	0.00082	0.0014	0.000005 U	0.000005 U
Total HpCDF	0.00016	0.000014	0.00024	0.00026	0.00056	0.000005 U	0.000005 U
Total HxCDD	0.00032	0.000005 U	0.00022	0.00033	0.00056	0.000005 U	0.000005 U
Total HxCDF	0.0027	0.000058	0.00081	0.0015	0.003	0.000005 U	0.000005 U
Total PeCDD	0.00012	0.000005 U	0.000066	0.000095	0.00023	0.000005 U	0.000005 U
Total PeCDF	0.0045 E	0.000098	0.0013	0.0018	0.0054	0.000005 U	0.000005 U
Total TCDD	0.000089	0.000001	0.000031	0.000062	0.000053	0.000001 U	0.000001 U
Total TCDF	0.0018 E	0.000043	0.00042	0.0011	0.0019	0.000001 U	0.000001 U
Inorganics (mg/kg)							
Arsenic	23	7.1	42	26.4	23.7	28.1	4.3
Barium							
Beryllium	0.82	0.16	0.65	0.9	0.91	0.08 U	0.12
Cadmium	1.57	0.61 U	2.64	2.83	2.66	0.37 U	0.35 U
Chromium	87.6	8	127	196	189	3.9	3.2
Copper	189	14	336	342	327	5.6	5.1

Table 4.5
Summary of Analytical Results Detected in Shallow Sediment (0-1 ft) - Outer Cove Study Area
Phase II Area - Mashapaug Pond and Cove
Former Gorham Manufacturing Facility
333 Adelaide Avenue
Providence, Rhode Island

Parameter	SED-44-01	SED-45-01	SED-46-01	SED-47-01	SED-48-01	SED-59-01	SED-60-01
	12/15/2011	12/14/2011	12/20/2011	12/15/2011	12/14/2011	12/20/2011	12/20/2011
	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
Lead	393	25.1	490	580	611	4.5	3.5
Mercury	0.972	0.07	0.482	1.03	1.22	0.016 U	0.019 U
Nickel	34.2	4.1	69.4	77.3	69.2	5	2.8
Silver	13.9	0.66	17	16.7	16	0.37 U	0.35 U
Zinc	363	31.8	467	496	501	18.3	15.3
Percent Solid (%)			14.7			78.6	83.4
Total Organic Carbon	99000	19000	123000	130000	110000	4500	1200 U
AVS/SEM (umol/kg)							
Arsenic	205	63.3	372	235	223	121	38.3 U
Beryllium	66.9	11	75.2	67.6	75.4	6.85 U	9.59
Cadmium	17	4.18 U	33	27.6	24.5	2.74 U	2.55 U
Chromium	1010	72.3	1450	1730	1730	35.8	64.2
Copper	2680	172	4960	4480	3510	40.6	57.6
Lead	2300	138	2640	2950	3070	14.8	15.7
Nickel	291	80 U	767	737	498	52.6 U	48.8 U
Silver	37.1	8.71 U	81.6	61.7	33.8	5.72 U	5.31 U
Zinc	6190	525	8540	7640	7410	219	214
AVS	6530 D	205	15600 D	5300 D	4970 D	1.95 U	11.7

Notes:

- [1] Average calculated using one-half the reporting limit for non-detects
- AVS/SEM - Acid Volatile Sulfide/Simultaneously Extracted Metals
- mg/kg - milligram per kilogram
- umol/kg - micromole per kilogram
- U - not detected, value is reporting limit
- J - value is estimated
- B - analyte detected in sample and the associated blank
- H - holding time exceeded
- E - PCDE interference
- A - detection limit based on signal-to-noise measurement
- D - value is from a diluted analyses

Prepared By: EYM 12/6/12
Checked By: KJC 12/6/12

Table 4.6
Summary of Analytical Results Detected in Shallow Sediment (0-1 ft) - Remainder of the Pond
Phase II Area - Mashapaug Pond and Cove
Former Gorham Manufacturing Facility
333 Adelaide Avenue
Providence, Rhode Island

Parameter	Frequency of Detection	Range of Reporting Limits for Non Detects	Range of Detected Concentrations	Average [1]	SED1001 6/22/2006 0.5 - 1 ft	SED1201 6/22/2006 0.5 - 1 ft
Volatile Organic Compound (mg/kg)						
Acetone	1 / 2	0.0403 - 0.0403	0.0757 : 0.0757	0.048	0.0403 U	0.0757
Semivolatile Organic Compound (mg/kg)						
Acenaphthene	1 / 2	0.0305 - 0.0305	0.0564 : 0.0564	0.036	0.0305 U	0.0564
Anthracene	1 / 2	0.0305 - 0.0305	0.276 : 0.276	0.15	0.0305 U	0.276
Benzo(a)anthracene	1 / 2	0.0305 - 0.0305	0.685 : 0.685	0.35	0.0305 U	0.685
Benzo(a)pyrene	1 / 2	0.0305 - 0.0305	0.862 : 0.862	0.44	0.0305 U	0.862
Benzo(b)fluoranthene	1 / 2	0.0305 - 0.0305	1.41 : 1.41	0.71	0.0305 U	1.41
Benzo(g,h,i)perylene	1 / 2	0.0305 - 0.0305	0.244 : 0.244	0.13	0.0305 U	0.244
Benzo(k)fluoranthene	1 / 2	0.0305 - 0.0305	0.636 : 0.636	0.33	0.0305 U	0.636
Chrysene	1 / 2	0.0305 - 0.0305	0.625 : 0.625	0.32	0.0305 U	0.625
Dibenzo(a,h)anthracene	1 / 2	0.0305 - 0.0305	0.0807 : 0.0807	0.048	0.0305 U	0.0807
Fluoranthene	1 / 2	0.0305 - 0.0305	1.92 : 1.92	0.97	0.0305 U	1.92
Fluorene	1 / 2	0.0305 - 0.0305	0.107 : 0.107	0.061	0.0305 U	0.107
Indeno(1,2,3-cd)pyrene	1 / 2	0.0305 - 0.0305	0.259 : 0.259	0.14	0.0305 U	0.259
Phenanthrene	1 / 2	0.0305 - 0.0305	1.14 : 1.14	0.58	0.0305 U	1.14
Pyrene	1 / 2	0.0305 - 0.0305	1.01 : 1.01	0.51	0.0305 U	1.01
Pesticides (mg/kg)						
4,4'-DDD	1 / 2	0.0056 - 0.0056	0.0214 : 0.0214	0.012	0.0056 U	0.0214
Dioxins/Furans (mg/kg)						
1,2,3,4,6,7,8-HpCDD	9 / 11	0.00000075 - 0.0000005	0.0000074 : 0.00023	0.000060	0.00000075 U	0.0000074
1,2,3,4,6,7,8-HpCDF	8 / 11	0.00000075 - 0.0000005	0.000002 : 0.00012	0.000040	0.00000075 U	0.000002 J
1,2,3,4,7,8,9-HpCDF	4 / 11	0.00000071 - 0.0000005	0.0000067 : 0.000081	0.000017	0.00000075 U	0.00000071 U
1,2,3,4,7,8-HxCDD	3 / 11	0.00000071 - 0.0000005	0.0000063 : 0.000079	0.000016	0.00000075 U	0.00000071 U
1,2,3,4,7,8-HxCDF	6 / 11	0.00000071 - 0.0000005	0.00001 : 0.00007	0.000021	0.00000075 U	0.00000071 U
1,2,3,6,7,8-HxCDD	6 / 11	0.00000071 - 0.0000005	0.0000065 : 0.000075	0.000018	0.00000075 U	0.00000071 U
1,2,3,6,7,8-HxCDF	6 / 11	0.00000071 - 0.0000005	0.000022 : 0.000077	0.000028	0.00000075 U	0.00000071 U
1,2,3,7,8,9-HxCDD	4 / 11	0.00000071 - 0.0000005	0.0000082 : 0.00008	0.000017	0.00000075 U	0.00000071 U
1,2,3,7,8,9-HxCDF	5 / 11	0.00000071 - 0.0000005	0.0000078 : 0.000075	0.000017	0.00000075 U	0.00000071 U
1,2,3,7,8-PeCDD	3 / 11	0.00000071 - 0.0000005	0.0000066 : 0.000065	0.000013	0.00000075 U	0.00000071 U
1,2,3,7,8-PeCDF	6 / 11	0.00000071 - 0.0000005	0.0000075 : 0.000078	0.000018	0.00000075 U	0.00000071 U
2,3,4,6,7,8-HxCDF	6 / 11	0.00000071 - 0.0000005	0.000033 : 0.000076	0.000027	0.00000075 U	0.00000071 U
2,3,4,7,8-PeCDF	7 / 11	0.00000075 - 0.0000005	0.0000073 : 0.00025	0.000073	0.00000075 U	0.00000073 J
2,3,7,8-TCDD	5 / 11	0.00000014 - 0.0000001	0.0000014 : 0.000014	0.0000032	0.00000015 U	0.00000014 U
2,3,7,8-TCDF	8 / 11	0.00000015 - 0.0000001	0.00000024 : 0.000038	0.000010	0.00000015 U	0.00000024 JA
OCDD	10 / 11	0.00001 - 0.00001	0.0000044 : 0.0018	0.00038	0.0000044 BJ	0.000064
OCDF	7 / 11	0.0000015 - 0.00001	0.0000031 : 0.00013	0.000043	0.0000015 U	0.0000031 J
Dioxin Toxicity Equivalent (USEPA, 2010)	8 / 9	0.0000058 - 0.0000058	0.00000086 : 0.0001	0.000033	0.00000086	0.000001

Table 4.6
Summary of Analytical Results Detected in Shallow Sediment (0-1 ft) - Remainder of the Pond
Phase II Area - Mashapaug Pond and Cove
Former Gorham Manufacturing Facility
333 Adelaide Avenue
Providence, Rhode Island

Parameter	Frequency of Detection	Range of Reporting Limits for Non Detects	Range of Detected Concentrations	Average [1]	SED1001 6/22/2006 0.5 - 1 ft	SED1201 6/22/2006 0.5 - 1 ft
Total HpCDD	7 / 11	0.0000007 - 0.000005	0.000013 : 0.00055	0.00011	0.00000075 U	0.000013 J
Total HpCDF	6 / 11	0.0000007 - 0.000005	0.000002 : 0.00014	0.000035	0.00000075 U	0.000002 J
Total HxCDD	5 / 11	0.0000007 - 0.000005	0.0000011 : 0.00024	0.000051	0.00000075 U	0.0000011 J
Total HxCDF	7 / 11	0.0000007 - 0.000005	0.0000039 : 0.0014	0.00032	0.00000075 U	0.0000039 J
Total PeCDD	4 / 11	0.0000007 - 0.000005	0.0000069 : 0.00006	0.000015	0.00000075 U	0.00000071 U
Total PeCDF	7 / 11	0.0000007 - 0.000005	0.0000056 : 0.002	0.00058	0.00000075 U	0.0000056 J
Total TCDD	5 / 11	0.00000014 - 0.000001	0.00000031 : 0.000053	0.000013	0.00000015 U	0.00000031 J
Total TCDF	7 / 11	0.00000014 - 0.000001	0.0000037 : 0.00093	0.00025	0.00000015 U	0.0000037 J
Inorganics (mg/kg)						
Arsenic	6 / 9	0.3 - 3	11.4 : 57	18.0	0.3 U	3 U
Barium	2 / 2		10.2 : 33.1	22	10.2	33.1
Beryllium	8 / 9	0.07 - 0.07	0.14 : 0.72	0.47	0.07 U	0.31
Cadmium	2 / 9	0.35 - 2.05	0.96 : 1.41	0.69	0.65 U	1.19 U
Chromium	9 / 9		3 : 70.4	27	3	7
Copper	9 / 9		4.1 : 211	60	4.1	12.5
Lead	7 / 9	6.5 - 20.4	4.1 : 419	130	6.5 U	20.7
Mercury	4 / 9	0.021 - 0.11	0.66 : 1.35	0.42	0.035 U	0.068 U
Nickel	8 / 9	5.9 - 5.9	3.6 : 36.1	14.6	3.6	5.9 U
Silver	4 / 9	0.35 - 2.05	2 : 7.49	2.7	0.65 U	1.19 U
Zinc	8 / 9	10.2 - 10.2	16.1 : 308	114	28.1	34.7
Total Organic Carbon (TOC)	8 / 9	1000 - 1000	780 : 140000	69953	780	2300
AVS/SEM (umol/kg)						
Arsenic	5 / 7	36.4 - 87.1	96.1 : 532	217		
Beryllium	6 / 7	6.05 - 6.05	32 : 55.5	40		
Cadmium	4 / 7	2.43 - 13.8	6.83 : 15.5	8.0		
Chromium	5 / 7	107 - 120	30.1 : 753	291		
Copper	7 / 7		34.7 : 2370	809		
Lead	6 / 7	30 - 30	16.9 : 2210	902		
Nickel	3 / 7	46.5 - 265	114 : 404	143		
Silver	1 / 7	5.06 - 28.8	24 : 24	10.6		
Zinc	5 / 7	212 - 238	141 : 4810	2177		
AVS	6 / 7	1.71 - 1.71	718 : 6250	2418		

Notes:

- [1] Average calculated using one-half the reporting limit for non-detects
- AVS/SEM - Acid Volatile Sulfide/Simultaneously Extracted Metals
- mg/kg - milligram per kilogram
- umol/kg - micromole per kilogram
- U - not detected, value is the reporting limit
- J - value is estimated
- B - analyte detected in sample and the associated blank
- E - exceeds calibration range
- A - detection limit based on signal-to-noise measurement
- D - value is from a diluted analyses

Table 4.6
Summary of Analytical Results Detected in Shallow Sediment (0-1 ft) - Remainder of the Pond
Phase II Area - Mashapaug Pond and Cove
Former Gorham Manufacturing Facility
333 Adelaide Avenue
Providence, Rhode Island

Parameter	SED-52-01 12/16/2011 0 - 1 ft	SED-53-01 12/16/2011 0 - 1 ft	SED-54-01 12/16/2011 0 - 1 ft	SED-55-01 12/16/2011 0 - 1 ft	SED-56-01 12/16/2011 0 - 1 ft	SED-57-01 12/16/2011 0 - 1 ft	SED-58-01 12/16/2011 0 - 1 ft
Volatile Organic Compound (mg/kg)							
Acetone							
Semivolatile Organic Compound (mg/kg)							
Acenaphthene							
Anthracene							
Benzo(a)anthracene							
Benzo(a)pyrene							
Benzo(b)fluoranthene							
Benzo(g,h,i)perylene							
Benzo(k)fluoranthene							
Chrysene							
Dibenzo(a,h)anthracene							
Fluoranthene							
Fluorene							
Indeno(1,2,3-cd)pyrene							
Phenanthrene							
Pyrene							
Pesticides (mg/kg)							
4,4'-DDD							
Dioxins/Furans (mg/kg)							
1,2,3,4,6,7,8-HpCDD	0.00011	0.000062	0.00023	0.000012	0.0000076	0.000095	0.000005 U
1,2,3,4,6,7,8-HpCDF	0.00007	0.00004	0.00012	0.0000052	0.000005 U	0.000042	0.000005 U
1,2,3,4,7,8,9-HpCDF	0.0000067	0.000005 U	0.0000093	0.000005 U	0.000005 U	0.000005 U	0.000005 U
1,2,3,4,7,8-HxCDD	0.000005 U	0.000005 U	0.0000063	0.000005 U	0.000005 U	0.000005 U	0.000005 U
1,2,3,4,7,8-HxCDF	0.000028	0.000015	0.00003	0.000005 U	0.000005 U	0.00001	0.000005 U
1,2,3,6,7,8-HxCDD	0.000011	0.0000065	0.000019	0.000005 U	0.000005 U	0.0000073	0.000005 U
1,2,3,6,7,8-HxCDF	0.000049	0.000028	0.000049	0.000005 U	0.000005 U	0.000022	0.000005 U
1,2,3,7,8,9-HxCDD	0.0000082	0.000005 U	0.000014	0.000005 U	0.000005 U	0.000005 U	0.000005 U
1,2,3,7,8,9-HxCDF	0.000012	0.0000078	0.000011	0.000005 U	0.000005 U	0.000005 U	0.000005 U
1,2,3,7,8-PeCDD	0.0000066	0.000005 U	0.000005 U	0.000005 U	0.000005 U	0.000005 U	0.000005 U
1,2,3,7,8-PeCDF	0.000011	0.0000075	0.000012	0.000005 U	0.000005 U	0.0000087	0.000005 U
2,3,4,6,7,8-HxCDF	0.000034	0.000033	0.000038	0.000005 U	0.000005 U	0.000036	0.000005 U
2,3,4,7,8-PeCDF	0.00025	0.00015	0.00018	0.000005 U	0.000005 U	0.00007	0.000005 U
2,3,7,8-TCDD	0.0000018	0.0000014	0.0000024	0.000001 U	0.000001 U	0.000001 U	0.000001 U
2,3,7,8-TCDF	0.0000019	0.000014	0.000038	0.0000012	0.000001 U	0.000012	0.000001 U
OCDD	0.00073	0.00046	0.0018	0.000099	0.000061	0.00067	0.00001 U
OCDF	0.000042	0.000035	0.0001	0.00001 U	0.00001 U	0.000031	0.00001 U
Dioxin Toxicity Equivalent (USEPA, 2010)	0.0001	0.000061	0.000084	0.0000059	0.0000058 U	0.000035	0.0000057

Table 4.6
Summary of Analytical Results Detected in Shallow Sediment (0-1 ft) - Remainder of the Pond
Phase II Area - Mashapaug Pond and Cove
Former Gorham Manufacturing Facility
333 Adelaide Avenue
Providence, Rhode Island

Parameter	SED-52-01 12/16/2011 0 - 1 ft	SED-53-01 12/16/2011 0 - 1 ft	SED-54-01 12/16/2011 0 - 1 ft	SED-55-01 12/16/2011 0 - 1 ft	SED-56-01 12/16/2011 0 - 1 ft	SED-57-01 12/16/2011 0 - 1 ft	SED-58-01 12/16/2011 0 - 1 ft
Total HpCDD	0.00027	0.00014	0.00055	0.00002	0.000013	0.00024	0.000005 U
Total HpCDF	0.000082	0.000074	0.00014	0.0000052	0.000005 U	0.000075	0.000005 U
Total HxCDD	0.00015	0.000076	0.00024	0.000005 U	0.000005 U	0.000088	0.000005 U
Total HxCDF	0.0014	0.00052	0.0012	0.000017	0.0000057	0.00035	0.000005 U
Total PeCDD	0.00006	0.000034	0.00005	0.000005 U	0.000005 U	0.000069	0.000005 U
Total PeCDF	0.002	0.0019	0.0016	0.000024	0.000014	0.00081	0.000005 U
Total TCDD	0.000044	0.000027	0.000053	0.000001 U	0.000001 U	0.000021	0.000001 U
Total TCDF	0.00093	0.00059	0.00093	0.000016	0.0000081	0.00028	0.000001 U
Inorganics (mg/kg)							
Arsenic	13.2	11.4	17.3	57	43.7	17.1	1.7 U
Barium							
Beryllium	0.56	0.49	0.7	0.72	0.69	0.6	0.14
Cadmium	0.96	0.78 U	1.41	2.05 U	1.64 U	0.96 U	0.35 U
Chromium	52	39.4	70.4	11.9	13.7	45.9	3.6
Copper	115	88.6	211	14.9	19.7	71.8	4.5
Lead	287	229	419	20.4 U	24.2	177	4.1
Mercury	0.871 E	0.66	0.737	0.11 U	0.088 U	1.35 D	0.021 U
Nickel	21.3	19.2	36.1	12.5	13.6	18.6	3.6
Silver	7.25	5.06	7.49	2.05 U	1.64 U	2	0.35 U
Zinc	232	175	308	10.2 U	31.7	196	16.1
Total Organic Carbon (TOC)	84000	99000	110000	140000	130000	63000	1000 U
AVS/SEM (umol/kg)							
Arsenic	96.1	87.1 U	161	520	532	148	36.4 U
Beryllium	40.7	32	44.7	55.5	54.9	47.9	6.05 U
Cadmium	10.2	6.83	15.5	13.8 U	12.3 U	9.43	2.43 U
Chromium	459	257	753	120 U	107 U	427	30.1
Copper	1210	797	2370	99.8	157	995	34.7
Lead	1650	1210	2210	30 U	82.3	1130	16.9
Nickel	137	114	404	265 U	236 U	150 U	46.5 U
Silver	13.1 U	12.1 U	24	28.8 U	25.7 U	16.3 U	5.06 U
Zinc	3680	2700	4810	238 U	212 U	3680	141
AVS	3230 D	4160 D	1850 D	718	720	6250 D	1.71 U

Notes:

- [1] Average calculated using one-half the reporting limit for non-detects
- AVS/SEM - Acid Volatile Sulfide/Simultaneously Extracted Metals
- mg/kg - milligram per kilogram
- umol/kg - micromole per kilogram
- U - not detected, value is the reporting limit
- J - value is estimated
- B - analyte detected in sample and the associated blank
- E - exceeds calibration range
- A - detection limit based on signal-to-noise measurement
- D - value is from a diluted analyses

Prepared By: EYM 12/6/12

Checked By: KJC 12/6/12

Table 4.7
Summary of Analytical Results Detected in Sediment 1-8 ft - Inner Cove
Phase II Area - Mashapaug Pond and Cove
Former Gorham Manufacturing Facility
333 Adelaide Avenue
Providence, Rhode Island

Parameter	Frequency of Detection	Range of Reporting Limits for Non Detects		Range of Detected Concentrations		Average [1]	SED1603	SED1704	SED1804	SED1903	SED2003	SED2103	SED2203	SED2303
							6/22/2006	6/22/2006	6/22/2006	6/22/2006	6/22/2006	6/22/2006	6/22/2006	6/22/2006
Volatle Organic Compounds (mg/kg)														
1,1,1-Trichloroethane	3 / 18	0.0041	0.49	0.384	6.65	0.44	0.0045 U	0.555 E	0.0313 U	6.65	0.0209 U	0.0043 U	0.0357 U	0.0041 U
1,1-Dichloroethane	6 / 18	0.0041	0.49	0.0054	0.299	0.047	0.0045 U	0.031	0.0313 U	0.299	0.0209 U	0.0043 U	0.0357 U	0.0041 U
1,1-Dichloroethene	3 / 18	0.0041	0.49	0.0144	0.8	0.070	0.0045 U	0.0358	0.0313 U	0.8	0.0209 U	0.0043 U	0.0357 U	0.0041 U
2-Butanone	2 / 18	0.0406	12.2	0.442	0.936	0.50	0.0453 U	0.0454 U	0.313 U	0.936	0.209 U	0.0428 U	0.357 U	0.0406 U
Acetone	10 / 18	0.0406	12.2	0.0608	1.94	0.88	0.0453 U	0.0454 U	0.796	1.94	0.57	0.0608	1.08	0.0406 U
Carbon disulfide	3 / 18	0.0041	0.49	0.0068	0.212	0.037	0.0045 U	0.0045 U	0.0313 U	0.212	0.0209 U	0.0043 U	0.0357 U	0.0041 U
cis-1,2-Dichloroethene	7 / 18	0.0045	0.49	0.0046	5.78	0.38	0.0045 U	0.0045 U	0.0313 U	5.78	0.0209 U	0.0267	0.0357 U	0.0046
Isopropylbenzene	3 / 18	0.0041	0.49	0.0688	0.332	0.046	0.0045 U	0.0045 U	0.0313 U	0.0688	0.0209 U	0.0043 U	0.0357 U	0.0041 U
n-Propyl Benzene	1 / 18	0.0041	0.49	0.0955	0.0955	0.028	0.0045 U	0.0045 U	0.0313 U	0.0579 U	0.0209 U	0.0043 U	0.0357 U	0.0041 U
sec-Butylbenzene	3 / 18	0.0041	0.49	0.0563	0.173	0.038	0.0045 U	0.0045 U	0.0313 U	0.0977	0.0209 U	0.0043 U	0.0357 U	0.0041 U
Tetrachloroethene	3 / 18	0.0043	0.49	0.0154	27	1.5	0.0045 U	0.0045 U	0.0313 U	27	0.0209 U	0.0043 U	0.0357 U	0.0636
trans-1,2-Dichloroethene	1 / 18	0.0041	0.49	0.153	0.153	0.031	0.0045 U	0.0045 U	0.0313 U	0.153	0.0209 U	0.0043 U	0.0357 U	0.0041 U
Trichloroethene	6 / 18	0.0043	0.49	0.0073	88	5.0	0.0045 U	0.407 E	0.0313 U	88	0.0209 U	0.0043 U	0.0357 U	0.0255
Vinyl chloride	5 / 18	0.0081	0.49	0.107	0.91	0.14	0.0091 U	0.0091 U	0.107	0.116 U	0.0418 U	0.0086 U	0.0714 U	0.0081 U
Semi-Volatile Organic Compounds (mg/kg)														
1-Methylnaphthalene	1 / 19	0.0301	0.232	0.266	0.266	0.059	0.0306 U	0.0306 U	0.148 U	0.266	0.104 U	0.0301 U	0.119 U	0.0311 U
Benzo(b)fluoranthene	1 / 19	0.0301	0.232	0.0527	0.0527	0.052	0.0306 U	0.0306 U	0.148 U	0.198 U	0.104 U	0.0301 U	0.119 U	0.0311 U
Fluoranthene	2 / 19	0.0301	0.232	0.0821	0.211	0.061	0.0306 U	0.0306 U	0.148 U	0.198 U	0.104 U	0.0301 U	0.119 U	0.0311 U
Phenanthrene	1 / 19	0.0301	0.232	0.135	0.135	0.054	0.0306 U	0.0306 U	0.148 U	0.198 U	0.104 U	0.0301 U	0.119 U	0.0311 U
Pyrene	1 / 19	0.0301	0.232	0.0659	0.0659	0.052	0.0306 U	0.0306 U	0.148 U	0.198 U	0.104 U	0.0301 U	0.119 U	0.0311 U
Inorganics (mg/kg)														
Arsenic	12 / 19	0.3	7.2	2.2	244	34	6.4	0.3 U	18.2	244	2.2	1.7 U	6.9 U	1.7 U
Barium	17 / 19	12.2	23.1	5.4	2430	161	18.6	11.1	18.7	89.2	12.2 U	5.4	33.6	7.8
Beryllium	7 / 19	0.06	0.47	0.2	1.75	0.33	0.07 U	0.06 U	0.32 U	0.52	0.25 U	0.07 U	1.17	0.07 U
Cadmium	2 / 19	0.63	5.08	2.06	6.35	1.4	0.71 U	0.63 U	3.23 U	6.35	2.44 U	0.68 U	2.76 U	0.66 U
Chromium	19 / 19			3	73.5	15.5	3.9	3.5	10.3	14.2	11.8	3	16.2	73.5
Copper	19 / 19			2.3	454	60	3.7	3.2	13	33	5.9	2.3	46	4.7
Lead	4 / 19	6.3	47.4	23	182	29	7.1 U	6.3 U	32.3 U	47.4 U	24.4 U	6.8 U	27.6 U	6.6 U
Mercury	2 / 19	0.037	0.284	0.171	0.477	0.093	0.039 U	0.041 U	0.196 U	0.269 U	0.14 U	0.039 U	0.156 U	0.04 U
Nickel	12 / 19	3.3	25.4	3.5	458	38	3.5	5.1	17.7	458	12.2 U	3.4 U	13.8 U	3.3 U
Selenium	1 / 19	6.3	50.8	38.7	38.7	12.9	7.1 U	6.3 U	32.3 U	47.4 U	24.4 U	6.8 U	27.6 U	6.6 U
Silver	4 / 19	0.63	5.08	3.34	31.9	3.7	0.71 U	0.63 U	3.23 U	4.87	2.44 U	0.68 U	2.76 U	0.66 U
Thallium	1 / 19	1.6	12.7	3.2	3.2	2.9	1.8 U	1.6 U	8.1 U	11.8 U	6.1 U	1.7 U	6.9 U	1.7 U
Zinc	18 / 19	12.2	12.2	5.8	588	74	10.8	13.8	27.9	588	12.2 U	9.6	37.3	7.9
Total Organic Carbon (TOC)	3 / 3			14000	110000	48667								

Notes:
[1] Average calculated using 1/2 the reporting limit for non-detects
mg/kg - milligram per kilogram
U - not detected, value is reporting limit
E - exceeds calibration range

Table 4.7
Summary of Analytical Results Detected in Sediment 1-8 ft - Inner Cove
Phase II Area - Mashapaug Pond and Cove
Former Gorham Manufacturing Facility
333 Adelaide Avenue
Providence, Rhode Island

Parameter	SED2403 6/22/2006 2 - 3 ft	SED2503 6/22/2006 2_5 - 3 ft	SED2507 6/23/2006 6 - 7 ft	SED2602 6/22/2006 1_5 - 2 ft	SED2605 6/22/2006 4 - 5 ft	SED2703 6/22/2006 2_5 - 3 ft	SED2803 6/21/2006 2_5 - 3 ft	SED2904 6/21/2006 3 - 4 ft	SED3004 6/21/2006 3_6 - 4 ft	SED3104 6/21/2006 3 - 3_6 ft	SED3204 6/21/2006 3_5 - 4 ft	SED-49-08 12/13/2011 0 - 8 ft	SED-50-08 12/13/2011 0 - 8 ft	SED-51-08 12/13/2011 0 - 8 ft
Volatile Organic Compounds (mg/kg)														
1,1,1-Trichloroethane	0.0253 U	0.0311 U	0.0521 U	0.0118 U		0.384	0.0758 U	0.49 U	0.0111 U	0.0051 U	0.0061 U			
1,1-Dichloroethane	0.0544	0.051	0.0521 U	0.0118 U		0.0054	0.0758 U	0.49 U	0.0285	0.0051 U	0.0061 U			
1,1-Dichloroethene	0.0253 U	0.0311 U	0.0521 U	0.0118 U		0.0144	0.0758 U	0.49 U	0.0111 U	0.0051 U	0.0061 U			
2-Butanone	0.253 U	0.442	0.521 U	0.118 U		0.0459 U	0.758 U	12.2 U	0.111 U	0.0505 U	0.0613 U			
Acetone	0.834	1.68	0.892	0.118 U		0.0459 U	1.57	12.2 U	0.147	0.0505 U	0.0613 U			
Carbon disulfide	0.0253 U	0.0311 U	0.0729	0.0118 U		0.0068	0.0758 U	0.49 U	0.0111 U	0.0051 U	0.0061 U			
cis-1,2-Dichloroethene	0.0253 U	0.0822	0.56	0.0118 U		0.0386	0.0758 U	0.49 U	0.0111 U	0.0051 U	0.0137			
Isopropylbenzene	0.0253 U	0.0738	0.0521 U	0.0118 U		0.0046 U	0.332	0.49 U	0.0111 U	0.0051 U	0.0061 U			
n-Propyl Benzene	0.0253 U	0.0311 U	0.0521 U	0.0118 U		0.0046 U	0.0955	0.49 U	0.0111 U	0.0051 U	0.0061 U			
sec-Butylbenzene	0.0253 U	0.0563	0.0521 U	0.0118 U		0.0046 U	0.173	0.49 U	0.0111 U	0.0051 U	0.0061 U			
Tetrachloroethene	0.0253 U	0.0311 U	0.0521 U	0.0118 U		0.0154	0.0758 U	0.49 U	0.0111 U	0.0051 U	0.0061 U			
trans-1,2-Dichloroethene	0.0253 U	0.0311 U	0.0521 U	0.0118 U		0.0046 U	0.0758 U	0.49 U	0.0111 U	0.0051 U	0.0061 U			
Trichloroethene	0.0253 U	0.0313	0.0521 U	0.0118 U		0.691	0.0758 U	0.49 U	0.0111 U	0.0051 U	0.0073			
Vinyl chloride	0.191	0.91	0.591	0.0236 U		0.0092 U	0.152 U	0.49 U	0.224	0.0101 U	0.0123 U			
Semi-Volatile Organic Compounds (mg/kg)														
1-Methylnaphthalene	0.125 U	0.215 U	0.209 U	0.0518 U	0.137 U	0.031 U	0.232 U	0.0957 U	0.0507 U	0.0335 U	0.0309 U			
Benzo(b)fluoranthene	0.125 U	0.215 U	0.209 U	0.0518 U	0.137 U	0.031 U	0.232 U	0.0957 U	0.0527	0.0335 U	0.0309 U			
Fluoranthene	0.211	0.215 U	0.209 U	0.0518 U	0.137 U	0.031 U	0.232 U	0.0957 U	0.0821	0.0335 U	0.0309 U			
Phenanthrene	0.135	0.215 U	0.209 U	0.0518 U	0.137 U	0.031 U	0.232 U	0.0957 U	0.0507 U	0.0335 U	0.0309 U			
Pyrene	0.125 U	0.215 U	0.209 U	0.0518 U	0.137 U	0.031 U	0.232 U	0.0957 U	0.0659	0.0335 U	0.0309 U			
Inorganics (mg/kg)														
Arsenic	20.7	115	78.6	55.2	7.2 U	4.1	51.4	24.7	3 U	1.8 U	5.6			
Barium	73.8	85.7	23.1 U	2430	93.2	14.2	115	13.5	10.2	6.1	11.1			
Beryllium	0.41	0.47 U	0.47 U	1.75	0.29	0.07 U	0.81	0.22 U	0.12 U	0.07 U	0.2			
Cadmium	2.53 U	4.63 U	4.63 U	2.06	2.89 U	0.72 U	5.08 U	2.17 U	1.18 U	0.72 U	0.71 U			
Chromium	34.3	19.6	10.4	25.3	8.4	4.6	19.6	14.7	10.3	3.2	7.1			
Copper	200	51.8	10.7	144	19.7	454	48.4	57.9	33.6	2.8	8.5			
Lead	76.4	46.3 U	46.3 U	182	28.9 U	7.2 U	101	21.7 U	23	7.2 U	7.1 U			
Mercury	0.171	0.278 U	0.269 U	0.477	0.17 U	0.042 U	0.284 U	0.115 U	0.07 U	0.044 U	0.037 U			
Nickel	16.3	46.4	43.8	33.1	14.4 U	18.6	25.4 U	35.1	7.2	3.6 U	4.3			
Selenium	25.3 U	46.3 U	46.3 U	38.7	28.9 U	7.2 U	50.8 U	21.7 U	11.8 U	7.2 U	7.1 U			
Silver	31.9	4.63 U	4.63 U	14.1	2.89 U	0.72 U	5.08 U	2.17 U	3.34	0.72 U	0.71 U			
Thallium	6.3 U	11.6 U	11.6 U	3.2	7.2 U	1.8 U	12.7 U	5.4 U	3 U	1.8 U	1.8 U			
Zinc	157	77.6	84.8	166	19.8	24.3	45.5	54.8	43.3	5.8	19.5			
Total Organic Carbon (TOC)												110000	22000	14000

Notes:
 [1] Average calculated using 1/2 the reporting
 limit for non-detects
 mg/kg - milligram per kilogram
 U - not detected, value is reporting limit
 E - exceeds calibration range

Prepared By: EYM 12/6/12
 Checked By: KMW 12/6/12

Table 4.8
Comparison of Analytical Results Detected in Surficial (0-1ft) and Deep (1-8 ft) Sediment - Inner Cove
Phase II Area - Mashapaug Pond and Cove
Former Gorham Manufacturing Facility
333 Adelaide Avenue
Providence, Rhode Island

Parameter	Inner Cove Surficial Sediment (0-1 ft)				Inner Cove Deep Sediment (1-8 ft)			
	Frequency of Detection	Range of Reporting Limits for Non Detects	Range of Detected Concentrations	Average [1]	Frequency of Detection	Range of Reporting Limits for Non Detects	Range of Detected Concentrations	Average [1]
1,2,3,6,7,8-HxCDF	20 / 22	0.00000068 - 0.00000014	0.0000073 : 0.0013	0.00025	NA			NA
1,2,3,7,8,9-HxCDD	18 / 22	0.00000068 - 0.0000018	0.0000017 : 0.000097	0.000025	NA			NA
1,2,3,7,8,9-HxCDF	16 / 22	0.00000068 - 0.0000071	0.0000024 : 0.00042	0.000091	NA			NA
1,2,3,7,8-PeCDD	19 / 22	0.00000068 - 0.000003	0.0000095 : 0.00012	0.000032	NA			NA
1,2,3,7,8-PeCDF	11 / 22	0.00000068 - 0.0000018	0.0000023 : 0.00023	0.000023	NA			NA
2,3,4,6,7,8-HxCDF	20 / 22	0.00000068 - 0.0000014	0.000012 : 0.00091	0.00021	NA			NA
2,3,4,7,8-PeCDF	21 / 22	0.00000068 - 0.00000068	0.0000017 : 0.0062	0.0010	NA			NA
2,3,7,8-TCDD	19 / 22	0.00000014 - 0.00000028	0.0000052 : 0.000033	0.0000093	NA			NA
2,3,7,8-TCDF	17 / 22	0.00000014 - 0.0000042	0.0000016 : 0.00012	0.000030	NA			NA
OCDD	22 / 22	-	0.0000035 : 0.0029	0.00083	NA			NA
OCDF	21 / 22	0.0000014 - 0.0000014	0.0000022 : 0.0003	0.00011	NA			NA
Dioxin Toxicity Equivalent (USEPA, 2010)	22 / 22	-	0.0000078 : 0.0024	0.00044	NA			NA
Total HpCDD	21 / 22	0.00000068 - 0.00000068	0.0000088 : 0.0013	0.00036	NA			NA
Total HpCDF	21 / 22	0.00000068 - 0.00000068	0.0000059 : 0.0028	0.00067	NA			NA
Total HxCDD	21 / 22	0.00000068 - 0.00000068	0.000013 : 0.0026	0.00063	NA			NA
Total HxCDF	22 / 22	-	0.0000017 : 0.025	0.0062	NA			NA
Total PeCDD	21 / 22	0.00000068 - 0.00000068	0.0000081 : 0.002	0.00046	NA			NA
Total PeCDF	22 / 22	-	0.0000044 : 0.04	0.0075	NA			NA
Total TCDD	21 / 22	0.00000014 - 0.00000014	0.0000036 : 0.0008	0.00020	NA			NA
Total TCDF	22 / 22	-	0.0000012 : 0.015	0.0033	NA			NA
Inorganics (mg/kg)								
Antimony	2 / 22	0.54 - 25.7	1.6 : 2.7	6.0	0 / 19	6.3 - 50.8		NA
Arsenic	18 / 22	0.4 - 1.8	2.1 : 45	17.9	12 / 19	0.3 - 7.2	2.2 : 244	34
Barium	22 / 22	-	12.4 : 466	141	17 / 19	12.2 - 23.1	5.4 : 2430	161
Beryllium	19 / 22	0.07 - 0.13	0.075 : 3.5	0.64	7 / 19	0.06 - 0.47	0.2 : 1.75	0.33
Cadmium	18 / 22	0.74 - 1.31	0.14 : 7.11	2.9	2 / 19	0.63 - 5.08	2.06 : 6.35	1.4
Chromium	22 / 22	-	4.8 : 640	231	19 / 19	-	3 : 73.5	15.5
Copper	22 / 22	-	8.6 : 2670	1185	19 / 19	-	2.3 : 454	60
Lead	21 / 22	7.4 - 7.4	12.2 : 1120	423	4 / 19	6.3 - 47.4	23 : 182	29
Mercury	17 / 22	0.043 - 0.12	0.031 : 2.52	0.50	2 / 19	0.037 - 0.284	0.171 : 0.477	0.093
Nickel	20 / 22	3.7 - 6.6	5.7 : 853	161	12 / 19	3.3 - 25.4	3.5 : 458	38
Selenium	3 / 22	0.54 - 25.7	1.8 : 17.9	6.6	1 / 19	6.3 - 50.8	38.7 : 38.7	12.9
Silver	20 / 22	0.74 - 1.31	2.77 : 227	83	4 / 19	0.63 - 5.08	3.34 : 31.9	3.7
Thallium	0 / 22	0.27 - 6.4	-	NA	1 / 19	1.6 - 12.7	3.2 : 3.2	2.9
Zinc	22 / 22	-	9.5 : 1940	947	18 / 19	12.2 - 12.2	5.8 : 588	74
Total Organic Carbon (TOC)	17 / 17	-	2800 : 115000	35994	3 / 3	-	14000 : 110000	48667
Total Petroleum Hydrocarbon (mg/kg)								
Total Petroleum Hydrocarbon	19 / 22	50.1 - 291	57.8 : 2600	677	NA			NA

Notes:
 [1] Average calculated using 1/2 the reporting limit for non-detects in surficial or deep sediment analytical data respectively
 mg/kg - milligram per kilogram
 NA - not analyzed / applicable

Prepared By: EYM 12/6/12
 Checked By: KMW 12/7/12

Table 4.9
Calculation of Human Dioxin Toxic Equivalents (TEQ) for Surface Water Samples
Supplemental Site Investigation Report
Former Gorham Manufacturing Site
333 Adelaide Avenue
Providence, Rhode Island

chemical_name	TEF Humans-Mammals	SW11	SW11	Sample*TEF	SW19	SW19	Sample*TEF	SW27	SW27	Sample*TEF
		6/21/2006	6/21/2006		6/21/2006	6/21/2006		6/22/2006	6/22/2006	
1,2,3,4,6,7,8-HpCDD	0.01		2.4E-08	2.4E-10	0.00000043		4.3E-10	4.3E-08		4.3E-10
1,2,3,4,6,7,8-HpCDF	0.01	<	0.00000001	0	<	0.00000001	0	<	0.00000001	0
1,2,3,4,7,8,9-HpCDF	0.01	<	0.00000001	0	<	0.00000001	0	<	0.00000001	0
1,2,3,4,7,8-HxCDD	0.1	<	0.00000001	0	<	0.00000001	0	<	0.00000001	0
1,2,3,4,7,8-HxCDF	0.1	<	0.00000001	0	<	0.00000001	0	<	0.00000001	0
1,2,3,6,7,8-HxCDD	0.1	<	0.00000001	0	<	0.00000001	0	1.3E-08		1.3E-09
1,2,3,6,7,8-HxCDF	0.1	<	0.00000001	0	<	0.00000001	0	<	0.00000001	0
1,2,3,7,8,9-HxCDD	0.1	<	0.00000001	0	<	0.00000001	0	5.1E-08		5.1E-09
1,2,3,7,8,9-HxCDF	0.1	<	0.00000001	0	<	0.00000001	0	<	0.00000001	0
1,2,3,7,8-PeCDD	1	<	0.00000001	0	<	0.00000001	0	4.6E-08		0.000000046
1,2,3,7,8-PeCDF	0.03	<	0.00000001	0	<	0.00000001	0	<	0.00000001	0
2,3,4,6,7,8-HxCDF	0.1	<	0.00000001	0	<	0.00000001	0	<	0.00000001	0
2,3,4,7,8-PeCDF	0.3	<	0.00000001	0	<	0.00000001	0	<	0.00000001	0
2,3,7,8-TCDD	1	<	2.1E-09	0	<	0.000000002	0	3.1E-09		3.1E-09
2,3,7,8-TCDF	0.1	<	2.1E-09	0	<	0.000000002	0	8.9E-09		8.9E-10
OCDD	0.0003		0.00000018	5.4E-11	0.00000032		9.6E-11	0.00000035		1.05E-10
OCDF	0.0003	<	2.1E-08	0	<	0.00000002	0	<	0.00000002	0
TEQ-Mammal (1)				2.94E-10			5.26E-10			5.69E-08

(1) - TEQ-Mammal is calculated by multiplying each congener by its corresponding TEF then summing all of the results.

Bolded and Shaded values indicate the TEQ-Mammal is greater than the surface water screening value standard.

< - Compound was not detected and a concentration of zero was used to calculate the TEQ.

Recommended Toxicity Equivalence Factors (TEFs) for Human Health Risk Assessments of 2,3,7,8-Tetrachlorodibenzo-p-dioxin and Dioxin-Like Compounds, EPA/100/R-10/005 (2010).

Results reported in mg/L

Prepared by: MJM
Checked by: LCG

Table 4.10
Comparison of Inner Cove Surface Sediment and Upland Soil Analytical Data
Former Gorham Manufacturing Site
Providence, Rhode Island

chemical_name	SEDIMENT				SOIL			
	Frequency of Detection	Range of Reporting Limits for Non-Detects	Range of Detected Concentrations	Average of Samples	Frequency of Detection	Range of Reporting Limits for Non-Detects	Range of Detected Concentrations	Average of Samples
Inorganics (mg/kg)								
Antimony	2 / 28	0.54 : 25.7	1.6 - 2.7	6.0	4 / 65	6 : 12.3	2.4 - 32.1	4.5
Arsenic	22 / 28	0.3 : 3	2.1 - 47.6	16.8	63 / 78	1 : 5	1.5 - 67.8	8.4
Barium	28 / 28		9.7 - 466	123	32 / 34	13.6 : 13.7	11.5 - 510	80
Beryllium	22 / 28	0.07 : 0.13	0.075 - 3.5	0.55	38 / 65	0.06 : 1	0.13 - 3	0.31
Cadmium	20 / 28	0.65 : 1.31	0.14 - 7.11	2.6	17 / 65	0.6 : 1.23	1 - 21.7	1.2
Chromium	28 / 28		2.9 - 640	192	63 / 65	3 : 4	3.5 - 1330	69
Copper	28 / 28		4.1 - 2670	955	79 / 79		3 - 15800	1168
Lead	24 / 28	6.5 : 7.4	12.2 - 1120	364	73 / 78	6 : 7	6.8 - 4670	364
Mercury	17 / 28	0.035 : 0.208	0.031 - 2.52	0.40	38 / 65	0.032 : 0.5	0.055 - 4.67	0.44
Nickel	25 / 28	3.7 : 6.6	3.6 - 853	132	65 / 65		3 - 390	25
Selenium	3 / 28	0.54 : 25.7	1.8 - 17.9	6.5	1 / 65	0.52 : 12.3	5 - 5	3.1
Silver	22 / 28	0.65 : 1.31	2.77 - 227	67.4	54 / 65	0.6 : 1	0.81 - 385	40
Thallium	0 / 28	0.27 : 6.4		1.5	0 / 65	0.26 : 9		1.9
Zinc	28 / 28		9.5 - 1940	783	65 / 65		8 - 4760	355
Semivolatile Organics (mg/kg)								
1-Methylnaphthalene	0 / 23	0.0305 : 0.183		0.039	1 / 32	0.0261 : 1.13	4.03 - 4.03	0.31
2-Methylnaphthalene	0 / 28	0.0305 : 0.99		0.081	3 / 77	0.0261 : 3.57	0.345 - 5.9	0.42
Acenaphthene	6 / 28	0.03 : 0.183	0.024 - 0.26	0.062	5 / 77	0.0261 : 3.57	0.819 - 9.94	0.55
Acenaphthylene	3 / 28	0.0079 : 0.183	0.026 - 0.781	0.064	4 / 77	0.0261 : 3.57	0.13 - 2.97	0.37
Aniline	0 / 5	0.39 : 2		0.54	0 / 2	3.3 : 3.9		1.8
Anthracene	13 / 28	0.0305 : 0.183	0.04 - 3.09	0.24	23 / 77	0.0261 : 3.57	0.0572 - 10.8	0.83
Benzo(a)anthracene	18 / 28	0.0305 : 0.183	0.0896 - 15.1	0.87	45 / 77	0.0261 : 3.57	0.0332 - 46.3	2.1
Benzo(a)pyrene	17 / 28	0.0305 : 0.183	0.0707 - 7.87	0.57	46 / 77	0.0261 : 3.57	0.0273 - 41.6	1.9
Benzo(b)fluoranthene	21 / 28	0.0305 : 0.183	0.0378 - 14.8	1.0	46 / 77	0.0261 : 3.57	0.0867 - 39.4	2.1
Benzo(g,h,i)perylene	14 / 28	0.0305 : 0.183	0.046 - 2.54	0.21	37 / 77	0.0261 : 3.57	0.0283 - 28.3	1.15
Benzo(k)fluoranthene	12 / 28	0.0305 : 0.183	0.065 - 5.1	0.35	40 / 77	0.0261 : 3.57	0.0638 - 39.5	1.5
bis(2-Ethylhexyl)phthalate	0 / 5	0.2 : 0.99		0.27	2 / 18	0.33 : 3.3	0.379 - 0.81	0.74
Chrysene	17 / 28	0.0305 : 0.183	0.0896 - 8.94	0.66	48 / 77	0.0261 : 3.3	0.0284 - 54.2	2.2
Dibenzo(a,h)anthracene	6 / 28	0.0079 : 0.183	0.0404 - 1.45	0.099	8 / 77	0.0261 : 3.57	0.0277 - 2.06	0.35
Dibenzofuran	0 / 5	0.39 : 2		0.54	1 / 18	0.33 : 3.9	0.824 - 0.824	0.83
Di-n-butylphthalate	2 / 5	0.2 : 0.74	0.48 - 1.1	0.44	0 / 9	0.34 : 3.9		0.69
Fluoranthene	23 / 28	0.0305 : 0.035	0.0833 - 28.8	1.8	49 / 77	0.0261 : 3.57	0.0626 - 116	4.2
Fluorene	9 / 28	0.018 : 0.183	0.022 - 0.863	0.082	7 / 77	0.0261 : 3.57	0.0438 - 9.52	0.54
Indeno(1,2,3-cd)pyrene	13 / 28	0.03 : 0.183	0.046 - 2.47	0.21	38 / 77	0.0261 : 3.57	0.0293 - 27.9	1.1
Naphthalene	5 / 28	0.03 : 0.183	0.0342 - 0.28	0.054	6 / 77	0.0261 : 3.57	0.398 - 17.5	0.67
Phenanthrene	19 / 28	0.0305 : 0.183	0.0333 - 11.8	1.0	47 / 77	0.0261 : 3.57	0.0364 - 122	4.2
Pyrene	22 / 28	0.0305 : 0.0794	0.0513 - 15.2	1.2	54 / 77	0.0261 : 1.65	0.0375 - 142	5.3

mg/Kg - milligram per kilogram

Prepared by: MJM
Checked by: LCG

APPENDIX C-2
PARCEL C
SOIL AND SOIL GAS

VOLUME 1
REMEDIAL INVESTIGATION REPORT
GORHAM MANUFACTURING FACILITY
333 ADELAIDE AVENUE
PROVIDENCE, RHODE ISLAND

Prepared for:

Textron Incorporated
40 Westminster Street
Providence, Rhode Island

Prepared by:

ABB Environmental Services, Inc.
107 Audubon Road
Wakefield, Massachusetts

PN: 09111.15

MAY 1995

TABLE 4-12
 SOIL SAMPLING ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS
 TASK 10 - TERRAPROBE SURVEY
 GORHAM MANUFACTURING SITE
 PROVIDENCE, RHODE ISLAND
 (concentrations in ug/kg)

Sample Location	Sample Depth	TCE	PCE	1,1,1-TCA	BENZENE	TOLUENE	ETHYLBENZENE	XYLENE
TP-001	5-7	<1.1	5	<1.1	<1.1	<1.1	<1.1	<1.1
	28-30	<1.3	630 E	<1.3	<1.3	<1.3	<1.3	<1.3
TP-001 CONFIRM	28-30	<5	11	<5	<5	<5	<5	<10
TP-001 DUP	28-30	<5	13	<5	<5	7J	<5	<10
TP-002	5-7	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	25-27	<1.2	7.8	<1.2	<1.2	<1.2	<1.2	<1.2
TP-003	5-7	<1.1	8.3	<1.1	<1.1	<1.1	<1.1	<1.1
	25-27	<13	190	<13	<13	<13	<13	<13
TP-004	5-7	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	25-27	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
TP-005	5-7	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	20-22	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
TP-006	5-7	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
	20-22	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
TP-007	5-7	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
	22-24	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
TP-008	5-7	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	25-27	30 E	24 E	<1.1	<1.1	<1.1	<1.1	<1.1
TP-008 CONFIRM	25-27	<5	23	<5	<5	<5	<5	<10
TP-009	5-7	28 EJ	2.9 E	<1.1	<1.1	<1.1	30	1.2
	25-27	57 EJ	11 J	8.0 J	<1.4	<1.4	<1.4	<1.4
TP-010	5-7	16	1.2	<1.1	<1.1	<1.1	<1.1	<1.1
	12-14	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
TP-011	5-7	6.5 J	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
	10-12	2.2	1.9	<1.1	<1.1	<1.1	<1.1	<1.1
TP-011 CONFIRM	10-12	28J	28J	<5	<5	<5	<5	<10
TP-012	5-7	1.3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	11-13	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
TP-013	5-7	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
	20-22	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
TP-014	5-7	<6.3	<6.3	<6.3	<6.3	<6.3	<6.3	48
	21-23	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3
TP-015	5-7	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
	21-23	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3
TP-016	5-7	<1.2	<1.2	<1.2	<1.2	2.6	110	39.3
	21-23	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
TP-017	5-7	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
	13-15	1.6	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3
TP-017 CONFIRM	13-15	<5	<5	<5	<5	<5	<5	<10
TP-018	5-7	<1.1	1.0	<1.1	<1.1	<1.1	<1.1	<1.1
	11-13	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
TP-019	5-7	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
	12-14	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
TP-020	5-7	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
	12-14	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
TP-021	5-7	<1.0	2.6	<1.0	<1.0	<1.0	<1.0	<1.0
	15-17	<1.1	2.0	<1.1	<1.1	<1.1	<1.1	<1.1
	20-22	<1.2	75 E	<1.2	<1.2	29	110	173
TP-037	8-10	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
TP-038	6-8	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
TP-039	1-3	150	12	41	<1.2	<1.2	<1.2	<1.2
TP-039 CONFIRM	1-3	140	<25	<25	<25	<25	<25	<50
TP-040	5-7	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	25-27	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
TP-041	5-7	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	25-27	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
TP-044	5-7	<1.1	50	<1.1	<1.1	<1.1	<1.1	<1.1
	11-13	<1.0	4.6	<1.0	<1.0	<1.0	<1.0	<1.0
TP-044 CONFIRM	5-7	<5	67	<5	<5	<5	<5	<10
TP-045	1-3	<1.0	110	<1.0	<1.0	<1.0	<1.0	<1.0
	6-8	<1.1	26	<1.1	<1.1	<1.1	<1.1	<1.1

J = Estimated value

TCE - Trichloroethylene

PCE - Tetrachloroethylene

1,1,1-TCA - 1,1,1-Trichloroethane

Table 1
Summary of Analytical Results Detected in Soil - Parcel C
Former Gorham Manufacturing Facility
Providence, Rhode Island

parameter.name	Frequency of Detection	Range of Reporting Limits for Non Detects	Range of Detected Concentrations	Average of All Samples	Residential DEC (mg/Kg)	B3-S1 3/27/1989 14.5-16 ft	GMEX0050120 1XX 10/19/1994 12-14 ft	GMSBXX1X130 1XX 10/24/1994 13-15 ft
Volatiles Organics (mg/Kg)								
2-Butanone	2 / 8	0.05 : 0.25	0.065 - 4.3	0.58625	10000		4.3	0.05 U
Acetone	2 / 9	0.05 : 1.25	0.162 - 0.228	0.150278	7800	0.125 U	1.25 U	0.05 U
cis-1,2-Dichloroethene	3 / 8	0.005 : 0.125	0.005 - 0.16	0.034688	630		0.125 U	0.005 U
Ethylbenzene	1 / 9	0.005 : 0.125	0.11 - 0.11	0.023056	71	0.11	0.125 U	0.005 U
Methylene chloride	6 / 9	0.01 : 0.025	0.011 - 0.175	0.033889	45	0.025 U	0.175	0.011
Tetrachloroethene	2 / 9	0.005 : 0.125	0.071 - 0.28	0.049278	12	0.025 U	0.125 U	0.005 U
Toluene	1 / 9	0.005 : 0.125	0.083 - 0.083	0.020056	190	0.083	0.125 U	0.005 U
Trichloroethene	3 / 9	0.005 : 0.125	0.007 - 0.17	0.044556	13	0.025 U	0.125 U	0.005 U
Vinyl chloride	1 / 9	0.01 : 0.05	1.53 - 1.53	0.180556	0.02	0.05 U	1.53	0.01 U
Xylenes, Total	1 / 9	0.01 : 0.25	0.44 - 0.44	0.070556	110	0.44	0.25 U	0.01 U
Semivolatile Organics (mg/Kg)								
Acenaphthene	1 / 10	0.0268 : 3.3	0.033 - 0.033	0.58339	43			0.33 U
Acenaphthylene	1 / 10	0.0268 : 3.3	0.05 - 0.05	0.58509	23			0.33 U
Anthracene	1 / 10	0.0268 : 3.3	0.14 - 0.14	0.59409	35			0.33 U
Benzo(a)anthracene	5 / 10	0.0268 : 3.3	0.414 - 14.7	2.29249	0.9			0.33 U
Benzo(a)pyrene	6 / 10	0.33 : 3.3	0.0273 - 18.4	2.64798	0.4			0.33 U
Benzo(b)fluoranthene	5 / 10	0.0268 : 3.3	0.739 - 39.2	5.01799	0.9			0.33 U
Benzo(g,h,i)perylene	4 / 10	0.0268 : 3.3	0.24 - 7.04	1.30269	0.8			0.33 U
Benzo(k)fluoranthene	4 / 10	0.0268 : 3.3	0.22 - 15.2	2.00569	0.9			0.33 U
Chrysene	6 / 10	0.33 : 3.3	0.0284 - 14.3	2.23639	0.4			0.33 U
Dibenzo(a,h)anthracene	2 / 10	0.0268 : 3.3	0.039 - 0.45	0.61249	0.4			0.33 U
Di-n-butylphthalate	1 / 2	0.355 : 0.355	36 - 36	18.08875				
Fluoranthene	6 / 10	0.33 : 3.3	0.0626 - 40.6	5.58201	20			0.33 U
Fluorene	1 / 10	0.0268 : 3.3	0.049 - 0.049	0.58499	28			0.33 U
Indeno(1,2,3-cd)pyrene	3 / 10	0.0268 : 3.3	0.19 - 6.07	1.14859	0.9			0.33 U
Naphthalene	1 / 10	0.0268 : 3.3	0.049 - 0.049	0.58499	54			0.33 U
Phenanthrene	5 / 10	0.0268 : 3.3	0.71 - 12.5	2.24679	40			0.33 U
Pyrene	6 / 10	0.33 : 3.3	0.0375 - 31.9	6.1875	13			0.33 U
Pesticides/PCBs (mg/Kg)								
4,4'-DDE	1 / 2	0.00579 : 0.00579	0.0027 - 0.0027	0.002798	1.9			
4,4'-DDT	1 / 2	0.00579 : 0.00579	0.0042 - 0.0042	0.003548	1.9			
alpha-Chlordane	1 / 2	0.00579 : 0.00579	0.0044 - 0.0044	0.003648	1.8			
gamma-Chlordane	1 / 2	0.00579 : 0.00579	0.004 - 0.004	0.003448	1.8			

Table 1
Summary of Analytical Results Detected in Soil - Parcel C
Former Gorham Manufacturing Facility
Providence, Rhode Island

parameter.name	Frequency of Detection	Range of Reporting Limits for Non Detects	Range of Detected Concentrations	Average of All Samples	Residential DEC (mg/Kg)	B3-S1 3/27/1989 14.5-16 ft	GMEX0050120 1XX 10/19/1994 12-14 ft	GMSBXX1X130 1XX 10/24/1994 13-15 ft
Aroclor-1260	1 / 9	0.0579 : 10	0.022 - 0.022	0.89455	10			1 U
Dioxins (mg/Kg)								
1,2,3,4,6,7,8-HpCDD	3 / 3		0.000019 - 0.00017	0.000107				
1,2,3,4,6,7,8-HpCDF	3 / 3		0.000014 - 0.00075	0.000256				
1,2,3,4,7,8,9-HpCDF	1 / 3	0.00000086 : 0.0000019	0.0000036 - 0.0000036	1.66E-06				
1,2,3,4,7,8-HxCDD	2 / 3	0.00000086 : 0.00000086	0.0000031 - 0.0000048	2.78E-06				
1,2,3,4,7,8-HxCDF	2 / 3	0.00000086 : 0.00000086	0.0000035 - 0.0000053	3.08E-06				
1,2,3,6,7,8-HxCDD	2 / 3	0.00000086 : 0.00000086	0.0000088 - 0.000049	1.94E-05				
1,2,3,6,7,8-HxCDF	2 / 3	0.00000086 : 0.00000086	0.0000041 - 0.0000042	2.91E-06				
1,2,3,7,8,9-HxCDD	2 / 3	0.00000086 : 0.00000086	0.0000088 - 0.000017	8.74E-06				
1,2,3,7,8,9-HxCDF	1 / 3	0.00000086 : 0.0000011	0.0000022 - 0.0000022	1.06E-06				
1,2,3,7,8-PeCDD	2 / 3	0.00000086 : 0.00000086	0.0000038 - 0.0000054	3.21E-06				
2,3,4,6,7,8-HxCDF	1 / 3	0.00000086 : 0.00000098	0.0000043 - 0.0000043	1.74E-06				
2,3,4,7,8-PeCDF	2 / 3	0.00000086 : 0.00000086	0.0000055 - 0.0000082	4.71E-06				
2,3,7,8-TCDD	2 / 3	0.00000017 : 0.00000017	0.0000049 - 0.000001	5.25E-07				
2,3,7,8-TCDF	3 / 3		0.00000035 - 0.0000042	2.78E-06				
OCDD	3 / 3		0.000015 - 0.0011	0.000598				
OCDF	3 / 3		0.0000028 - 0.00039	0.000137				
Total HpCDD	3 / 3		0.0000036 - 0.00031	0.000198				
Total HpCDF	3 / 3		0.0000026 - 0.0012	0.000412				
Total HxCDD	2 / 3	0.00000086 : 0.00000086	0.00012 - 0.00038	0.000167				
Total HxCDF	3 / 3		0.000001 - 0.00031	0.000122				
Total PeCDD	2 / 3	0.00000086 : 0.00000086	0.000038 - 0.000072	3.68E-05				
Total PeCDF	3 / 3		0.0000028 - 0.00011	5.69E-05				
Total TCDD	3 / 3		0.0000003 - 0.000041	2.08E-05				
Total TCDF	3 / 3		0.0000041 - 0.00005	2.97E-05				
Inorganics (mg/Kg)								
Antimony	2 / 10	7 : 10	4.9 - 34	7.64	10		34	10 U
Arsenic	8 / 10	5 : 10	2 - 17	5.97	7		17	5 U
Barium	1 / 1		3000 - 3000	3000	5500			
Beryllium	2 / 10	0.2 : 1	0.2 - 0.28	0.408	0.4		1 U	1 U
Cadmium	7 / 10	1 : 1	1 - 12	3.35	39		3	1 U
Chromium	9 / 10	4 : 4	14 - 1540	256.4	390		1540	19
Copper	10 / 10		15 - 26300	4754.8	3100		26300	22

Table 1
Summary of Analytical Results Detected in Soil - Parcel C
Former Gorham Manufacturing Facility
Providence, Rhode Island

parameter.name	Frequency of Detection	Range of Reporting Limits for Non Detects	Range of Detected Concentrations	Average of All Samples	Residential DEC (mg/Kg)	B3-S1 3/27/1989 14.5-16 ft	GMEX0050120 1XX 10/19/1994 12-14 ft	GMSBXX1X130 1XX 10/24/1994 13-15 ft
Lead	9 / 10	10 : 10	22 - 880	454.5	150		871	10 U
Mercury	2 / 10	0.07 : 0.5	0.18 - 1	0.2765	23		0.5 U	0.5 U
Nickel	10 / 10		3 - 504	138.8	1000		504	16
Silver	8 / 10	1 : 1	6 - 472	113.9	200		171	1 U
Zinc	10 / 10		10 - 6190	1933.7	6000		6190	43
Total Cyanide	3 / 9	0.5 : 0.61	1.1 - 4	0.939444	200		0.5 U	0.5 U
Total Petroleum Hydrocarbon	8 / 9	21 : 21	37 - 12000	2348.389			12000	21 U
TCLP Metals (mg/L)								
Barium	7 / 7		0.3 - 4.4	1.857143				0.6
Cadmium	5 / 7	0.02 : 0.02	0.05 - 0.12	0.06				0.02 U
Lead	6 / 7	0.1 : 0.1	0.4 - 26.1	8.864286				0.1 U

mg/Kg = milligram per kilogram

mg/L = milligram per liter

U = not detected, value is the reporting limit

J = value is estimated

Dioxin Specific Qualifiers:

A = Detection limit based on signal-to-noise measurement

E = PCDE interference

Bold shaded results exceed the Residential Direct Exposure Criteria

Table 1
Summary of Analytical Results Detected in Soil - Parcel C
Former Gorham Manufacturing Facility
Providence, Rhode Island

parameter.name	GMSBXX2XX50 1XX 10/25/1994 5-7 ft	GMSBXX3XX00 1XX 10/25/1994 0-2 ft	GMSBXX4XX00 1XX 10/25/1994 0-2 ft	GMSBXX5XX00 1XX 10/26/1994 0-2 ft	GMSBXX6X100 1XX 10/26/1994 10-12 ft	GMSBXX6X150 1XX 10/26/1994 15-17 ft	GMSBXX7XX00 1XX 10/26/1994 0-2 ft	GMSS105X01L DXX 5/27/1998 0-1 ft	GMSS205X01R AXX 12/11/1998 0-1 ft
Volatile Organics (mg/Kg)									
2-Butanone	0.1 U	0.25 U	0.1 U	0.065	0.1 U		0.05 U		
Acetone	0.1 U	0.25 U	0.1 U	0.228	0.162		0.05 U		
cis-1,2-Dichloroethene	0.01 U	0.035	0.01 U	0.005	0.16		0.005 U		
Ethylbenzene	0.01 U	0.025 U	0.01 U	0.005 U	0.01 U		0.005 U		
Methylene chloride	0.018	0.025 U	0.034	0.018	0.01 U		0.019		
Tetrachloroethene	0.071	0.28	0.01 U	0.005 U	0.01 U		0.005 U		
Toluene	0.01 U	0.025 U	0.01 U	0.005 U	0.01 U		0.005 U		
Trichloroethene	0.134	0.17	0.01 U	0.005 U	0.01 U		0.007		
Vinyl chloride	0.02 U	0.05 U	0.02 U	0.01 U	0.02 U		0.01 U		
Xylenes, Total	0.02 U	0.05 U	0.02 U	0.01 U	0.02 U		0.01 U		
Semivolatile Organics (mg/Kg)									
Acenaphthene	0.33 U	0.33 U	3.3 U	3.3 U	0.33 U		3.3 U	0.355 U	
Acenaphthylene	0.33 U	0.33 U	3.3 U	3.3 U	0.33 U		3.3 U	0.355 U	
Anthracene	0.33 U	0.33 U	3.3 U	3.3 U	0.33 U		3.3 U	0.355 U	
Benzo(a)anthracene	0.414	0.33 U	3.95	3.3 U	1.18		14.7	0.355 U	
Benzo(a)pyrene	0.445	0.33 U	3.65	3.3 U	1.35		18.4	0.355 U	
Benzo(b)fluoranthene	0.739	0.33 U	5.7	3.3 U	1.54		39.2	0.355 U	
Benzo(g,h,i)perylene	0.406	0.33 U	3.3 U	3.3 U	1.52		7.04	0.355 U	
Benzo(k)fluoranthene	0.352	0.33 U	3.3 U	3.3 U	0.464		15.2	0.355 U	
Chrysene	0.448	0.33 U	3.58	3.3 U	1.29		14.3	0.355 U	
Dibenzo(a,h)anthracene	0.33 U	0.33 U	3.3 U	3.3 U	0.45		3.3 U	0.355 U	
Di-n-butylphthalate								0.355 U	
Fluoranthene	1.06	0.33 U	8.44	3.3 U	2.5		40.6	0.355 U	
Fluorene	0.33 U	0.33 U	3.3 U	3.3 U	0.33 U		3.3 U	0.355 U	
Indeno(1,2,3-cd)pyrene	0.33 U	0.33 U	3.3 U	3.3 U	1.24		6.07	0.355 U	
Naphthalene	0.33 U	0.33 U	3.3 U	3.3 U	0.33 U		3.3 U	0.355 U	
Phenanthrene	0.777	0.33 U	5.05	3.3 U	1.26		12.5	0.355 U	
Pyrene	1.16	0.33 U	7.22	3.3 U	17.8 E		31.9	0.355 U	
Pesticides/PCBs (mg/Kg)									
4,4'-DDE									
4,4'-DDT									
alpha-Chlordane									
gamma-Chlordane									

Table 1
Summary of Analytical Results Detected in Soil - Parcel C
Former Gorham Manufacturing Facility
Providence, Rhode Island

parameter.name	GMSBXX2XX50 1XX 10/25/1994 5-7 ft	GMSBXX3XX00 1XX 10/25/1994 0-2 ft	GMSBXX4XX00 1XX 10/25/1994 0-2 ft	GMSBXX5XX00 1XX 10/26/1994 0-2 ft	GMSBXX6X100 1XX 10/26/1994 10-12 ft	GMSBXX6X150 1XX 10/26/1994 15-17 ft	GMSBXX7XX00 1XX 10/26/1994 0-2 ft	GMSS105X01L DXX 5/27/1998 0-1 ft	GMSS205X01R AXX 12/11/1998 0-1 ft
Aroclor-1260	1 U	1 U	1 U	1 U	1 U		10 U		
Dioxins (mg/Kg)									
1,2,3,4,6,7,8-HpCDD									
1,2,3,4,6,7,8-HpCDF									
1,2,3,4,7,8,9-HpCDF									
1,2,3,4,7,8-HxCDD									
1,2,3,4,7,8-HxCDF									
1,2,3,6,7,8-HxCDD									
1,2,3,6,7,8-HxCDF									
1,2,3,7,8,9-HxCDD									
1,2,3,7,8,9-HxCDF									
1,2,3,7,8-PeCDD									
2,3,4,6,7,8-HxCDF									
2,3,4,7,8-PeCDF									
2,3,7,8-TCDD									
2,3,7,8-TCDF									
OCDD									
OCDF									
Total HpCDD									
Total HpCDF									
Total HxCDD									
Total HxCDF									
Total PeCDD									
Total PeCDF									
Total TCDD									
Total TCDF									
Inorganics (mg/Kg)									
Antimony		10 U	10 U	10 U		10 U	10 U	7 U	8 U
Arsenic		10 U	3	4		9	2	4	2.2
Barium									
Beryllium		1 U	1 U	1 U		1 U	1 U	0.2 U	0.2
Cadmium		12	5	1		9	1 U	1	1 U
Chromium		22	60	249		31	14	17	4 U
Copper		7960	3120	2960		1910	754	107	15

Table 1
Summary of Analytical Results Detected in Soil - Parcel C
Former Gorham Manufacturing Facility
Providence, Rhode Island

parameter.name	GMSBXX2XX50 1XX 10/25/1994 5-7 ft	GMSBXX3XX00 1XX 10/25/1994 0-2 ft	GMSBXX4XX00 1XX 10/25/1994 0-2 ft	GMSBXX5XX00 1XX 10/26/1994 0-2 ft	GMSBXX6X100 1XX 10/26/1994 10-12 ft	GMSBXX6X150 1XX 10/26/1994 15-17 ft	GMSBXX7XX00 1XX 10/26/1994 0-2 ft	GMSS105X01L DXX 5/27/1998 0-1 ft	GMSS205X01R AXX 12/11/1998 0-1 ft
Lead		880	880	149		756	780	42	22
Mercury		0.5 U	0.5 U	0.5 U		1	0.5 U	0.1 U	0.07 U
Nickel		204	143	95		185	52	6	3
Silver		192	472	6		128	22	7	1 U
Zinc		4400	1360	1290		4230	588	26	10
Total Cyanide	0.5 U	4	0.5 U	1.8		1.1	0.5 U		
Total Petroleum Hydrocarbon	37	2300	410	5100	1100		130	48	
TCLP Metals (mg/L)									
Barium	0.6	1.7	2.6	2.8		0.3	4.4		
Cadmium	0.12	0.08	0.06	0.05		0.09	0.02 U		
Lead	7.2	0.4	20.3	2.2		5.8	26.1		

mg/Kg = milligram per kilogram

mg/L = milligram per liter

U = not detected, value is the reporting limit

J = value is estimated

Dioxin Specific Qualifiers:

A = Detection limit based on signal-to-noise measurement

E = PCDE interference

Bold shaded results exceed the Residential Direct Exposure Criteria

Table 1
Summary of Analytical Results Detected in Soil - Parcel C
Former Gorham Manufacturing Facility
Providence, Rhode Island

parameter.name	SS-1005 12/28/2005 0-1 ft	SS10501 2/28/2007 0-0.5 ft	SS-SI205 6/8/2006 0-0.5 ft
Volatile Organics (mg/Kg)			
2-Butanone			
Acetone			
cis-1,2-Dichloroethene			
Ethylbenzene			
Methylene chloride			
Tetrachloroethene			
Toluene			
Trichloroethene			
Vinyl chloride			
Xylenes, Total			
Semivolatile Organics (mg/Kg)			
Acenaphthene	0.033		0.0268 U
Acenaphthylene	0.05		0.0268 U
Anthracene	0.14		0.0268 U
Benzo(a)anthracene	0.51		0.0268 U
Benzo(a)pyrene	0.45		0.0273
Benzo(b)fluoranthene	0.83		0.0268 U
Benzo(g,h,i)perylene	0.24		0.0268 U
Benzo(k)fluoranthene	0.22		0.0268 U
Chrysene	0.56		0.0284
Dibenzo(a,h)anthracene	0.039		0.0268 U
Di-n-butylphthalate	36		
Fluoranthene	1		0.0626
Fluorene	0.049		0.0268 U
Indeno(1,2,3-cd)pyrene	0.19		0.0268 U
Naphthalene	0.049		0.0268 U
Phenanthrene	0.71		0.0268 U
Pyrene	1.6		0.0375
Pesticides/PCBs (mg/Kg)			
4,4'-DDE	0.0027		0.00579 U
4,4'-DDT	0.0042		0.00579 U
alpha-Chlordane	0.0044		0.00579 U
gamma-Chlordane	0.004		0.00579 U

Table 1
Summary of Analytical Results Detected in Soil - Parcel C
Former Gorham Manufacturing Facility
Providence, Rhode Island

parameter.name	SS-1005 12/28/2005 0-1 ft	SS10501 2/28/2007 0-0.5 ft	SS-SI205 6/8/2006 0-0.5 ft
Aroclor-1260	0.022		0.0579 U
Dioxins (mg/Kg)			
1,2,3,4,6,7,8-HpCDD	0.00015	0.00017	0.0000019 J
1,2,3,4,6,7,8-HpCDF	0.000016	0.00075	0.0000014 J
1,2,3,4,7,8,9-HpCDF	0.0000019 U	0.0000036 J	0.0000086 U
1,2,3,4,7,8-HxCDD	0.000048	0.0000031 J	0.0000086 U
1,2,3,4,7,8-HxCDF	0.000053	0.0000035 J	0.0000086 U
1,2,3,6,7,8-HxCDD	0.000088	0.000049	0.0000086 U
1,2,3,6,7,8-HxCDF	0.000042	0.0000041 J	0.0000086 U
1,2,3,7,8,9-HxCDD	0.000088	0.000017	0.0000086 U
1,2,3,7,8,9-HxCDF	0.000011 U	0.0000022 J	0.0000086 U
1,2,3,7,8-PeCDD	0.000054	0.0000038 J	0.0000086 U
2,3,4,6,7,8-HxCDF	0.000043	0.0000098 UE	0.0000086 U
2,3,4,7,8-PeCDF	0.000055	0.0000082	0.0000086 U
2,3,7,8-TCDD	0.000001	0.0000049 J	0.0000017 U
2,3,7,8-TCDF	0.000038	0.0000042 A	0.0000035 J
OCDD	0.0011	0.00068	0.000015
OCDF	0.000019	0.00039	0.0000028 J
Total HpCDD	0.00028	0.00031	0.0000036 J
Total HpCDF	0.000033	0.0012	0.0000026 J
Total HxCDD	0.00012	0.00038	0.0000086 U
Total HxCDF	0.000055	0.00031	0.000001 J
Total PeCDD	0.000072	0.000038	0.0000086 U
Total PeCDF	0.000058	0.00011	0.0000028 J
Total TCDD	0.000041	0.000021	0.0000003 J
Total TCDF	0.00005	0.000035	0.0000041
Inorganics (mg/Kg)			
Antimony	4.9		
Arsenic	11		
Barium	3000		
Beryllium	0.28		
Cadmium	1		
Chromium	610		
Copper	4400		

Table 1
Summary of Analytical Results Detected in Soil - Parcel C
Former Gorham Manufacturing Facility
Providence, Rhode Island

parameter.name	SS-1005 12/28/2005 0-1 ft	SS10501 2/28/2007 0-0.5 ft	SS-SI205 6/8/2006 0-0.5 ft
Lead	160		
Mercury	0.18		
Nickel	180		
Silver	140		
Zinc	1200		
Total Cyanide	0.61 U		
Total Petroleum Hydrocarbon			
TCLP Metals (mg/L)			
Barium			
Cadmium			
Lead			

mg/Kg = milligram per kilogram

mg/L = milligram per liter

U = not detected, value is the reporting limit

J = value is estimated

Dioxin Specific Qualifiers:

A = Detection limit based on signal-to-noise measurement

E = PCDE interference

Bold shaded results exceed the Residential Direct Exposure Criteria

Prepared by / Date: KJC 09/30/10

Checked by / Date: DEH 10/01/10

2003 5 29 11:05



**SITE INVESTIGATION REPORT -
ADDITIONAL ASSESSMENT TASKS
PROVIDENCE YMCA - PARCEL C
PROVIDENCE, RHODE ISLAND**

PREPARED FOR:

Rhode Island Department of Environmental Management
Providence, Rhode Island

PREPARED BY:

GZA GeoEnvironmental, Inc.
Providence, Rhode Island

May 2003

File No. 32384.02

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Summary of Field Soil Gas Data
Former Gorham Site - Providence, Rhode Island

Soil Gas Point ID	TVOC (ppmv)	O ₂ (%)	CO ₂ (%)	LEL (%)	CH ₄ (%)
SG11	<0.1	10.6	10.3	60	5.4
SG12	<0.1	18.1	0.7	4	0.3
SG13	<0.1	9.0	7.0	12	0.7
SG14	<0.1	19.9	0.7	0	0
SG21	6.0 / <0.1	19.5	1.6	0	0
SG22	<0.1	18.1	2.6	0	0
SG23	<0.1	19.4	1.8	0	0
SG24	<0.1	15.8	3.3	0	0
SG31	0.2	13.6	7.7	0	0
SG32	<0.1	14.2	6.5	0	0
SG33	<0.1	17.4	2.7	0	0
SG34	<0.1	13.7	6.4	0	0
SG41	<0.1	19.5	1.8	0	0
SG42	<0.1	21.0	0.0	0	0
SG43	<0.1	20.1	1.0	0	0
SG44	<0.1	20.0	0.8	0	0
SG51	<0.1	20.8	0.0	0	0
SG52	<0.1	19.6	1.3	0	0
SG53	<0.1	20.2	0.6	0	0
SG54	<0.1	20.2	0.8	0	0
SA-1	<0.1	20.6	0.3	0	0
SA-2	<0.1	20.3	0.7	0	0
SB-1	<0.1	20.7	0.2	0	0
SB-2	<0.1	19.9	1.0	0	0
SG61	<0.1	20.5	0.3	0	0
SG62	<0.1	20.6	0.3	0	0
SG63	<0.1	20.5	0.3	0	0
SG64	<0.1	20.4	0.3	0	0

TABLE 2

SUMMARY OF SOIL GAS ANALYTICAL TESTING RESULTS

Former Garham Site - Providence, Rhode Island

PARAMETER	ppmv	mg/m ³	RI AAI, mg/m ³	CTDEP Residential Soil Vapor Criteria	Soil Vapor Concentrations in mg/m ³											
					S12	S14	S22	S24	S33	S42	SA-1	SS2	SB1			
benzene	1	3	1x10 ⁻⁴	--	0.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
chloroform	31	143	NA	--	0.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-dichloroethane	11	75	5x10 ⁻⁵	--	ND	7	ND	0.3	0.4	ND	0.4	ND	ND	ND	ND	ND
1,1-dichloroethylene	7	38	3x10 ⁻⁴	--	ND	0.04	0.5	3	0.6	8	0.6	2	2	0.5	ND	ND
1,1,1-trichloroethane (Freon 11)	NA	NA	NA	--	ND	ND	ND	ND	ND	27	32	24	8	10	2	2
1,1,2-trichloroethane	1	3	NA	--	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

NOTES:

-- No criteria established by RIDEM.

NA - FIDELITY Air Pollution Control Regulation No. 22 Acceptable Ambient Air Levels Table 1.

Health Consultation

PARCEL C (AKA: FORMER GORHAM SITE)

PROVIDENCE, RHODE ISLAND

EPA FACILITY ID: RID001195015

AUGUST 11, 2009

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

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to a contaminant could have occurred in the past, could be occurring, or could occur in the future.[ATSDR 2005]

A future potential exposure pathway includes situations in which contamination does not currently exist at an exposure point but is speculated to occur in the future. For example, if buildings are constructed on Parcel C, then a future potential exposure pathway may exist from vapor intrusion into the indoor air of those buildings from the contaminants in the groundwater and subsurface soil.

For Parcel C, ATSDR identified the following current and future potential exposure pathways based on a review of available parcel data:

Current potential exposure pathways:

- Exposure to surface soils
- Exposure to physical hazards

Future potential exposure pathways:

- Exposure to surface soils
- Exposure to physical hazards including explosions
- Vapor intrusion from underlying groundwater and soil into indoor air if buildings are constructed

Following is a detailed discussion on these exposure pathways and associated contaminants, including perspective on potential health hazards where possible.

Exposure to Surface Soils

A total of 15 surface soil samples were collected from Parcel C during the years 1989, 1994, 1998, 2001, and 2005 [GZA 2003] (see Table 1, 2). Most samples collected prior to 2005 were analyzed for PAHs and metals, and a small subset of samples was analyzed for VOCs and TPHs. In 2005, a single soil sample was collected from the northern edge of Parcel C. This sample was analyzed for metals, polychlorinated biphenyls (PCBs), pesticides, semi-volatile organic compounds (SVOCs), and dioxins and furans.

As shown in Table 2, Parcel C surface soils contained arsenic, cadmium, chromium, copper, lead, and silver at concentrations exceeding CVs. Surface soils also contained several PAHs, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene at concentrations exceeding CVs in about half the samples collected. TPH was detected in surface soil samples at an average concentration of 1,300 parts per million (ppm). In 2005, the single sample analyzed for dioxins and furans slightly exceeded the CV.

In addition to the surface soil sampling, site investigators collected a *single composite sample* from the top 12 inches of the stockpile (sample GZ-1). Detected concentrations of PAHs in the stockpile soil were above CVs, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene [GZA 2005b]. Additionally, TPH was detected at an elevated concentration of 2,300 ppm—slightly higher than the average TPH concentration detected throughout the rest of Parcel C. The sample was also analyzed for asbestos, which was not detected.

Exposure Assessment and Health Effects Evaluation: Surface Soils

Parcel C is currently partially enclosed by a locked, chain-link fence in good condition. It was very clear to ATSDR during our site visit in December of 2006 that people could trespass onto the site and onto Parcel D (Park/Pond Parcel) due to several breaks in the fence. The soil is overgrown with vegetation throughout Parcel C. There are also no trespassing signs posted along the fence. Based on current parcel use and conditions, it is unlikely that the general public would come into contact with surface soil contamination on Parcel C for a sufficient amount of time to result in any adverse health effects. ATSDR personnel also met and spoke to a homeless woman camping on the Park Parcel D and fishing in the pond. Trespassers currently represent the population most likely to come into contact with the contaminated surface soil on Parcel C. Parcel C has not been fully characterized for the nature and extent of contamination.

PAHs and metals (e.g. lead) in the soil appear to be the primary contaminants of interest and may drive the need for measures to prevent soil exposures. However, site characterization is incomplete. For example, a single 2001 soil sample revealed an elevated lead concentration (1,780 ppm), which could increase the risk of unhealthy lead exposures to a child exposed on a daily basis to soils with this concentration. Though the remaining 13 samples analyzed for lead did not show elevated concentrations, questions still remain on the property that can only be answered by characterizing the nature and extent of the contamination on Parcel C (approximately 5 acres in size).

Depending on future land use at Parcel C, additional surface soil sampling may be necessary to fully evaluate the public health hazards associated with contaminated soil, especially for young children. Currently, trespassers represent the most likely population to come into contact with site related contamination (surface soil) and physical hazards. Although contaminant levels are above CVs, trespassers are not likely to come into contact with contaminants at sufficient amounts, concentrations, or durations to result in any adverse health effects. The need for further characterization would be particularly important if remedial actions such as those proposed in the 2005 RAWP are not implemented (e.g., capping all soil with asphalt pavement, building structures, or 2 feet of clean soil). However, a soil cap may not adequately protect the underlying soil from being disturbed and brought to the surface. If the current Parcel C ELUR will be implemented by any future owners of Parcel C then the soil contamination exposure route may not be a public health concern.

Table 2. Surface Soil Sampling, Former Gorham Site, Parcel C—1989, 1994, 1998, 2001, 2005 . See Figure 2 for Surface Soil Sample Locations.

<i>Analyte</i>	<i># of detects</i>	<i>Minimum (ppm)</i>	<i>Maximum (ppm)</i>	<i>Maximum Sample Name</i>	<i>Date of Maximum</i>	<i>CV (ppm)</i>	<i>Source of CV</i>	<i># > CV</i>
Volatile Organic Compounds								
Acetone	4/6	0.075 J	0.391	SS-107	05/27/1998	50,000	RMEG (Child)	0/6
cis-1,2 Dichloroethene	2/3	0.005 J	0.04	SB-3 (0)	10/25/1994	20,000	Intermediate EMEG (Child)	0/3
Methyl-ethyl ketone	1/6	0.065 J	0.065 J	SB-5 (0)	10/26/1994	30,000	RMEG (Child)	0/6
Methylene chloride	2/6	0.018 J	0.034 J	SB-4 (0)	10/25/1994	90	CREG	0/6
Naphthalene	1/6	0.012	0.012	SS-107	05/27/1998	1,000	RMEG (Child)	0/6
Tetrachloroethylene	1/3	0.285	0.285	SB-3 (0)	10/25/1994	500	RMEG (Child)	0/3
Toluene	1/6	0.005 J	0.005 J	SB-5 (0)	10/26/1994	1,000	Intermediate EMEG (Child)	0/6
Trichloroethylene	1/6	0.175	0.175	SB-3 (0)	10/25/1994	1.6	RBC	0/6
Semi-volatile Organic Compounds								
Acenaphthene	1/14	0.033	0.033	SS-1005	12/28/2005	3,000	RMEG (Child)	0/14
Acenaphthylene	2/9	0.05	4.03	SS-409S	03/01/2001	3,000	RMEG (Child; Acenaphthene)	0/9
Anthracene	4/14	0.14	17.3	SS-409S	03/01/2001	20,000	RMEG (Child)	0/14
Benzo(a)anthracene	7/14	0.48	25.3	SS-409S	03/01/2001	0.22	RBC	7/14
Benzo(a)pyrene	7/14	0.45	25.3	SS-409S	03/01/2001	0.1	CREG	7/14
Benzo(b)fluoranthene	7/14	0.781	21.3	SS-409S	03/01/2001	0.22	RBC	5/14
Benzo(g,h,i)perylene	5/14	0.24	11.5	SS-409S	03/01/2001	20,000	RMEG (Child; Anthracene)	0/14
Benzo(k)fluoranthene	6/14	0.23	26.5	SS-409S	03/01/2001	2.2	RBC	3/14
Chrysene	7/14	0.56	19.8	SS-409S	03/01/2001	22	RBC	0/14
Dibenzo(a,h)anthracene	4/14	0.054	4.77	SS-409S	03/01/2001	0.022	RBC	4/14
Di-n-butylphthalate	1/4	36	36	SS-1005	12/28/2005	5,000	RMEG (Child)	0/4
Fluoranthene	7/14	0.986	67.7	SS-409S	03/01/2001	2,000	RMEG (Child)	0/14
Fluorene	2/14	0.049	3.88	SS-409S	03/01/2001	2,000	RMEG (Child)	0/14
Indeno(1,2,3-cd) pyrene	5/14	0.19	11.7	SS-409S	03/01/2001	0.22	RBC	4/14
Naphthalene	1/11	0.049	0.049	SS-1005	12/28/2005	1,000	RMEG (Child)	0/11
Phenanthrene	7/14	0.375	64.6	SS-409S	03/01/2001	2,000	RMEG (Child; Pyrene)	0/14

Gorham Silver Parcel C
Health Consultation

Analyte	# of detects	Minimum (ppm)	Maximum (ppm)	Maximum Sample Name	Date of Maximum	CV (ppm)	Source of CV	# > CV
Pyrene	7/14	0.878	48.6	SS-409S	03/01/2001	2,000	RMEG (Child)	0/14
Polychlorinated Biphenyls, Pesticides, Dioxins/Furans								
Aroclor 1260	1/4	0.023	0.023	SS-1005	12/28/2005	0.32	RBC	0/4
4,4-DDE	1/1	0.0027	0.0027	SS-1005	12/28/2005	1.9	RBC	0/1
4,4-DDT	1/1	0.0042	0.0042	SS-1005	12/28/2005	30	Intermediate EMEG (Child)	0/1
Alpha-Chlordane	1/1	0.0044	0.0044	SS-1005	12/28/2005	30	Chronic EMEG (Child; Chlordane)	0/1
gamma-Chlordane	1/1	0.004	0.004	SS-1005	12/28/2005	30	Chronic EMEG (Child; Chlordane)	0/1
Dioxins/Furans ¹	1/1	0.000178	0.000178	SS-1005	12/28/2005	0.00005	Chronic EMEG (Child; 2,3,7,8 TCDD)	1/1
Total Petroleum Hydrocarbons	6/8	36	5,100	SB-5 (0)	10/26/1994	NA		
Inorganics								
Antimony	1/12	4.9	4.9	SS-1005	12/28/2005	20	RMEG (Child)	0/12
Arsenic	13/14	1.88	11	SS-1005	12/28/2005	0.5	CREG	13/14
						20	Chronic EMEG (Child)	0/14
Barium	3/4	20.5	3,000	SS-1005	12/28/2005	10,000	RMEG (Child)	0/4
Beryllium	5/12	0.076	0.3	SS-108	05/27/1998	100	Chronic EMEG (Child)	0/12
Cadmium	6/12	1	14	SB-3 (0)	10/25/1994	10	Chronic EMEG (Child)	1/12
Chromium	9/12	6	610	SS-1005	12/28/2005	200	RMEG (Child; Hexavalent.Cr)	2/12
Copper	14/14	3	10,100	SB-3 (0)	10/25/1994	500	Intermediate EMEG (Child)	7/14
Cyanide (total)	2/5	0.5	4	SB-3 (0)	10/25/1994	1,000	RMEG (Child)	0/5
Lead	12/14	23	1,780	SS-411S	03/01/2001	400	EPA Action Level	1/14
Mercury	4/12	0.1	0.293	SS-409S	03/01/2001	20	RMEG (Child; Mercuric Chloride)	0/12
Nickel	11/12	3	204	SB-3 (0)	10/25/1994	1,000	RMEG (Child)	0/12
Silver	10/12	3	472	SB-4 (0)	10/25/1994	300	RMEG (Child)	1/12
Zinc	12/12	11	5,750	SB-3 (0)	10/25/1994	20,000	Chronic EMEG (Child)	0/12

¹ - Total relative concentrations were calculated using the toxic equivalency factor (TEF) approach for dioxins. This approach to evaluating health hazards has been developed and used to some extent to guide public health decisions. In short, the TEF approach compares the relative potency of individual congeners with that of 2,3,7,8- tetrachlorodibenzo-p-dioxin (TCDD), the best-studied member of this chemical class. The concentration of each dioxin-like congener is multiplied by its TEF to arrive at a toxic equivalent (TEQ), and the TEQs are added to give the total toxic equivalency. The total toxic equivalency is then compared to reference exposure levels for 2,3,7,8-TCDD. The total TEQ concentrations reported here were estimated using the TOTAL dioxin/furan analysis results. The maximum total TEQ



concentration was also estimated using congener-specific totals, with a resulting value of 0.000014 ppm (below the CV), and was detected in the same sample (SS-SI002).

CREG - cancer risk evaluation guide

EMEG - environmental media evaluation guide

J - estimated value between the detection limit and the quantitative value

ppm - part per million

CV - comparison value

EPA RBC- risk-based concentration

NA - not available

RMEG - reference media evaluation guide

Sources:

[ABB] ABB Environmental Services. 1995. Remedial investigation report.

[CDM] Camp Dresser and McKee. 1993. Site inspection report.

Fuss & O'Neill. 2006. Supplemental Site Investigation.

Harding ESE. 2001. Remedial Action Work Plan.

[HLA] Harding Lawson Associates. 1999. Site investigation summary report and risk assessment, Volumes 1 & 2.

Table 7. Subsurface Soil Sampling, Former Gorham Site, Parcel C—1989, 1994, 2001 (See Figure 4 for sample locations?)

Analyte	# of detects	Minimum (ppm)	Maximum (ppm)	Maximum Sample Name	Date of Maximum	CV (ppm)	Source of CV	# > CV
Volatile Organic Compounds								
Methylene Chloride	2/2	0.011	0.018 J	SB-2 (5)	10/25/1994	90	CREG	0/2
Tetrachloroethylene	1/4	0.071 J	0.071 J	SB-2 (5)	10/25/1994	500	RMEG (Child)	0/4
Trichloroethylene	1/4	0.134 J	0.134 J	SB-2 (5)	10/25/1994	1.6	RBC	0/4
Xylenes (total)	1/3	1	1	TP-11 (S4)	03/23/1989	10,000	RMEG (Child)	0/3
Polycyclic Aromatic Hydrocarbons								
Anthracene	2/5	0.952	4.29	SS-411D	03/01/2001	20,000	RMEG (Child)	0/5
Benzo(a)anthracene	3/5	0.414	8.43	SS-411D	03/01/2001	0.22	RBC	3/5
Benzo(a)pyrene	3/5	0.445	13.8	SS-410D	03/12/2001	0.1	CREG	3/5
Benzo(b)fluoranthene	4/5	0.406	11.9	SS-410D	03/12/2001	0.22	RBC	4/5
Benzo(g,h,i)perylene	2/5	0.406	4.57	SS-410D	03/12/2001	20,000	RMEG (Child; Anthracene)	0/5
Benzo(k)fluoranthene	3/5	0.352	12.3	SS-410D	03/12/2001	2.2	RBC	1/5
Chrysene	3/5	0.448	8.25	SS-411D	03/01/2001	22	RBC	0/5
Dibenzo(a,h) anthracene	1/5	1.94	1.94	SS-410D	03/12/2001	0.022	RBC	1/5
Fluoranthene	4/5	0.749	18.1	SS-411D	03/01/2001	2,000	RMEG (Child)	0/5
Indeno(1,2,3-cd) pyrene	1/5	4.4	4.4	SS-410D	03/12/2001	0.87	RBC	1/5
Phenanthrene	3/5	0.777	17.8	SS-411D	03/01/2001	2,000	RMEG (Child; Pyrene)	0/5
Pyrene	4/5	0.788	16.9	SS-411D	03/01/2001	2,000	RMEG (Child)	0/5
Total Petroleum Hydrocarbons	6/7	37	23,800	TP-12 (S1)	03/23/1989	NA		
Inorganics								
Arsenic	3/9	1.49	8.76	SS-410D	03/12/2001	0.5	CREG	3/9
						20	Chronic EMEG (Child)	0/9
Barium	3/5	26	73	S comp B	03/23/1989	10,000	RMEG (Child)	0/5
Beryllium	1/7	0.089	0.089	SS-412D	03/01/2001	100	Chronic EMEG (Child)	0/7
Cadmium	4/7	2	4	S comp A	03/23/1989	10	Chronic EMEG (Child)	0/7
Chromium	4/7	8	3,750	S comp B	03/23/1989	200	RMEG (Child; Hexavalent Cr)	1/7
Copper	9/9	22	11,300	S comp D	03/23/1989	500	Intermediate EMEG (Child)	6/9
Cyanide (total)	2/8	1.35	5.38	TP-12 (S2)	03/23/1989	1,000	RMEG (Child)	0/8
Lead	8/9	9.1	22,600	SS-411D	03/01/2001	400	EPA Action Level	2/9
Nickel	7/7	3.39	2,820	S comp D	03/23/1989	1,000	RMEG (Child)	1/7
Silver	5/7	6	6,970	S comp D	03/23/1989	300	RMEG (Child)	1/7
Thallium	1/7	10	10	S comp A	03/23/1989	5.5	RBC	1/7
Zinc	7/7	38.6	9,230	S comp D	03/23/1989	20,000	Chronic EMEG (Child)	0/7

CREG - cancer risk evaluation guide

CV - comparison value

Gorham Silver Parcel C
Health Consultation

EMEG - environmental media evaluation guide
J - estimated value between the detection limit and the quantitative value
ppm - part per million

EPA RBC - risk-based concentration
NA - not available
RMEG - reference media evaluation guide

Sources:

[ABB] ABB Environmental Services. 1995. Remedial investigation report.

[CDM] Camp Dresser and McKee. 1993. Site inspection report.

Harding ESE. 2001. Remedial Action Work Plan.

Figure 1. Gorham Silver Site, Providence, Rhode Island



Figure 2. Surface Soil Sample Locations, Former Gorham Site, Parcel C



Figure 3. Groundwater Sample Locations, Former Gorham Site, Parcel C



Figure 4. Subsurface Soil Sample Locations, Former Gorham Site, Parcel C



(6.) THE LOCATIONS OF THE TEST PITS, BORINGS, AND SOIL GAS PROBES
SHOWN ON THIS MAP ARE FOR INFORMATION ONLY AND SHOULD BE CONSIDERED
ACCURATE ONLY TO THE DEGREE IMPLIED.

APPROVAL



SCALE IN FEET
0' 10' 80' 160'

PROJ. MGR. DRG
REV'D BY: DRG
DRAWN BY: IAD

PROVIDENCE YMC
PROVIDENCE, RI
SOIL GAS

PROJECT
3238

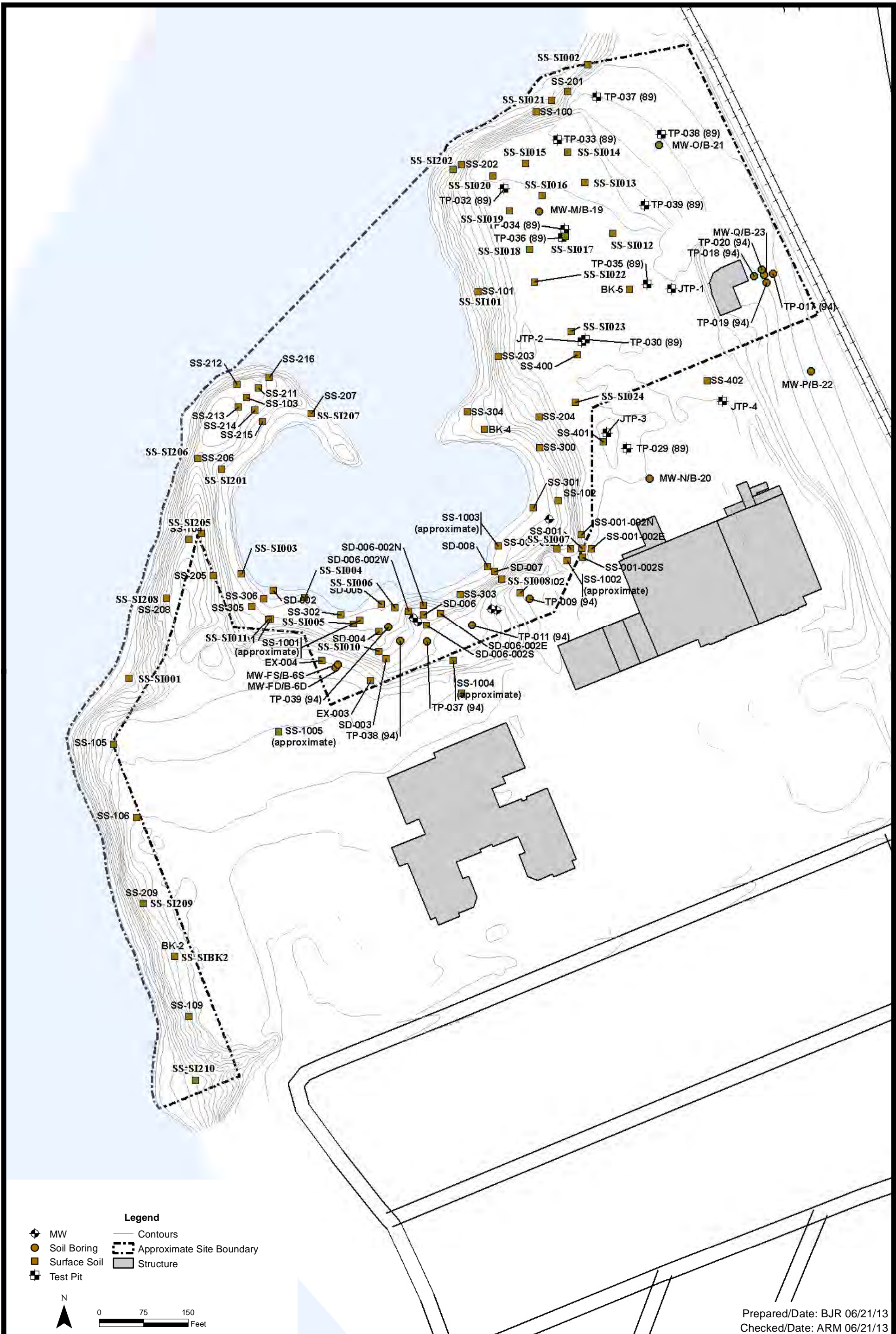
FIGURE NO.

From
LA WORK
2005

848°5'19"E
107.01'
144.89' SW

2011 A GeoEnvironmental, Inc. (60 FILE 12184-013284 OVERLAP LAY OUT ENV-30)

APPENDIX C-3
Phase III Area Soils



Prepared/Date: BJR 06/21/13
 Checked/Date: ARM 06/21/13

333 Adelaide Avenue Site
 Providence, Rhode Island



Summary of 1994-2007 Soil
 Investigation Locations
 Project 3650-11-0222

Figure 3.1

**Table 5.2
Summary of Comparison of Detections to RDEC in Soil to be Capped – Phase III Area
Former Gorham Manufacturing Facility
Providence, Rhode Island**

parameter.name	Residential Direct Exposure Criteria (ppm)	BK-4D 3/12/2001 1.5-2 ft	BK4XX020-1 8/6/2002 0-1 ft	BK4XX021-1.5 8/6/2002 1-1.5 ft	BK5D 3/1/2001 1.5-2 ft	BK5S 3/1/2001 0-0.5 ft	GMSS100X01 LDXX 5/27/1998 0-1 ft	GMSS101X01 LDXX 5/27/1998 0-1 ft	GMSS201X01 RAXX 12/11/1998 0-1 ft	GMSS202X01 RAXX 12/11/1998 0-1 ft	GMSS203X01 RAXX 12/11/1998 0-1 ft	GMSS204X01 RAXX 12/11/1998 0-1 ft	GMSSBK4001 01XX 10/12/1994 0-1 ft	GMSSBK5001 01XX 10/12/1994 0-1 ft	SS-100D 3/12/2001 1.5-2 ft	SS-203D 3/12/2001 1.5-2 ft	SS203XX020-1 8/6/2002 0-1 ft	
Semivolatile Organics (mg/Kg)																		
Acenaphthylene	23				0.366 U	0.45 U	0.348 U											
Anthracene	35				0.366 U	0.45 U	0.348 U											
Benzo(a)anthracene	0.9				0.366 U	0.808	0.348 U											
Benzo(a)pyrene	0.4				0.366 U	1.11	0.348 U											
Benzo(b)fluoranthene	0.9				0.366 U	1.24	0.348 U											
Benzo(g,h,i)perylene	0.8				0.366 U	0.508	0.348 U											
Benzo(k)fluoranthene	0.9				0.366 U	1.1	0.348 U											
Chrysene	0.4				0.366 U	0.904	0.348 U											
Dibenzo(a,h)anthracene	0.4				0.366 U	0.45 U	0.348 U											
Fluoranthene	20				0.368	2.3	0.348 U											
Fluorene	28				0.366 U	0.45 U	0.348 U											
Indeno(1,2,3-cd)pyrene	0.9				0.366 U	0.514	0.348 U											
Naphthalene	54				0.366 U	0.45 U	0.348 U											
Phenanthrene	40				0.366 U	0.928	0.348 U											
Pyrene	13				0.366 U	1.74	0.348 U											
Polyaromatic Hydrocarbons (mg/Kg)																		
Anthracene	35		0.337 U	0.337 U														0.34 U
Benzo(a)anthracene	0.9		0.337 U	0.337 U														0.34 U
Benzo(a)pyrene	0.4		0.337 U	0.337 U														0.34 U
Benzo(b)fluoranthene	0.9		0.337 U	0.337 U														0.34 U
Benzo(g,h,i)perylene	0.8		0.337 U	0.337 U														0.34 U
Benzo(k)fluoranthene	0.9		0.337 U	0.337 U														0.34 U
Chrysene	0.4		0.337 U	0.337 U														0.34 U
Dibenzo(a,h)anthracene	0.4		0.337 U	0.337 U														0.34 U
Fluoranthene	20		0.337 U	0.337 U														0.568
Indeno(1,2,3-cd)pyrene	0.9		0.337 U	0.337 U														0.34 U
Phenanthrene	40		0.337 U	0.337 U														0.34 U
Pyrene	13		0.337 U	0.337 U														0.461
Pesticides/PCBs (mg/Kg)																		
4,4'-DDD	2.7																	
4,4'-DDE	1.9																	
4,4'-DDT	1.9																	
alpha-Chlordane	1.8																	
beta-BHC	0.4																	
Chlordane	0.5																	
gamma-Chlordane	1.8																	
Heptachlor epoxide	0.07																	
Hexachlorobenzene	0.4																	
Aroclor-1242	10																	
Aroclor-1254	10																	
Dioxins/Furans (mg/Kg)																		
1,2,3,4,6,7,8-HpCDD																		
1,2,3,4,6,7,8-HpCDF																		
1,2,3,4,7,8,9-HpCDF																		
1,2,3,4,7,8-HxCDD																		
1,2,3,4,7,8-HxCDF																		
1,2,3,6,7,8-HxCDD																		
1,2,3,6,7,8-HxCDF																		
1,2,3,7,8,9-HxCDD																		
1,2,3,7,8,9-HxCDF																		
1,2,3,7,8-PeCDD																		
1,2,3,7,8-PeCDF																		
2,3,4,6,7,8-HxCDF																		
2,3,4,7,8-PeCDF																		
2,3,7,8-TCDD																		
2,3,7,8-TCDF																		
OCDD																		
OCDF																		
Total HpCDD																		

P:\old_Wakefield_Data\projects\3652130029 - Textron Gorham Updated Cove SIR\4.0 Project Deliverables\4.1 Reports\SIR\Tables\ Table 5.2 - Summary of Comparison_formatted.xls, Detects

Table 5.2
Summary of Comparison of Detections to RDEC in Soil to be Capped – Phase III Area
Former Gorham Manufacturing Facility
Providence, Rhode Island

parameter.name	Residential Direct Exposure Criteria (ppm)	BK-4D 3/12/2001 1.5-2 ft	BK4XX020-1 8/6/2002 0-1 ft	BK4XX021-1.5 8/6/2002 1-1.5 ft	BK5D 3/1/2001 1.5-2 ft	BK5S 3/1/2001 0-0.5 ft	GMSS100X01 LDXX 5/27/1998 0-1 ft	GMSS101X01 LDXX 5/27/1998 0-1 ft	GMSS201X01 RAXX 12/11/1998 0-1 ft	GMSS202X01 RAXX 12/11/1998 0-1 ft	GMSS203X01 RAXX 12/11/1998 0-1 ft	GMSS204X01 RAXX 12/11/1998 0-1 ft	GMSSBK4001 01XX 10/12/1994 0-1 ft	GMSSBK5001 01XX 10/12/1994 0-1 ft	SS-100D 3/12/2001 1.5-2 ft	SS-203D 3/12/2001 1.5-2 ft	SS203XX020-1 8/6/2002 0-1 ft	
Total HpCDF																		
Total HxCDD																		
Total HxCDF																		
Total PeCDD																		
Total PeCDF																		
Total TCDD																		
Total TCDF																		
TEQ Mammal	0.0000043																	
Inorganics (mg/Kg)																		
Arsenic	7	1.4 U	4.1	20.6	67.8	11	4	15	2.9	23	19	11	60	6.21	2.35			
Barium	5500		14.5	20.9	37													
Beryllium	0.4		0.302	0.271	0.323	0.2 U	0.2 U	0.3	0.2	0.2	0.3	1 U	1 U					
Cadmium	39		0.642 U	0.73 U	0.87 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U				
Chromium	390		4.45	4.41	35.8	6	7	9	5	6	7	10	70					
Copper	3100		21.9	14.7	40.8	19	12	52	31	43	91	66	49					
Lead	150	7 U	28	30.7	280	61	23	160	61	119	274	279	591	23.2	6.8 U			
Mercury	23		0.0648 U	0.108	0.375	0.1	0.1 U	0.53	0.07 U	0.45	0.34	0.5 U	0.5					
Nickel	1000		5.85	4.54	8.67	6	5	7	8	6	9	17	11					
Selenium	390		6.4 U	7.3 U	8.7 U	7 U	7 U	7 U	6 U	7 U	8 U	1 U	5					
Silver	200		14.2	4.81	21.2	3	2	10	5	16	18	52	1 U					
Zinc	6000		24.5	19.3	51.4	15	11	27	143	13	35	74	77					
Total Cyanide	200											0.5 U	0.5					
Petroleum Hydrocarbons (mg/Kg)																		
Total Petroleum Hydrocarbon							56	42					21 U	3600				

Bold value and shaded cell indicates exceedance of RDEC
mg/Kg = milligram per kilogram
U = not detected, value is the reporting limit
J = value is estimated
P = Percent difference between primary and confirmation results exceeds 40%
A = Detection limit based on signal-to-noise measurement
B = Less than 10 times higher than method blank level
E = PCDE Interference
I = Interference

Table 5.2
Summary of Comparison of Detections to RDEC in Soil to be Capped - Phase III Area
Former Gorham Manufacturing Facility
Providence, Rhode Island

parameter.name	Residential Direct Exposure Criteria (ppm)	SS204XX020- 1 8/6/2002 0-1 ft	SS-300D 3/12/2001 1.5-2 ft	SS-300S 3/12/2001 0-0.5 ft	SS300XX020- 1 8/6/2002 0-1 ft	SS304XX010- 1 8/6/2002 0-1 ft	SS400S 3/1/2001 0-0.5 ft	SS401D 3/1/2001 1.5-2 ft	SS401S 3/1/2001 0-0.5 ft	SS402S 3/1/2001 0-0.5 ft	SS-SI002 6/7/2006 0-0.5 ft	SS-SI012 6/8/2006 0-0.5 ft	SS-SI013 6/8/2006 0-0.5 ft	SS-SI014 6/8/2006 0-0.5 ft	SS-SI015 6/8/2006 0-0.5 ft	SS-SI016 6/8/2006 0-0.5 ft	
Semivolatile Organics (mg/Kg)																	
Acenaphthylene	23						0.404 U	0.368 U	0.431 U	0.443 U	1.13 U	0.0277 U	0.027 U	0.0261 U	0.559 U	0.543 U	
Anthracene	35						0.404 U	0.504	0.657	0.511	2.18	0.0277 U	0.0811	0.0261 U	0.784	0.543 U	
Benzo(a)anthracene	0.9						1.51	1.53	4.45	1.62	2.4	0.177	0.193	0.0261 U	2.78	1.36	
Benzo(a)pyrene	0.4						1.81	1.81	4.08	2.22	1.71	0.211	0.165	0.0261 U	2.69	1.65	
Benzo(b)fluoranthene	0.9						2.05	2.02	3.74	2.23	1.45	0.244	0.222	0.0261 U	2.68	1.95	
Benzo(g,h,i)perylene	0.8						0.782	0.816	2.04	1.26	1.13 U	0.061	0.0513	0.0261 U	1.55	0.944	
Benzo(k)fluoranthene	0.9						1.83	1.65	3.8	1.73	1.81	0.192	0.157	0.0261 U	1.95	1.36	
Chrysene	0.4						1.64	1.81	4.08	1.74	2.61	0.184	0.195	0.0261 U	2.7	1.47	
Dibenzo(a,h)anthracene	0.4						0.404 U	0.368 U	0.431 U	0.443 U	1.13 U	0.0277 U	0.027 U	0.0261 U	0.559 U	0.543 U	
Fluoranthene	20						4.2	3.99	8.34	3.76	6.59	0.495	0.504	0.0261 U	5.52	2.84	
Fluorene	28						0.404 U	0.368 U	0.431 U	0.443 U	1.13 U	0.0277 U	0.0438	0.0261 U	0.559 U	0.543 U	
Indeno(1,2,3-cd)pyrene	0.9						0.809	0.806	2.08	1.16	1.13 U	0.0682	0.0573	0.0261 U	1.53	0.952	
Naphthalene	54						0.404 U	0.368 U	0.431 U	0.443 U	1.13 U	0.0277 U	0.027 U	0.0261 U	0.559 U	0.543 U	
Phenanthrene	40						2.09	2.68	3.02	1.72	10.7	0.0621	0.413	0.0261 U	3.71	0.664	
Pyrene	13						3.07	3.28	7.78	3.23	7.52	0.294	0.438	0.0261 U	3.97	1.91	
Polyaromatic Hydrocarbons (mg/Kg)																	
Anthracene	35	0.629			1.13	0.344 U											
Benzo(a)anthracene	0.9	1.85			3.04	0.5											
Benzo(a)pyrene	0.4	1.71			3.44	0.635											
Benzo(b)fluoranthene	0.9	1.6			3.15	0.675											
Benzo(g,h,i)perylene	0.8	0.716			1.8	0.425											
Benzo(k)fluoranthene	0.9	1.43			2.72	0.526											
Chrysene	0.4	1.88			3.1	0.701											
Dibenzo(a,h)anthracene	0.4	0.365 U			0.687	0.344 U											
Fluoranthene	20	4.28			8.11	1.23											
Indeno(1,2,3-cd)pyrene	0.9	0.638			1.59	0.369											
Phenanthrene	40	2.71			5.54	0.555											
Pyrene	13	3.95			6.61	0.994											
Pesticides/PCBs (mg/Kg)																	
4,4'-DDD	2.7											0.048	0.00526 U	0.00514 U	0.00507 U	0.00729	0.00572 U
4,4'-DDE	1.9											0.116	0.00528 U	0.00514 U	0.00507 U	0.0191	0.00572 U
4,4'-DDT	1.9											0.496	0.00976	0.00514 U	0.00507 U	0.109	0.00858
alpha-Chlordane	1.8											0.0119 U	0.00528 U	0.00514 U	0.00507 U	0.0354	0.00572 U
beta-BHC	0.4											0.0119 U	0.00528 U	0.00514 U	0.00507 U	0.00562 U	0.00572 U
Chlordane	0.5											0.119 U	0.00528 U	0.00514 U	0.00507 U	0.226	0.00572 U
gamma-Chlordane	1.8											0.0119 U	0.00528 U	0.00514 U	0.00507 U	0.0248	0.00729
Heptachlor epoxide	0.07											0.0119 U	0.00528 U	0.00514 U	0.00507 U	0.00562 U	0.00572 U
Hexachlorobenzene	0.4											0.0119 U	0.00528 U	0.00514 U	0.00507 U	0.00562 U	0.00572 U
Aroclor-1242	10											0.119 U	0.0527 U	0.00514 U	0.00506 U	0.00561 U	0.00572 U
Aroclor-1254	10											0.119 U	0.0527 U	0.00514 U	0.00506 U	0.126	0.00572 U
Dioxins/Furans (mg/Kg)																	
1,2,3,4,6,7,8-HpCDD												0.000012	1.2E-06 J	0.0000011 J	8.5E-07 J	0.000015	4.9E-06
1,2,3,4,6,7,8-HpCDF												9.1E-06	1.2E-06 J	8.2E-07 U	8.1E-07 U	9.2E-06	4.5E-06
1,2,3,4,7,8,9-HpCDF												2.1E-06 J	8.1E-07 U	8.2E-07 U	8.1E-07 U	1.8E-06 J	8.1E-07 U
1,2,3,4,7,8-HxCDD												1.5E-06 J	8.1E-07 U	8.2E-07 U	8.1E-07 U	8.4E-07 U	8.1E-07 U
1,2,3,4,7,8-HxCDF												7.7E-06	8.1E-07 U	8.2E-07 U	8.1E-07 U	0.000004 J	1.2E-06 J
1,2,3,6,7,8-HxCDF												2.7E-06 J	8.1E-07 U	8.2E-07 U	8.1E-07 U	1.8E-06 J	9.7E-07 J
1,2,3,7,8,9-HxCDF												1.1E-06 UE	8.1E-07 UE	8.2E-07 U	8.1E-07 U	2.9E-06 J	8.1E-07 UE
1,2,3,7,8,9-HxCDD												1.9E-06 J	8.1E-07 U	8.2E-07 U	8.1E-07 U	1.1E-06 J	8.1E-07 U
1,2,3,7,8,9-HxCDF												4.9E-06 J	8.1E-07 U	8.2E-07 U	8.1E-07 U	1.9E-06 J	8.1E-07 UE
1,2,3,7,8-PeCDD												3.4E-06 J	8.1E-07 U	8.2E-07 U	8.1E-07 U	8.4E-07 U	8.1E-07 U
1,2,3,7,8-PeCDF												3.2E-06 J	8.1E-07 U	8.2E-07 U	8.1E-07 U	8.4E-07 U	8.1E-07 UE
2,3,4,6,7,8-HxCDF												5.7E-06	8.1E-07 U	8.2E-07 U	8.1E-07 U	2.4E-06 J	8.1E-07 U
2,3,4,7,8-PeCDF												0.000023	1.1E-06 J	8.2E-07 U	8.1E-07 U	3.2E-06 J	6.6E-06
2,3,7,8-TCDD												0.000001 J	1.6E-07 U	1.6E-07 U	1.6E-07 U	1.7E-07 UA	2.2E-07 UA
2,3,7,8-TCDF												1.9E-06	1.6E-07 U	1.6E-07 U	1.6E-07 U	8.5E-07 A	9E-07 A
OCDD												0.00005	0.000011	0.0000084	0.000007 J	0.00027	0.000057
OCDF												4.7E-06 J	1.6E-06 U	0.0000016 U	0.0000016 U	0.000014	1.6E-06 U
Total HpCDD												0.000025	2.4E-06 J	0.0000021 J	8.5E-07 J	0.00003	0.00001

P:\old_Wakefield_Data\projects\3652130029 - Tetrax Gorham Updated Cove SIR\4.0 Project Deliverables\4.1 Reports\SIR\Tables\ Table 5.2 - Summary of Comparison formatted.xls, Detects

Table 5.2
Summary of Comparison of Detections to RDEC in Soil to be Capped – Phase III Area
Former Gorham Manufacturing Facility
Providence, Rhode Island

parameter.name	Residential Direct Exposure Criteria (ppm)	SS204XX020-1 8/6/2002 0-1 ft	SS-300D 3/12/2001 1.5-2 ft	SS-300S 3/12/2001 0-0.5 ft	SS300XX020-1 8/6/2002 0-1 ft	SS304XX010-1 8/6/2002 0-1 ft	SS400S 3/12/2001 0-0.5 ft	SS401D 3/12/2001 1.5-2 ft	SS401S 3/12/2001 0-0.5 ft	SS402S 3/12/2001 0-0.5 ft	SS-SI002 6/7/2006 0-0.5 ft	SS-SI012 6/8/2006 0-0.5 ft	SS-SI013 6/8/2006 0-0.5 ft	SS-SI014 6/8/2006 0-0.5 ft	SS-SI015 6/8/2006 0-0.5 ft	SS-SI016 6/8/2006 0-0.5 ft
Total HpCDF											0.000022	1.2E-06 J	8.2E-07 U	8.1E-07 U	0.000023	9.7E-06
Total HxCDD											0.000039	8.1E-07 U	8.2E-07 U	8.1E-07 U	0.00002	6.1E-06
Total HxCDF											0.000016	6.3E-06	8.2E-07 U	8.1E-07 U	0.000072	0.000051
Total PeCDD											0.000037	8.1E-07 U	8.2E-07 U	8.1E-07 U	5.6E-06	8.1E-07 U
Total PeCDF											0.000025	0.000013	8.2E-07 U	0.000015 J	0.000064	0.00011
Total TCDD											0.000002	1.6E-07 U	1.6E-07 U	1.6E-07 U	2.4E-06	1.1E-06
Total TCDF											0.000081	4.1E-06	1.6E-07 U	3.5E-07 BJ	0.000029	0.000027
TEQ Mammal	0.0000043										0.000027	0.0000012	0.0000094	0.0000093	0.0000034	0.0000032
Inorganics (mg/Kg)																
Arsenic	7		2.23	6.02		11	29.2	20	19.8	44.6	3.1 U	1.9	1.5 U	1.5	3	1.5 U
Barium	5500					27.7	42.2	356	45.6	58.5	38.8	12.7	54.9	36.1	41.4	27.3
Beryllium	0.4					0.347	0.346	0.281	0.265	0.372	0.12 U	0.06 U	0.31 U	0.06 U	0.17	0.06 U
Cadmium	39					0.694 U	0.79 U	0.74 U	0.85 U	0.87 U	1.23 U	0.61 U	0.61 U	0.6 U	0.61 U	0.61 U
Chromium	390					8	34.4	12.5	21.7	70	10.6	7.4	10.8	9.8	11.3	9.3
Copper	3100					116	86.8	66.1	81.9	76.4	127	8.4	26.3	22.8	37.9	26.3
Lead	150		95.2	332		157	213	402	350	453	138	15.4	8.5	9.3	54.4	10.2
Mercury	23					0.373	0.357	0.253	0.283	1.21	0.143	0.055	0.034 U	0.032 U	0.571	0.035 U
Nickel	1000					13.7	9.02	9.53	9.86	12.6	13.9	3.3	11.1	9.3	10	9.1
Selenium	390					6.9 U	7.9 U	7.4 U	8.5 U	8.7 U	12.3 U	6.1 U	6.1 U	6 U	6.1 U	6.1 U
Silver	200					30	19	35.6	63.9	53.5	10.7	0.81	0.61 U	0.6 U	12	0.61 U
Zinc	6000					49.6	64.4	88	139	83.4	120	16.2	29.4	27.3	67.3	24.2
Total Cyanide	200															
Petroleum Hydrocarbons (mg/Kg)																
Total Petroleum Hydrocarbon																

Bold value and shaded cell indicates exceedance of RDEC
mg/Kg = milligram per kilogram
U = not detected, value is the reporting limit
J = value is estimated
P = Percent difference between primary and confirmation results exceeds 40%
A = Detection limit based on signal-to-noise measurement
B = Less than 10 times higher than method blank level
E = PCDE Interference
I = Interference

**Table 5.2
Summary of Comparison of Detections to RDEC in Soil to be Capped – Phase III Area
Former Gorham Manufacturing Facility
Providence, Rhode Island**

parameter.name	Residential Direct Exposure Criteria (ppm)	SS-S1017	SS-S1018	SS-S1019	SS-S1020	SS-S1021	SS-S1022	SS-S1023	SS-S1024	SS-S1101	SS-S1202	
		6/8/2006 0-0.5 ft	6/8/2006 0-0.5 ft	6/8/2006 0-0.5 ft	6/8/2006 0-0.5 ft	6/8/2006 0-0.5 ft	6/8/2006 0-0.5 ft	6/7/2006 0-0.5 ft	6/7/2006 0-0.5 ft	6/8/2006 0-0.5 ft	6/7/2006 0-0.5 ft	
Semivolatile Organics (mg/Kg)												
Acenaphthylene	23	0.574	0.0272 U	0.0264 U	0.552 U	0.643 U	0.544 U	0.644 U	0.844 U	2.97	0.028 U	0.0295 U
Anthracene	35	1.05	0.0272 U	0.0264 U	0.558	0.643 U	0.544 U	0.644 U	2.34	0.028 U	0.0572	
Benzo(a)anthracene	0.9	3.12	0.0717	0.0332	2.24	0.643 U	1.33	0.644 U	9.67	0.108	0.203	
Benzo(a)pyrene	0.4	3.11	0.0869	0.0585	2.35	0.643 U	2.01	0.644 U	9.54	0.137	0.203	
Benzo(b)fluoranthene	0.9	3.33	0.125	0.0886	2.47	0.643 U	2.22	0.644 U	10.9	0.174	0.24	
Benzo(g,h,i)perylene	0.8	1.35	0.0272 U	0.0264 U	1.21	0.643 U	1.33	0.644 U	4.11	0.0342	0.0578	
Benzo(k)fluoranthene	0.9	2.25	0.0934	0.0638	1.76	0.643 U	1.36	0.644 U	9.81	0.128	0.183	
Chrysene	0.4	2.96	0.0766	0.0427	2.16	0.643 U	1.39	0.644 U	11.6	0.141	0.229	
Dibenzo(a,h)anthracene	0.4	0.529 U	0.0272 U	0.0264 U	0.552 U	0.643 U	0.544 U	0.644 U	0.68 U	0.028 U	0.033	
Fluoranthene	20	6.95	0.273	0.116	4.8	0.643 U	2.01	1.3	17.7	0.429	0.646	
Fluorene	28	0.529 U	0.0272 U	0.0264 U	0.552 U	0.643 U	0.544 U	0.644 U	1.07	0.028 U	0.0295 U	
Indeno(1,2,3-cd)pyrene	0.9	1.38	0.0293	0.0264 U	1.16	0.643 U	1.29	0.644 U	4.54	0.0392	0.0636	
Naphthalene	54	0.529 U	0.0272 U	0.0264 U	0.552 U	0.643 U	0.544 U	0.644 U	1.08	0.028 U	0.0295 U	
Phenanthrene	40	5.09	0.0565	0.0364	2.56	0.643 U	0.544 U	0.868	11.1	0.123	0.3	
Pyrene	13	5.42	0.171	0.0828	4.04	1.45	1.54	1.25	21.2	0.267	0.45	
Polyaromatic Hydrocarbons (mg/Kg)												
Anthracene	35											
Benzo(a)anthracene	0.9											
Benzo(a)pyrene	0.4											
Benzo(b)fluoranthene	0.9											
Benzo(g,h,i)perylene	0.8											
Benzo(k)fluoranthene	0.9											
Chrysene	0.4											
Dibenzo(a,h)anthracene	0.4											
Fluoranthene	20											
Indeno(1,2,3-cd)pyrene	0.9											
Phenanthrene	40											
Pyrene	13											
Pesticides/PCBs (mg/Kg)												
4,4'-DDD	2.7	0.0228	0.00549 U	0.00554 U	0.00837	0.0063 U	0.00523 U	0.0235	0.0164	0.0061 U	0.00578 U	
4,4'-DDE	1.9	0.0486	0.00549 U	0.00554 U	0.0397	0.019	0.00523 U	0.0458	0.0297	0.0061 U	0.00578 U	
4,4'-DDT	1.9	0.0332	0.00549 U	0.00554 U	0.107	0.143	0.0105	0.0609	0.0617	0.0061 U	0.0085	
alpha-Chlordane	1.8	0.0763	0.00549 U	0.00554 U	0.0661 P	0.0063 U	0.00523 U	0.258	0.0411	0.0061 U	0.00578 U	
beta-BHC	0.4	0.00558 U	0.00549 U	0.00554 U	0.097	0.0063 U	0.00523 U	0.00511 U	0.00669 U	0.0061 U	0.00578 U	
Chlordane	0.5	0.372	0.00549 U	0.00554 U	0.0598 U	0.063 U	0.0523 U	2.09	0.323	0.061 U	0.00578 U	
gamma-Chlordane	1.8	0.0483	0.00549 U	0.00554 U	0.158 P	0.0063 U	0.00737	0.18	0.0363	0.0061 U	0.00578 U	
Heptachlor epoxide	0.07	0.00869	0.00549 U	0.00554 U	0.00598 U	0.0063 U	0.00523 U	0.124	0.00669 U	0.0061 U	0.00578 U	
Hexachlorobenzene	0.4	0.00558 U	0.00549 U	0.00554 U	0.0339	0.0063 U	0.00523 U	0.00611 U	0.00669 U	0.0061 U	0.00578 U	
Aroclor-1242	10	0.00558 U	0.00549 U	0.00554 U	6.87	0.0629 U	0.0523 U	0.061 U	0.0669 U	0.0609 U	0.0577 U	
Aroclor-1254	10	0.00558 U	0.00549 U	0.00554 U	0.0597 U	0.0629 U	0.0523 U	0.061 U	0.0669 U	0.0609 U	0.0577 U	
Dioxins/Furans (mg/Kg)												
1,2,3,4,6,7,8-HpCDD	0.000015		0.0000015 J	0.0000093 J	0.000026	0.000014	0.0000028 J	0.0000055	0.0000031 U	3.6E-06 J	0.000007	
1,2,3,4,6,7,8-HpCDF	0.000011		0.0000081 U	0.0000081 U	0.000013	0.0000077	0.0000018 J	0.0000094	0.0000031 U	3.6E-06 J	4.8E-06	
1,2,3,4,7,8,9-HpCDF	0.000002 J		0.0000081 U	0.0000081 U	0.0000027 J	0.00000099 U	0.00000083 U	0.00000097 U	0.0000031 U	8.9E-07 U	8.9E-07 U	
1,2,3,4,7,8-HxCDD	8.3E-07 U		0.0000081 U	0.0000081 U	0.0000084 U	0.00000099 U	0.00000083 U	0.00000097 U	0.0000031 U	8.9E-07 U	8.9E-07 U	
1,2,3,4,7,8-HxCDF	4.6E-06		0.0000081 U	0.0000081 U	0.0000082	0.0000018 J	0.00000083 U	0.0000011 J	0.0000031 U	8.9E-07 U	1.2E-06 J	
1,2,3,6,7,8-HxCDD	2.1E-06 J		0.0000081 U	0.0000081 U	0.0000033 J	0.00000099 U	0.00000083 U	0.00000097 U	0.0000031 U	8.9E-07 U	8.9E-07 U	
1,2,3,6,7,8-HxCDF	3.4E-06 J		0.0000081 U	0.0000081 U	0.000004 J	0.0000023 J	0.00000083 U	0.00000097 U	0.0000031 U	8.9E-07 U	8.9E-07 U	
1,2,3,7,8,9-HxCDD	9.5E-07 J		0.0000081 U	0.0000081 U	0.0000018 J	0.00000099 U	0.00000083 U	0.00000097 U	0.0000031 U	8.9E-07 U	8.9E-07 U	
1,2,3,7,8,9-HxCDF	2.1E-06 J		0.0000081 U	0.0000081 U	0.0000039 J	0.00000099 U	0.00000083 U	0.00000097 U	0.0000031 U	8.9E-07 U	8.9E-07 U	
1,2,3,7,8-PeCDD	8.3E-07 U		0.0000081 U	0.0000081 U	0.0000014 J	0.00000099 U	0.00000083 U	0.00000097 U	0.0000031 U	8.9E-07 U	8.9E-07 U	
1,2,3,7,8-PeCDF	1.2E-06 J		0.0000081 U	0.0000081 U	0.0000084 UE	0.0000017 J	0.00000083 U	0.00000097 U	0.0000031 U	8.9E-07 U	8.9E-07 U	
2,3,4,6,7,8-HxCDF	2.2E-06 J		0.0000081 U	0.0000081 U	0.0000031 J	0.000003 J	0.00000083 U	0.0000011 J	0.0000031 U	0.000001 J	1.5E-06 J	
2,3,4,7,8-PeCDF	6.8E-06		0.0000081 U	0.0000081 U	0.0000048	0.000005	0.0000026 J	0.0000014 J	0.0000031 U	1.7E-06 J	2.2E-06 J	
2,3,7,8-TCDD	2.2E-07 J		0.0000016 U	0.00000016 U	0.00000019 J	0.00000021 J	0.00000017 U	0.00000019 U	0.0000063 U	1.8E-07 U	1.8E-07 U	
2,3,7,8-TCDF	7.3E-07 JA		0.00000018 J	0.00000016 U	0.00000075 JA	0.0000016	0.00000026 J	0.00000081 J	0.0000063 U	1.1E-06	1.3E-06	
OCDD	0.00031		0.0000072 J	0.0000059 J	0.0042	0.0001	0.000037	0.000058	0.00021	0.000025	0.00004	
OCDF	9.6E-06		0.0000016 U	0.0000016 U	0.000018	0.0000077 J	0.0000017 U	0.0000069 J	0.000063 U	3.1E-06 J	3.9E-06 J	
Total HpCDD	0.000031		0.000002 J	0.00000093 J	0.000055	0.000028	0.0000063	0.000011	0.000031 U	7.7E-06	0.000015	

P:\old_Wakefield_Data\projects\3652130029 - Teton Gorham Updated Cove SIRA.0 Project Deliverables\4.1 Reports\SIR\Tables Table 5.2 - Summary of Comparison formatted.xls, Detects

Table 5.2
Summary of Comparison of Detections to RDEC in Soil to be Capped – Phase III Area
Former Gorham Manufacturing Facility
Providence, Rhode Island

parameter.name	Residential Direct Exposure Criteria (ppm)	SS-SI017 6/8/2006 0-0.5 ft	SS-SI018 6/8/2006 0-0.5 ft	SS-SI019 6/8/2006 0-0.5 ft	SS-SI020 6/8/2006 0-0.5 ft	SS-SI021 6/8/2006 0-0.5 ft	SS-SI022 6/8/2006 0-0.5 ft	SS-SI023 6/7/2006 0-0.5 ft	SS-SI024 6/7/2006 0-0.5 ft	SS-SI101 6/8/2006 0-0.5 ft	SS-SI202 6/7/2006 0-0.5 ft
	Total HpCDF		0.000022	0.0000081 U	0.000001 J	0.000031	0.000014	0.000043	0.000014	0.000031 U	5.1E-06
Total HxCDD		0.000023	0.0000081 U	0.0000081 U	0.000041	0.000011	0.000029 J	0.000027 J	0.000031 U	1.4E-06 J	4.8E-06
Total HxCDF		0.000047	0.0000081 U	0.0000081 U	0.00001	0.000034	0.000072	0.00001	0.000031 U	8.2E-06	0.000014
Total PeCDD		0.000012	0.0000081 U	0.0000081 U	0.000019	0.000038 J	0.0000083 U	0.0000097 U	0.000031 U	8.9E-07 U	1.4E-06 J
Total PeCDF		0.000039	0.0000011 J	0.0000081 U	0.000065	0.000053	0.000026	0.000011	0.000036	0.000017	0.000023
Total TCDD		4.6E-06	0.0000016 U	0.0000016 U	0.000049	0.000079	0.0000031 J	0.000022	0.000063 U	0.000002	2.7E-06
Total TCDF		0.000022	0.0000018 BJ	0.0000016 U	0.000021	0.000039	0.000083	0.000012	0.000014	0.000019	0.000017
TEQ Mammal	0.0000043	0.0000047	0.0000094	0.0000093	0.0000059	0.0000036	0.000017	0.000017	0.000035	0.000016	0.000020
Inorganics (mg/Kg)											
Arsenic	7	3.5	1.5 U	1.5 U	3	1.8 U	1.6 U	37.3	4.5		
Barium	5500	44.1	29.4	22.8	47.4	15.6	28.4	31.3	75.8		
Beryllium	0.4	0.13	0.06 U	0.06 U	0.15	0.14	0.06 U	0.13	0.21		
Cadmium	39	0.6 U	0.6 U	0.61 U	0.63 U	0.71 U	0.62 U	1.15	0.74 U		
Chromium	390	12.1	11.8	11.4	13.9	5	13.5	21	11.4		
Copper	3100	60.4	28.1	23.7	50.3	15.7	27.5	36	153		
Lead	150	99.4	6.8	6.1 U	6.7	43	14.5	113	231		
Mercury	23	0.789	0.034 U	0.032 U	0.539	0.07	0.098	0.284	0.228		
Nickel	1000	11	10.4	9.3	11.5	5	10.4	6.7	13.8		
Selenium	390	6 U	6 U	6.1 U	6.3 U	7.1 U	6.2 U	7.3 U	7.4 U		
Silver	200	13.4	0.6 U	0.61 U	10.8	2.81	1.98	7.94	28.7		
Zinc	6000	97.1	26.2	23.6	82.3	49.1	31.8	32.6	125		
Total Cyanide	200										
Petroleum Hydrocarbons (mg/Kg)											
Total Petroleum Hydrocarbon											

Bold value and shaded cell indicates exceedance of RDEC
mg/Kg = milligram per kilogram
U = not detected, value is the reporting limit
J = value is estimated
P = Percent difference between primary and confirmation results exceeds 40%
A = Detection limit based on signal-to-noise measurement
B = Less than 10 times higher than method blank level
E = PCDE Interference
I = Interference

Prepared by / Date: KJC 04/22/13
Checked by / Date: ARM 05/29/13

Table 5.3
Summary of Comparison of Detections in June 2013 Phase III Area Pre-Design Soil Samples to RDEC in Soil to be Capped – Phase III Area
Former Gorham Manufacturing Facility
Providence, Rhode Island

parameter_name	Residential (ppm)	SS-500-01 6/21/2013	SS-500-02 6/21/2013	SS-501-01 6/21/2013	SS-501-02 6/21/2013	SS-502-01 6/21/2013	SS-502-02 6/21/2013	SS-503-01 6/21/2013
Semivolatile Organics (mg/Kg)								
1,1-Biphenyl	0.8	0.093 DU	0.184 DU	0.095 DU	0.093 DU	0.019 U	0.017 U	0.019 U
2-Methylnaphthalene	123	0.093 DU	0.184 DU	0.131 D	0.093 DU	0.019 U	0.017 U	0.034
Acenaphthene	43	0.093 DU	0.184 DU	0.095 DU	0.093 DU	0.019 U	0.017 U	0.019 U
Acenaphthylene	23	0.682 D	1.55 D	0.224 D	0.436 D	0.019 U	0.017 U	0.125
Anthracene	35	0.724 D	1.52 D	0.278 D	0.579 D	0.019 U	0.017 U	0.117
Benzo(a)anthracene	0.9	1.55 D	3.02 D	0.643 D	1.33 D	0.038	0.017 U	0.362
Benzo(a)pyrene	0.4	1.51 D	2.88 D	0.632 D	1.27 D	0.048	0.017 U	0.432
Benzo(b)fluoranthene	0.9	2.42 D	4.76 D	1.01 D	1.74 D	0.073	0.017 U	0.62
Benzo(g,h,i)perylene	0.8	0.807 D	1.33 D	0.321 D	0.527 D	0.04	0.017 U	0.3
Benzo(k)fluoranthene	0.9	0.644 D	1.87 D	0.336 D	0.597 D	0.022	0.017 U	0.219
Chrysene	0.4	1.58 D	3.62 D	0.765 D	1.34 D	0.053	0.017 U	0.458
Dibenzo(a,h)anthracene	0.4	0.291 D	0.491 D	0.116 D	0.174 D	0.019 U	0.017 U	0.088
Fluoranthene	20	2.22 D	6.05 D	1.15 D	2.59 D	0.094	0.017 U	0.637
Fluorene	28	0.093 DU	0.184 DU	0.095 DU	0.115 D	0.019 U	0.017 U	0.019 U
Indeno(1,2,3-cd)pyrene	0.9	1.1 D	1.84 D	0.403 D	0.683 D	0.044	0.017 U	0.351
Naphthalene	54	0.093 DU	0.184 DU	0.095 D	0.093 DU	0.019 U	0.017 U	0.029
Phenanthrene	40	0.68 D	2.32 D	0.502 D	1.86 D	0.042	0.017 U	0.243
Pyrene	13	1.96 D	4.71 D	0.975 D	2.31 D	0.073	0.017 U	0.6
Inorganics (mg/Kg)								
Arsenic	7	10	12.9	5.1	4.7	4	2.6	4.1
Lead	150	116	242	170	270	34.3	4.8	59.8

Bold value and shaded cell indicates exceedance of RDEC
 U = not detected, value is the reporting limit
 J = value is estimated
 D = value is from a diluted analysis

Table 5.3
Summary of Comparison of Detections in June 2013 Phase III Area Pre-Design Soil Samples to RDEC in Soil to be Capped – Phase III Area
Former Gorham Manufacturing Facility
Providence, Rhode Island

parameter_name	Residential (ppm)	SS-503-02 6/21/2013	SS-504-01 6/21/2013	SS-504-02 6/21/2013	SS-505-01 6/21/2013	SS-505-02 6/21/2013	SS-506-01 6/21/2013	SS-506-02 6/21/2013
Semivolatile Organics (mg/Kg)								
1,1-Biphenyl	0.8	0.018 U	0.018 U	0.019 U	0.358 DU	0.089 DU	0.019 U	0.018 U
2-Methylnaphthalene	123	0.024	0.022	0.019 U	0.8 D	0.089 DU	0.019 U	0.018 U
Acenaphthene	43	0.035	0.025	0.019 U	1.21 D	0.089 DU	0.03	0.018 U
Acenaphthylene	23	0.324	0.175	0.099	13.7 D	0.805 D	0.124	0.037
Anthracene	35	0.358	0.199	0.073	12 D	0.453 D	0.137	0.068
Benzo(a)anthracene	0.9	1.15	0.573	0.369	32 D	1.06 D	0.466	0.222
Benzo(a)pyrene	0.4	1.09	0.616	0.445	27.6 D	1.73 D	0.512	0.26
Benzo(b)fluoranthene	0.9	1.42	0.94	0.652	52.7 D	2.59 D	0.629	0.292
Benzo(g,h,i)perylene	0.8	0.57	0.233	0.167	11.5 D	1.12 D	0.309	0.161
Benzo(k)fluoranthene	0.9	0.467	0.32	0.203	55.7 D	0.746 D	0.253	0.105
Chrysene	0.4	1.11	0.563	0.395	29.5 D	1.35 D	0.486	0.241
Dibenzo(a,h)anthracene	0.4	0.173	0.066	0.045	4.88 D	0.392 D	0.09	0.042
Fluoranthene	20	2.68 D	1.03	0.733	68.8 D	1.8 D	0.939	0.448
Fluorene	28	0.056	0.033	0.019 U	3.35 D	0.089 DU	0.03	0.018 U
Indeno(1,2,3-cd)pyrene	0.9	0.69	0.293	0.217	15.1 D	1.43 D	0.366	0.18
Naphthalene	54	0.033	0.035	0.021	0.912 D	0.089 DU	0.023	0.018 U
Phenanthrene	40	0.982	0.55	0.275	24.2 D	0.539 D	0.516	0.266
Pyrene	13	2.62 D	1.1	0.738	56.6 D	1.71 D	0.794	0.426
Inorganics (mg/Kg)								
Arsenic	7	5	3.7	5.1	14.4	6.2	35.5	6.3
Lead	150	71.9	45.6	78	166	24.4	87.8	29.7

Bold value and shaded cell indicates exceedance of RDEC
U = not detected, value is the reporting limit
J = value is estimated
D = value is from a diluted analysis

I

Table 5.3
Summary of Comparison of Detections in June 2013 Phase III Area Pre-Design Soil Samples to RDEC in Soil to be Capped – Phase III Area
Former Gorham Manufacturing Facility
Providence, Rhode Island

parameter_name	Residential (ppm)	SS-507-01 6/21/2013	SS-507-02 6/21/2013
Semivolatile Organics (mg/Kg)			
1,1-Biphenyl	0.8	0.093 DU	0.019 U
2-Methylnaphthalene	123	0.093 DU	0.019 U
Acenaphthene	43	0.239 D	0.019 U
Acenaphthylene	23	0.126 D	0.019 U
Anthracene	35	0.349 D	0.02
Benzo(a)anthracene	0.9	0.866 D	0.085
Benzo(a)pyrene	0.4	0.955 D	0.106
Benzo(b)fluoranthene	0.9	1.22 D	0.131
Benzo(g,h,i)perylene	0.8	0.491 D	0.07
Benzo(k)fluoranthene	0.9	0.371 D	0.041
Chrysene	0.4	0.992 D	0.096
Dibenzo(a,h)anthracene	0.4	0.133 D	0.019 U
Fluoranthene	20	2.26 D	0.196
Fluorene	28	0.19 D	0.019 U
Indeno(1,2,3-cd)pyrene	0.9	0.614 D	0.08
Naphthalene	54	0.239 D	0.019 U
Phenanthrene	40	2 D	0.093
Pyrene	13	1.9 D	0.172
Inorganics (mg/Kg)			
Arsenic	7	26.7	4
Lead	150	77	19.8

Bold value and shaded cell indicates exceedance of RDEC
U = not detected, value is the reporting limit

J = value is estimated

D = value is from a diluted analysis

Prepared by / Date: KJC 08/06/13

Checked by / Date: ARM 10/14/13

APPENDIX D
AQUATIC WILDLIFE MANAGEMENT PLAN

**Wildlife Management Plan
Former Gorham Manufacturing Site
333 Adelaide Ave.
Providence, RI**

Introduction

Textron presents this work plan for managing aquatic wildlife during remedial activities within the Mashapaug Inner Cove at the former Gorham Manufacturing Site, 333 Adelaide Avenue, Providence RI (See Figure 9). Per the Rhode Island Department of Environmental Management's Rules and Regulations Governing the Administration and Enforcement of the Fresh Water Wetlands Act Rule 10.a, Wildlife and Wildlife Habitat, wetlands serve as an important function for wildlife and wildlife habitat. The objectives of this plan are to provide the methods for the management and treatment of wildlife in the Mashapaug Pond Inner Cove slated for remediation. The proposed remediation of sediment will require the installation of a temporary dam at the mouth of the Inner Cove, dewatering, and excavation in the dry of contaminated sediment, followed by restoration. The Wildlife Management Plan outlines the steps needed to protect fish, amphibians, reptiles and any freshwater mollusks that are known to occur in the Cove. This work plan will identify the sequence of steps to relocate fish and other aquatic wildlife from areas of the Inner Cove to Mashapaug Pond focusing on non-lethal means to relocate wildlife. However, it is important to recognize that some mortality to fish and aquatic wildlife may occur despite the contractors best efforts. No threatened or endangered species are known to be present within the Project vicinity.

Site Description and Overview

The former Gorham Manufacturing Facility (the Site) is situated on a 37 acre parcel at 333 Adelaide Avenue in Providence, Rhode Island. Between 1890 and 1985, sterling silver and plated silverware, as well as bronze castings, were manufactured on-site. Based on multiple investigations of surface water and sediment of Mashapaug Inner and Outer Cove, including several Screening Level Ecological Risk Assessments (SLERA), Amec Foster Wheeler determined that the sediments in the Inner Cove are impacted and remedial action is required in order to eliminate human health and ecological risks from contamination and create productive reuse of the Site.

Mashapaug Pond is a Class B fresh water lake, and its applicable designated uses are primary and secondary contact recreation and fish and wildlife habitat (RIDEM, 2009). The Inner Cove consists largely of open water, approximately 2.8 acres in area and 3-4 feet in depth, and is characterized as highly eutrophic. It has been determined that when remediation of sediments in the Inner Cove is complete, there will be reduced risk to ecological receptors throughout Mashapaug Pond and the surrounding area.

Wildlife management and monitoring will take place prior to, and throughout remediation activities at the Mashapaug Inner Cove and Pond during the dewatering of Mashapaug Inner Cove. No threatened or endangered species are known to be present within the Project vicinity. A combination of methods for removing aquatic wildlife will be used prior to and during dewatering of the cove, including a technique using seine nets and noise makers to herd fish, as well as capturing and manually transporting wildlife. Best professional judgment will be used in determining sequence of activities, best management practices and safety in handling and transporting wildlife.

Wildlife Habitat Assessment

The main habitat of concern during remedial activities and dewatering of the Inner Cove is the aquatic environment. The RIDEM Geographic Data Viewer was used to determine the presence of rare species habitat. Based on the available maps, no rare species habitat were identified in the vicinity of the project site. On June 20, 2006, a MACTEC biologist visited Mashapaug Cove and Mashapaug Pond to conduct a reconnaissance level habitat assessment. During the field visit mammals, birds, herptiles, and benthic organisms observed by direct observation (sight) or tracks were recorded. Juvenile fish were observed along the shoreline, but could not be identified, and fish observed jumping in the center of the Cove were tentatively identified as carp. No amphibians were observed and none were heard calling. Mallard ducks, as well as one of the nesting pairs of swans were observed foraging within the Inner and Outer Cove.

Conceptual Plan and Methodology

Fish herding will be used prior to dewatering of the Inner Cove and before the temporary dam is constructed to herd fish into the Mashapaug Outer Cove. This method will involve a seine net; a fine mesh net with weights at the bottom and floats at the top which is positioned vertically in the water column. Methods which may increase effectiveness and/or efficiency include conducting seining operations at dawn or dusk (i.e., during low-light conditions). Small mesh sizes will be used as they are more effective across the full range of fish size (and age class). An underwater noise maker, such as a sopras sub underwater air signal or equivalent may also be used to help herd fish towards the Outer Cove prior to the use of the seine net. The seine net will extend from the eastern bank of the Inner Cove peninsula to the southeastern corner of the Inner Cove. The southern end of the seine net will be moved westerly to reach the tip of the western bank of the peninsula separating the Inner and Outer Cove. If it is found that debris at the bottom of the Inner Cove hinders this approach the alternative method is to place multiple noise makers around the southern bank of the Inner Cove beginning at dawn for half a day in order to scare wildlife away from the Inner Cove.

Once fish have been herded out of the Inner Cove, the seine net will be held in place within the Outer Cove, north of the proposed temporary dam. The dam will then be installed between the two peninsulas between the Inner and Outer Cove (Figure 9). Pumps will be placed in the Inner Cove to begin dewatering the area. To avoid entrainment, impingement, or injury to any remaining fish or other aquatic wildlife, and to avoid contaminated sediment, the pump intakes will be placed just below the water surface, pumping at approximately 0.5 feet/second velocity. A screened structure will surround the water intake structures with an approximate 1-2" mesh size. The intake screen shall be monitored during operations to ensure that the screening has not collapsed and that there are no openings or blockage.

Once the Inner Cove has been pumped down so that one foot of water remains the area will be monitored for any remaining aquatic fauna. Any existing fauna will be transported in 5-gallon buckets or other suitable containers outside of the excavation area and to inundated areas of Mashapaug Pond. Best professional judgment and safe handling practices will be used in properly transporting wildlife. The remaining water will be pumped out for groundwater treatment and discharge into the Outer Cove, and sump pumps will be used to maintain a depressed water table below the depth of sediment removal. Sediment removal will be completed and the Inner Cove and fringe wetlands restored.

If mute swans are found to be nesting they will need to be removed due to their aggressive nature and threat to worker safety. Mute Swans are an invasive species that displace native wildlife and deplete the aquatic vegetation that is habitat and food for other wildlife. Preliminary investigation in the spring before the start of the project will determine if mute swans appear to

be nesting in the area and proper methods will be taken. Lethal action may be required and/or adding of eggs to prevent hatching. It is best to addle eggs and place them back in the nest to insure the female will not lay more eggs.

After completion of the Inner Cove sediment removal and restoration, the sump pumps will be removed to allow natural groundwater recharge of the Inner Cove. After the Inner Cove is recharged two to three feet, the dam will slowly be removed in order to let the Inner Cove refill without turbulence, preventing erosion or scour. The process in which this is done is dependent on the type of dam used and the manufacturer's removal guidelines. Wildlife habitat will then be allowed to naturally re-populate the Inner Cove.

APPENDIX E
WETLAND RESTORATION PLAN

**Wetland Restoration Plan
Former Gorham Manufacturing Site
333 Adelaide Ave.
Providence, RI**

Three natural environments will require restoration following remediation: Mashapaug Inner Cove (sediment); fringe wetlands that form a narrow band along the shore of the Inner Cove; and perimeter wetlands that extend 50 feet upgradient of the delineated wetland edge. Figure 4 shows the conceptual plan for Site restoration.

This proposed restoration is consistent with the requirements of the Rhode Island Rules and Regulations Governing the Administration and Enforcement of the Fresh Water Wetlands Act Rule 6.00 (Exempt Activities), Section 6.08 Site Remediation. Textron will also obtain a U.S. Army Corps of Engineers General Permit - Category 2 or an Individual Permit under Section 404 of the Clean Water Act. The 404 Permit application is included within Appendix G of the Remedial Action Work Plan.

Mashapaug Inner Cove

The bottom sediments of the Inner Cove will be excavated to an average depth of one to two feet below existing grade for dewatering, stabilization and placement in the former Carriage House Area. A one foot thick layer of sand will then be placed on the Inner Cove bottom, partially restoring the grade. This restoration of the Inner Cove floor will be similar to the sediment surface material of the Outer Cove and Mashapaug Pond. Backfill material within the Inner Cove will consist of sand and organic mix (10% compost/organic material) and the material source area(s) will be tested to meet Remediation Regulation Residential Direct Exposure Criteria (RDEC) prior to its use onsite.

Within approximately ten feet of the shoreline of the Inner Cove, a mixture of sand and organic material will be laid down to replace the organic-rich soils in this shallow shoreline portion of the Inner Cove. This area will receive up to two-feet of clean backfill and will be graded to meet the surrounding grade of the capped fringe wetland discussed below. The Inner Cove is anticipated to naturally recover its functions of plant habitat, nutrient cycling, biological production, animal habitat, and other functions. Backfill material within 10 feet of the shoreline will consist of sand and organic mix (20% compost/organic material) and the material source area(s) will be tested to meet RDEC (Appendix C) prior to its use onsite.

Fringe Wetland

A vegetated wetland extends up to approximately 10 feet from the water's edge around the Inner Cove and Outer Cove (Figure 4). The wetland is presently vegetated with herbaceous plants, shrubs, and some trees. Dominant species include red maple, silver maple, black willow, sweet pepperbush, red osier dogwood, buttonbush, sensitive fern, poison ivy, along with other herbs and graminoids. The non-native invasive species purple loosestrife was observed in the fringe wetland along the Inner Cove; all occurrences of this plant in the restoration area will be mechanically removed prior to soil placement.

The restoration plan proposes to avoid site grading within this area and instead use the placement of a variable thickness layer of organic-rich soil over the existing ground surface. The soil will be placed to a maximum thickness of up to 12 inches over this fringe wetland. The soil thickness will be tapered to a minimum around existing large woody vegetation to maintain existing plantings where possible. Soil thickness will be determined in the field to avoid or

minimize damage to existing trees, and to match the contours of organic-rich soil to be placed off shore (below water level) within the Inner Cove shoreline. This thickness of soil is proposed so as to maintain wetland hydrology, but still serve as a physical barrier to impacted soil until vegetation is well-established. The area of the wetland is approximately 11,000 square feet. A volume of up to 8,250 cubic feet of soil is estimated to be required to cap the fringe wetland. Soil cover material within the fringe wetland will be amended with compost to achieve an organic content of 20%. The material source area will be tested to meet Remediation Regulation RDEC prior to its use onsite. This soil cover will be placed by hand to minimize damage to the existing vegetation.

A seed mixture of native New England wetland species will be spread over the emplaced soil. New England Wetland Plants “Wetmix” or a similar mixture is proposed. The seed mix consists of sedges, other graminoids, and other herbaceous species with wetland indicator status from obligate to facultative. The seed mix will provide a native community of wetland herbaceous plants to form the ground cover in this fringe wetland. The range in wetland indicator species in the seed mix will promote local establishment of species best suited to the varied hydrology and microtopography expected to result after soil placement. The New England Wetmix recommended application rate is 1 pound per 2,500 square feet over the 11,000 square feet of wetlands. The seed will be placed by hand to ensure thorough and even coverage in this relatively narrow wetland area.

Woody vegetation remaining in place in the fringe wetland will be amended by planting shrub species. A select list of species will be planted with emphasis on locations where existing vegetation is sparse or has been unavoidably damaged or removed by the soil placement process. Native shrub species were selected for their wildlife habitat value, and their ability to grow readily in this disturbed area, in order to prevent erosion and rapidly establish a dense community that will resist incursion by non-native invasive species. Importantly, greenbrier, swamp rose, and blackberry/rubus species have been specified because of their dense spines and propensity to form shrub thickets, which will serve as a barrier to human access to this area. The following species are proposed (if available to the trade in restoration grade):

- ▶ greenbrier (*Smilax rotundifolia*)
- ▶ swamp rose (*Rosa palustris*) – obligate wetland species
- ▶ blackberry (*Rubus* spp.)

Plants will be installed only within approximately four feet of the water’s edge, with an average spacing of four feet on center, placed in clusters. This dense planting is required to aid in resisting incursion by invasive species and create thickets to prevent access to the water’s edge by trespassers.

Perimeter Wetland

The remediation of the perimeter wetland within Parcel C-1 Phase III Area consists of variably steep forested uplands with mature trees, a thin mixed herbaceous and woody understory, and patches of woody invasive species. The perimeter wetland plant community presently includes oak species (white, red, black), gray birch, black birch, black cherry, mountain laurel, low-bush blueberry, huckleberry, ailanthus, oriental bittersweet, Japanese knotweed, and honeysuckle. The crowns of many of the mature trees in the perimeter wetland have been damaged, apparently by an ice storm within the last several years. These damaged trees are now more susceptible to other injury, and are expected to have significantly shortened expected life spans.

The remedial action proposed for the perimeter wetland includes site grading for slope stabilization (maximum 3:1 slope) where needed, placement of a permeable fabric warning

barrier, and placement of a one-foot thick soil cover (six inches cover soil and six inches topsoil) to serve as a physical barrier to underlying impacted soils. Trees and shrubs will be saved where possible. To facilitate soil placement (as a remedy) damaged trees will be removed prior to Site grading. In addition, some other trees and shrubs may require removal to allow equipment access and soil cover placement. The eradication or control of invasive species is proposed as one aspect of the perimeter wetland restoration. All invasive plants will be cut and treated with an herbicide by stump application prior to placement of the soil cover.

A seed mixture of native New England herbaceous species will be spread over the emplaced soil in order to stabilize the soil cap, promote native species and exclude invasive species in the understory, and rapidly restore the vegetated community that will be impacted by the cap. An area of 34,500 square feet will require seeding. To aid in stabilizing the emplaced soil, a hydromulch with tackifier will be applied with the seed mix. The seed mix New England Wetland Plants “New England Erosion Control/Restoration Mix for Dry Sites” or a similar mixture is proposed. This restoration seed mix contains native and naturalized grasses to ensure that dry or recently disturbed sites will be quickly re-vegetated and the soil surface stabilized. The seed application rate is one pound per 1,250 square feet.

Trees and woody shrubs remaining in the perimeter wetland will be amended by planting with native species. A select list of species will be planted with emphasis on places where existing vegetation is sparse or has been unavoidably damaged or removed by the site grading and soil placement process. Native species were selected for wildlife habitat value, ability to thrive in a disturbed area, in order to prevent erosion and rapidly establish a dense community that will resist incursion by non-native invasive species. Importantly, greenbrier and blackberry/rubus species are included because of their dense spines and propensity to form shrub thickets, which will serve as a barrier to human access. The following species are proposed:

- ▶ greenbrier (*Smilax rotundifolia*)
- ▶ blackberry (*Rubus* spp.)
- ▶ highbush blueberry (*Vaccinium corymbosum*) – thick-growth with high wildlife value
- ▶ red osier dogwood (*Cornus sericea*)
- ▶ sweet pepperbush (*Clethra alnifolia*)
- ▶ black willow (*Salix nigra*)
- ▶ red maple (*Acer rubrum*)

Plants will be installed randomly in clusters, with an average spacing of eight feet on center.

Monitoring and Reporting

Monitoring of the restored fringe wetland and perimeter wetland areas will be conducted over a one-year growth period to provide early indication of problems and corrective actions. Observations will be made at least two times during the growing season (late spring, late summer). The restored areas will be monitored for performance standards to include the minimum 80 % vegetation coverage in the fringe wetland and perimeter wetland; successful establishment of species with a wetland indicator status of facultative, facultative-wetland, or obligate within the fringe wetland; and absence of invasive species. Monitoring reports will be prepared bi-annually and will be submitted to RIDEM and the City of Providence.

As requested by RIDEM, a no cut zone of vegetation will be implemented 60 feet (10 feet fringe and 50 feet perimeter wetlands) from the water’s edge within the Phase I and Phase III areas of Parcel C-1 (Figure 4). This no-cut zone will allow the wetland plants and grasses to naturally restore the habitat for the Site. This no-cut zone requirement has been included within the Environmental Land Use Restrictions for Parcel C and C-1 (Appendix E).