

PCB Soil Removal Action
239.1 Jackson Street
Lowell, Massachusetts

Bid Specifications Package

October 2014

Prepared for:
City of Lowell



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Not Used

PART 3 – EXECUTION

Not Used

END OF SECTION

SECTION 00 71 00

CONTRACTING DEFINITIONS

PART 1 – GENERAL

1.02 SECTION INCLUDES:

- A. Contracting Definitions

1.03 CONTRACTING DEFINITIONS:

- A. **Agreement:** The signed and executed contract between the Owner and the Contractor. These contract documents shall be included in the Agreement by attachment.
- B. **Bidder:** One who submits a Bid directly to the Owner as distinct from a sub-bidder, who submits a bid to a Bidder.
- C. **Bidding Documents:** The document issued by the Owner setting the requirements for the Work and the procedures for submitting bids: The advertisement or invitation to Bid, Bid Form, Specifications, and Drawings.
- D. **Bid Form:** The forms provided with the Bidding Documents, including Schedules A through J thereto, which must be executed by the Bidder.
- E. **Bid Item:** A part of the Work, listed on Schedules A, Schedule of Quantities and Prices, which is defined in the Specifications and measured for payment in accordance with the Specifications.
- F. **Bid Pack:** The contracting document that details the Project to be completed by the Owner's Representative.
- G. **COI:** Constituents of Interest. The chemical compounds that are typically present at the Site. The COI consist primarily of Polychlorinated biphenyls (PCBs).
- H. **Change Order:** A written instrument, in the specified form, executed by the Owner and the Contractor that changes the Contract Price or Contract Time.
- I. **Contract:** Synonymous with Agreement herein defined.
- J. **Contract Documents:** The Contract Documents include the Agreement, Bid Form and Bid Form Schedules, the Specifications, the Drawings, Project Plans identified in this Section, any properly executed Change Orders and Work Change Directives, and any properly executed Work Orders, or addenda pertaining to Work set forth in the Specifications or Change Orders.
- K. **Contractor:** The person, firm, or corporation whom has entered into the Agreement to perform the Work specified herein.
- L. **Contractor's Daily Report:** Report generated and submitted by the Contractor.

- M. **Contract Price:** The amount payable to the Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement.
- N. **Contract Times:** The period required to complete the specified Milestones, to achieve Substantial Completion or to complete the Work.
- O. **Decontamination Zone:** Transition area between the Exclusion Zone(s) and the Support Zone(s) or other non-exclusion areas of the Secured Zone(s) where impacted soil and other undesirable materials can be cleaned from personnel and equipment.
- P. **Disturbed Areas:** Areas which have been disrupted or otherwise changed from their pre-construction conditions by the Contractor's activities that have not been restored as required by the Contract Documents.
- Q. **Drawings:** The Drawings that show the scope, extent and character of the Project. Shop Drawings are not Drawings as so defined.
- R. **Engineer:** Watermark or its designated agent authorized to monitor conformance of the Contractor's Work with the Specifications and Drawings. The term Engineer and Watermark may be used interchangeably on the Specifications and Drawings.
- S. **EPA:** Environmental Protection Agency
- T. **Exclusion Zone:** An area within the secured zone with controlled access due to the presence of impacted materials and other potential threats to human health or safety.
- U. **HASP:** The Site Specific Health and Safety Plan prepared by the Contractor described in Specification Section 00 73 19.
- V. **Invitation to Bid:** The letter or other transmittal attached to the Bidding Documents.
- W. **Issuing Office:** The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered is identified below:
- City of Lowell
Purchasing Department
Lowell, Massachusetts
- X. **Impacted:** An adjective that describes an area, object, or material that exhibits evidence of contamination or generates photoionization detector (PID) headspace readings or readings in the vicinity of the in-situ material of 50 ppm benzene equivalent or higher.
- Y. **Impacted Materials:** Inclusive of Impacted Sediment, Impacted Soil, and Impacted Water as herein defined, in addition to any other materials that exhibit characteristics of Impacted as herein defined.

- Z. **Impacted Sediment; Impacted Soil; Impacted Water:** Sediment, soil, or water that exhibits characteristics of Impacted as herein defined.
- AA. **MCP:** Massachusetts Contingency Plan
- BB. **Laws and Regulations; Laws or Regulations:** Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
- CC. **Notice of Award:** The written notice by the Owner to the Contractor stating that upon compliance with the conditions stated therein, within the time period specified, the Owner will issue the Work Order for the Work under the existing Agreement.
- DD. **Non-Conforming:** An adjective, which when modifying the word Work, refers to Work that is unsatisfactory, faulty, or deficient, in that it does not meet the requirements of a specified inspection, reference standard, test, approval, or performance requirement referred to in the Specifications or Drawings, or has been damaged prior to recommendation of final payment (unless responsibility for the protection thereof has been assumed by the Owner at Substantial Completion).
- EE. **Normal Work Hours:** The hours during which the Contractor may perform the work as defined in the Specifications.
- FF. **Owner:** City of Lowell
- GG. **Owner's Representative:** For the purpose of the work described here, Watermark will be known as the Owner's Representative.
- HH. **PCBs:** Polychlorinated biphenyls.
- II. **PPM:** parts per million.
- JJ. **Project:** The Project consists of the Scope of Work as described in the Contract Documents.
- KK. **Project Plans:** Any drawing, depiction, Schedule, or other item included in the Contract Documents.
- LL. **Record Documents:** The Record Documents and reports described in Specifications Section 01 33 00.
- MM. **Remedial Action Plan (RAP):** *Notification and Certification of Self Implementing Cleanup and Disposal Plan for PCB Remediation Waste (Revision 1)*, prepared by Watermark and submitted to City of Lowell on May 2, 2012.
- NN. **Remediation:** Activities performed to remove or mitigate the environmental effects of residuals and other hazardous substances remaining in site soil, groundwater, or surface water.

- OO. **Request for Information:** A written notice by the Contractor to receive clarification, direction or explanation from the Engineer regarding the Work.
- PP. **Samples:** Physical examples of materials, equipment or workmanship that are representative of some portion of the Work, and which establish the standards by which such portion of the Work will be evaluated.
- QQ. **Schedule of Quantities and Prices:** Schedules A of the Bid Documents.
- RR. **Self Implementing Cleanup Plan:** *Notification and Certification of Self Implementing Cleanup and Disposal Plan for PCB Remediation Waste* (Revision 1), prepared by Watermark and submitted to City of Lowell on May 2, 2012.
- SS. **Secured Zone:** The area(s) shown on the Drawings within which the Contractor shall perform the Work and where the Contractor has primary responsibility for operation, security and safety of materials, equipment and personnel.
- TT. **Site:** The location where there Work will take place, located at 239.1 Jackson Street Lowell, MA 01852.
- UU. **Shop Drawings:** Drawings submitted to Engineer prior to procurement of items for use in construction. Shop Drawings are subject to review and approval by the Engineer before procurement, fabrication, or construction shall take place.
- VV. **Specifications:** Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, standards, workmanship, measurement and payment as applied to the Work and certain administrative details, applicable thereto.
- WW. **SSHO:** The Contractor's Site Safety and Health Officer described in Specifications Section 00 73 19.
- XX. **Stockpile Containment Barriers:** Containment barriers constructed around temporary stockpile areas to separate and contain impacted materials prior to transportation off-site of those materials.
- YY. **Subcontractor:** An individual, firm or corporation having a direct contract with the Contractor or with any other Subcontractor for performance of a part of the Work.
- ZZ. **Submittals:** The submittals described in the Specification 01 33 00.
- AAA. **Substantial Completion:** Substantial Completion shall mean all on-site Work is complete except for demobilization and contract closeout. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.
- BBB. **Successful Bidder:** The Bidder to whom the Owner (on the basis of the Owner's evaluation as herein provided) awards the contract for the Work.

- CCC. **Supplier:** A manufacturer, fabricator, distributor, material person, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or any Subcontractor.
- DDD. **Support Zone:** Designated area within the Secured Zone that contains no impacted materials or construction hazards.
- EEE. **Suspected Impacted Materials:** Any materials that have not been confirmed as exhibiting characteristics of Impacted as herein defined, but that have been identified as possibly meeting the criteria of Impacted as herein defined.
- FFF. **Technical Execution Plan:** A written work plan, submitted by Bidder in accordance with the requirements of the Bidding Documents, and subsequently modified by Owner's Contractor in accordance with the Contract Documents, that describes methods, materials, and sequences of specific work items.
- GGG. **Temporary Activity Zone:** Within the Exclusion Zone, a marked area where an activity occurs or a structure exist that warrants separation or demarcation from other activities or areas.
- HHH. **Underground Facilities:** All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities that have been installed underground.
- III. **VOCs:** Volatile Organic Compounds.
- JJJ. **Watermark:** Watermark Environmental, Inc. The Engineer or Owner's Representative.
- KKK. **Work:** The entire completed construction and the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work includes, and is the result of performing or furnishing labor, furnishing and incorporating materials and equipment into the construction, performing or furnishing services, transportation, performing treatment, and furnishing documents, all as required by the Contract Documents.
- LLL. **Work Zones:** Areas of the site where Work is conducted. Work zones include, but are not limited to, the Decontamination Zone, Exclusion Zone, Secured Zone, Support Zone, and Temporary Activity Zone.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

END OF SECTION

SECTION 00 73 19

HEALTH AND SAFETY REQUIREMENTS

PART 1 – GENERAL

1.01 SPECIFICATION SECTION INCLUDES:

- A. Submittals
- B. Contractor's Responsibility for Health and Safety
- C. Applicable Regulations and Publications

1.02 SUBMITTALS:

- A. The Contractor shall prepare and submit a Site Specific Health and Safety Plan (HASP) as detailed in specification Section 01 33 00 – Submittals. The Contractor shall also follow all applicable local, state, and federal health and safety standards and guidelines implemented through, but not limited to, the Occupational Safety and Health Act (OSHA), the National Institute for Occupational Safety and Health (NIOSH), the American Conference of Governmental Industrial Hygienists (ACGIH), and United States Environmental Protection Agency (USEPA). Where these are in conflict, the most stringent requirement shall be followed. The following points shall be addressed in the HASP:
 - 1. Names of key personnel and alternates responsible for health and safety, including a Contractor Health and Safety Representative (SSHO).
 - 2. Delineation of specific work tasks and the associated hazards and protective measures.
 - 3. Identification of specific chemical and physical hazards that may occur during the Work.
 - 4. A health and safety risk or hazard analysis associated with each portion of the Work (i.e., list potential chemical and physical hazards).
 - 5. Employee and applicable Contractor training assignments to ensure compliance with 29 CFR 1910.120 and 1926.65 (HAZWOPER).
 - 6. A requirement that Contractor locate Underground Facilities prior to the start of Work.
 - 7. Personal protective equipment (PPE) to be used for each of the site tasks and operations being conducted, as required by the personal protective equipment program in 29 CFR 1910.120.
 - 8. Medical surveillance requirements in accordance with the program in 29 CFR 1910.120.

9. Frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used by the Contractor, including methods of maintenance and calibration of monitoring and sampling equipment.
 10. Corrective actions and upgrading of personnel protection based on monitoring of air, personnel, and environmental sampling, with specific action levels identified.
 11. Project site control measures in accordance with the control program required in 29 CFR 1910 and 29 CFR 1926.
 12. Decontamination procedures in accordance with 29 CFR 1910.
 13. An emergency response plan meeting federal, state, and local requirements for safe and effective responses to emergencies, including the necessary PPE and other equipment. Explanation of potential emergencies and contingency plan of action, including description of the route to the nearest appropriate hospital, hospital route map, and posting of emergency telephone numbers at the Project Site.
 14. Confined space entry procedures in accordance with 29 CFR 1910.146. List of all anticipated confined space entries required by the Contractor in the course of the Work.
 15. Lockout/Tagout procedures in accordance with 29 CFR 1910.147. List of all anticipated logout/tagout items and how this will be coordinated with the Owner.
 16. A spill containment program meeting the requirements of all applicable local, state and federal health and safety standards.
 17. A list of health and safety and emergency equipment to be available on the Project Site.
 18. A description of engineering controls used to reduce the hazards of equipment operation and exposure to Project Site hazardous chemicals.
- B.** Contractor's Daily Construction Report, submitted in accordance with Specification Section 01 33 00 – Submittal Procedures, shall include a summary of daily safety issues and a summary of the Contractor's daily safety meeting.
- C.** Contractor shall immediately report to Engineer the occurrence of any and all health and safety incidents. Contractor shall immediately and fully investigate any such incident and conduct a root cause analysis, and shall provide to the Engineer the Contractor's written corrective action plan for such incident within one day after the incident occurs.
- D.** Contractor shall notify the Engineer in writing at least five days prior to bringing any hazardous material, equipment, or process to the Project Site, or using the same on the Project Site.
- E.** Contractor shall immediately notify the Engineer in writing of any hazard that Contractor discovers on the Project Site.

- F.** Certificate of Training: Prior to initiating Work, Contractor shall provide Engineer with documentation of employee and applicable Contractor training and medical certifications required under 20 CFR 1910.120. Specifically, documentation of the following is required for each worker:
1. Initial 40-hour (or 80-hour where appropriate) OSHA hazardous waste health and safety training and current annual 8-hour refresher training.
 2. Eight-hour OSHA hazardous waste supervisory training (required for the Contractor's Superintendent or SSHO).
 3. Confined space entry training.
 4. Enrollment in a medical monitoring program, with clearance within the previous 12 months from a licensed physician allowing the worker to participate in field activities and use respiratory protective equipment. Contractor shall not submit detailed medical information for employees.
 5. Current respiratory fit testing certification.
 6. Current Cardiopulmonary Resuscitation (CPR) and first aid certification for at least two workers assigned to work on the Project Site.
 7. Personnel training records and/or certifications for handling of PCB TSCA remediation waste.

1.03 CONTRACTOR'S RESPONSIBILITY FOR HEALTH AND SAFETY:

- A.** All Contractor employees that will come in contact with impacted soil and/or groundwater must be 40-hr HAZWOPER trained with up-to-date 8-hr annual training.
- B.** Contractor shall be responsible for the health and safety of Contractor's employees, its Subcontractors, Suppliers, agents, inspectors, visitors, the general public, and others.
- C.** Contractor shall be responsible for emergency response planning and notification, and for actual response to any and all emergencies that may occur during the course of the Work, including emergencies occurring when Contractor is not present at the Project Site.
- D.** Contractor shall communicate daily with the Engineer regarding health and safety issues for safe conduct of his duties, but such communication shall not imply any duty or responsibility on his part with regard to health and safety of Contractor's employees, its Subcontractors, Suppliers, the general public, or others. Engineers' responsibility and duty with regard to health and safety shall be limited to his employees. Contractor shall have responsibility and duty to the Engineer to communicate health and safety issues accurately and in a timely manner to allow Engineer to take appropriate actions to protect his employees.
- E.** The Contractor shall comply with all provisions of the *Health and Safety Plan* (HASP) as referenced in this Specification. Where discrepancies are encountered between the HASP and the Contractor's HASP, the more stringent provisions shall apply.

1.04 APPLICABLE REGULATIONS AND PUBLICATIONS:

- A.** Applicable regulations and publications include, but are not limited to, the following:
- 1.** Occupational Safety and Health Administration (OSHA), Title 29 CFR Part 1910, Occupational Safety and Health Standards, and Title 29 CFR Part 1926, Safety and Health Regulations for Construction Sites.
 - 2.** Toxic Substance Control Act (TSCA), Title 40 CFR Part 76, Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distributing in Commerce, and Use Prohibitions.
 - 3.** National Fire Protection Association (NFPA), Flammable and Combustible Liquids Code, NFPA 30, most recent revision.
 - 4.** United States Environmental Protection Agency (USEPA), Standard Operating Safety Guidelines, November, 1984.
 - 5.** U.S. Department of Health and Human Services (DHHS), "Manual of Analytical Methods", 3rd edition Volumes I and II, DHHS (NIOSH) Publication 84-100.
 - 6.** ANSI, Practices for Respiratory Protection, Z88.2, most recent version.
 - 7.** ANSI, Emergency Eyewash and Shower Equipment, Z358.1, 1981.
 - 8.** ANSI, Protective Footwear Z41.1, 1983.
 - 9.** ANSI, Respirator Use Physical Qualification for Personnel, Z88.6, 1984.
 - 10.** ANSI, Practice for Occupational and Educational Eye and Face Protection, Z87.1, 1979.
 - 11.** NIOSH/OSHA/USCG/EPA, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, USDHHS/PHS/CDC/NIOSH, October, 1985.
 - 12.** NIOSH Pocket Guide to Chemical Hazards, USDHHS/PHS/CDC/NIOSH, June, 1990 or most recent.
 - 13.** USEPA, Health and Safety Requirements for Personnel Engaged in Field Activities, EPA Order No. 14402.
 - 14.** Departments of Transportation (DOT) Standards and Regulations, 49 CFR 171 and 49 CFR 172.
 - 15.** ACGIH, Threshold Limit Values and Biological Exposure Indices for 1992-93 or most recent.
 - 16.** Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, EPA/600/4-87-006, September 1986.

- B. Where two or more regulations/documents conflict, the one(s) offering the greatest degree of protection will apply.
- C. Contractor shall comply with any and all state and local ordinances and regulations.

PART 2 – PRODUCTS

2.01. SPECIFICATION SECTION INCLUDES:

- A. General
- B. Personal Protective Equipment
- C. Health and Safety Equipment

2.02. GENERAL:

- A. Contractor shall furnish and maintain materials and equipment for the safety and health of Contractor's employees, its Subcontractors, Suppliers, and visitors. Contractor shall provide all required health and safety equipment, first aid equipment, tools, monitoring equipment, PPE, and ancillary equipment and methods required to ensure worker health and safety and to comply with the HASP. Engineer will furnish PPE and monitoring for his employees.

2.03. PERSONAL PROTECTIVE EQUIPMENT:

- A. The appropriate level of personal protection shall be determined by the Contractor's SSHO for specific tasks as described in the HASP. If hazards are identified that require a level of protection greater than Level C, work shall be suspended. The Contractor's SSHO, in consultation with Engineer, shall determine what actions are required prior to restarting Work.
- B. At a minimum, all personnel and visitors on the Project Site shall wear modified Level D PPE, except in Support Zone areas.
 - 1. Level D PPE includes:
 - a. Safety glasses with side shields.
 - b. Safety toe boots.
 - c. Hard hat.
 - d. Orange reflective safety vest.

2.04. HEALTH AND SAFETY EQUIPMENT:

- A. Contractor is required to have the following equipment available on the Project Site:
 - 1. First aid kits.
 - 2. Fire suppression equipment (appropriate to location and type of flammable materials present).
 - 3. Emergency eye wash facilities.

4. Personnel decontamination facilities and equipment (hand washing stations).
5. Tyvek, overboots or duck boots, and goggles.
6. Other equipment or supplies as determined to be necessary or prudent by Contractor.

PART 3 – EXECUTION

3.01. SPECIFICATION SECTION INCLUDES:

- A. General
- B. Engineering Controls

3.02. GENERAL:

- A. Contractor shall designate a Contractor's SSHO on the Project Site during the Work who shall, as a minimum, have at least one year of experience as an SSHO on an uncontrolled hazardous waste site, and have 40-hour OSHA Hazardous Waste Operations training and 8-hour OSHA Supervisor training. Contractor's Project Superintendent, if qualified, may also be the designated SSHO.
- B. The SSHO shall establish and enforce the standards of safety for all Contractor personnel on-site at all times. The SSHO shall ensure that all Contractor and its Subcontractor personnel working at the Project site follow the HASP, including wearing the designated level of PPE. If the SSHO elects to require a higher level of protection than that specified in the HASP, the extra costs associated with such higher level shall be borne by Contractor.
- C. Prior to mobilization, the SSHO shall inspect the Project Site and document area-specific and worker-specific protection requirements.
- D. After mobilization, the SSHO shall monitor activities and shall document the need for additional worker protection as required, based on activities performed and action levels specified in the HASP.
- E. The SSHO shall verify that all activities are performed in accordance with the HASP and all federal, state, local, and health and safety standards, regulations, and guidelines.
- F. In coordination with Engineer, Contractor shall hold safety meetings on the Project Site a minimum of daily (per work shift, if applicable) for all workers, to address health and safety issues, changing site conditions, activities, and personnel. Contractor shall hold and document additional safety meetings at the start of each major task and whenever site conditions affecting personnel safety change.
- G. In the event of a health and/or safety risk as determined by the SSHO or other Contractor personnel, Contractor shall not proceed with the Work until a method for handling the risk has been determined in consultation with Engineer, and implemented. Any health or safety risk resulting in a stoppage of work shall be reported immediately to Engineer.

3.03. ENGINEERING CONTROLS:

- A.** Contractor shall, at a minimum, provide the following engineering controls to reduce the hazards of equipment operation and exposure to site hazardous chemicals:
- 1.** Roll over cages for bulldozers, back hoes, loaders, and tractors.
 - 2.** Back-up alarms for all trucks and heavy equipment.
 - 3.** Wetting of soil to reduce dust during the Work.
 - 4.** Decontamination of personnel and equipment.
 - 5.** Barricades, and benching, shoring or bracing for open trenches and excavations.
 - 6.** Others as determined to be necessary or prudent by Contractor or as required by Engineer.

END OF SECTION

SECTION 01 11 00

SUMMARY OF WORK

PART 1 – GENERAL

1.01 SECTION INCLUDES:

- A. Existing Conditions
- B. Environmental Considerations
- C. Project Context
- D. Project Summary
- E. Contractor's Scope of Work
- F. References

1.02 EXISTING CONDITIONS:

- A. Project Site Location
 - 1. The Project Site (Site) is located at the 239.1 Jackson Street, Lowell, Massachusetts.
- B. Utilities and Facilities Shown or Indicated
 - 1. The information and data shown or indicated on the Drawings with respect to existing utilities and facilities at the Project site are based on information and data furnished to the Owner or the Engineer by the owners of such utilities or facilities or by others. Included in these utilities and facilities are telecommunications, electric, drainage, irrigation, plumbing, and others.
 - 2. The Owner and the Engineer will not be responsible for the accuracy or completeness of any such information or data relating to utilities or facilities. Contractor is required to verify all locations prior to subsurface work.
 - 3. The cost of all of the following will be included in the contract price and the Owner's Contractor will have full responsibility for:
 - a. The safety and protection of all existing utilities and facilities and repairing any damage resulting from the Work.
 - b. The protection of all existing conditions and the repair of all features to their state prior to construction utilities.

1.03 ENVIRONMENTAL CONSIDERATIONS:

- A. Prior to redevelopment, the Site and surrounding area housed mills, office buildings, a bleach house, a dye house, a boiler house, paint shop, machine shop and repair shop.
- B. The properties adjacent to the Site to the south were redeveloped in 2011.

- C. Soil at the Site is impacted with polychlorinated biphenyls (PCBs) as a result of historic Site use.
- D. This work is being conducted as part of a Self Implementing Cleanup and Disposal Plan for PCB Remediation Waste and a Remedial Action Measures (RAM) Plan (to be written). The Self Implementing Cleanup and Disposal Plan for PCB Remediation Waste has been approved by the EPA and is attached to this Specification.

1.04 PROJECT CONTEXT :

- A. The Project is being conducted by the City of Lowell to address PCB-impacted soil. Excavating the contaminated soil will prepare the property for transfer and redevelopment by others.

1.05 PROJECT SUMMARY:

- A. For the purpose of determining occupational safety and health requirements, the work area shall be considered a hazardous waste operations site as defined in federal occupational safety and health (OSHA) regulations (29 CFR 1910.120).
 - 1. 40-hr training is required for the Work described in these Specifications.
 - 2. The soil shall be considered hazardous waste as defined by the Toxic Substance Control Act (TSCA) and all the requirements to handle, transport, and dispose of TSCA waste shall be adhered.
 - 3. Contractor shall review and comply with all of the conditions in the EPA Approval letter dated October 2, 2012. The EPA Approval letter is attached to this Specification.
 - 4. Contractor shall certify in writing that they have read and understand the EPA Approval letter and agree to abide by the conditions in the EPA Approval letter.
- B. During the course of the completion of the Work, it is expected that the Contractor shall encounter PCB impacted soil greater than 10 mg/kg. It is expected that impacted soil will only be encountered beneath elevation 81 feet.
- C. The approximate period of performance for the Work is anticipated to be approximately 1 month in duration.
- D. Site preparation shall include the activities listed below as shown and described in the Drawings and Specifications.
 - 1. Mobilize equipment to the Site.
 - 2. Define and setup Site zones (Support Zone, Decontamination Zone, and Exclusion Zone).
 - 3. Install the equipment decontamination pad and personnel decontamination stations.
 - 4. Install erosion and sediment controls.
 - 5. Prepare stockpile areas.

6. Prepare Site roads.
 7. Protect all existing utilities.
 8. Protect and/or remove existing landscaping to facilitate the Work.
- E.** Following Site preparation, the activities listed below shall be completed by the Contractor. These activities shall constitute the Work.
1. Install sheet piling, as shown and described in the Drawings and Specifications, to facilitate excavation.
 2. Excavate, segregate, and stockpile soil as shown and described in the Drawings and Specifications.
 3. Load and dispose of PCB impacted soil, as shown and described in the Drawings and Specifications.
 4. Backfill excavation with segregated clean material and import material, as shown and described in the Drawings and Specifications.
 5. Grade and compact backfill as shown and described in the Drawings and Specifications.
 6. Restore Site as described in the Drawings and Specifications.
 7. Demobilize from the Site.

1.06 CONTRACTOR'S SCOPE OF WORK:

A. General

1. This Section provides a brief general description of the technical scope of work for the Project. It is not intended to be a comprehensive description of all work required to complete the requirements of the Contract Documents.
2. It is the intent of these Specifications to describe a functionally complete Project to be executed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result must be provided whether or not specifically called for at no additional cost to the Owner or Engineer.

B. Mobilization and Demobilization

1. Mobilization shall include the work required to mobilize equipment, personnel, and materials to the Site and the work listed below.
 - a. Prepare submittals.
 - b. Obtain required permits and approvals.
 - c. Complete of the Contractor's Health and Safety Plan.

3. The Contractor shall remove all temporary Sheet pile once the excavation is complete, backfill, graded, and compacted.

E. Soil Excavation

1. The Contractor shall excavate soil as shown in the Drawings and described in specification Section 31 00 00.
2. The Contractor shall excavate soil from ground surface to elevation 82 feet and stockpile it to be reused as “clean” backfill.
3. The Contractor shall excavation soil from elevation 82 feet to 73 feet and stockpile it for disposal. All PCB impacted soil for disposal shall be considered TSCA hazardous waste.
4. The Contractor will remove, load, and stockpile soil to the extents required by Engineer until final excavation depths are achieved.
5. While performing excavation, Contractor shall be responsible for protection of all utilities, buildings, or other work being performed in the vicinity of the excavation.
6. Contractor shall perform all excavation and stockpiling in accordance with Section 31 00 00.

F. Soil Stockpiling and Loading

1. The Contractor shall coordinate disposal shipments and notify Engineer of planned shipments at least 24 hours prior to the shipment time.
2. The Contractor shall load PCB Impacted Material for transportation off-site. All material is assumed to be dry.
3. All PCB impacted soil shall be disposed of at a TSCA permitted landfill.

G. Decontamination

1. In accordance with Section 01 35 43, the Contractor shall perform decontamination of any equipment and personnel that has come into contact with PCB Impacted Materials.

H. Site Restoration

1. The Contractor shall restore disturbed areas to their original condition. This includes stockpile areas, or any other areas disturbed solely by the Contractor that otherwise would not have been disturbed due to the activities of the Contractor. Site restoration work may include but is not limited to the items listed below.
 - a. Grading Site to match the initial Site conditions.

- b. Restoration of damaged paved or concrete areas;
 - c. Restoration of vegetation, including trees along street & sidewalk.
 - 2. When construction and off-site disposal at the Site is complete, the Contractor shall remove temporary facilities; clean the Site; decontaminate equipment; and demobilize from the Site.
- I. Contractor's Use of Premises
 - 1. All of the Contractor's operations on the Site, including the storage of materials, shall be confined to designated areas.
 - 2. The Owner, Owner's Representative, and Engineer will assume no responsibility for damages to the facilities on the Site due to negligence or carelessness on the part of the Contractor. The Owner, Owner's Representative, and Engineer will not be liable for loss or damage of Contractor's tools, vehicles, equipment, or materials whatever the cause.
- J. Contractor's Daily Report
 - 1. The Contractor shall prepare and submit a Contractor's Daily Report to the Engineer in accordance with the procedures outlined in Section 01 33 00.

1.07 REFERENCES:

- A. Notification and Certification of Self-Implementing Cleanup and Disposal Plan for PCB Remediation Waste Revision 1. Watermark Environmental, Inc. May 17, 2012.
- B. PCB Cleanup and Disposal Approval under 40 CFR 761.61 (a) and (c), Former Appleton Mill, Parcel 9. United State Environmental Protection Agency. October 2, 2012.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

END OF SECTION

May 17, 2012

Ms. Kimberly N. Tisa
PCB Coordinator
United States Environmental Protection Agency (USEPA)
5 Post Office Square
Mail Code: OSRR07-2
Boston, MA 02109-3912

Subject: Notification and Certification of Self-Implementing Cleanup and Disposal Plan for PCB Remediation Waste – Revision 1
239.1 Jackson Street
Lowell, Massachusetts

To Ms. Tisa:

On behalf of the City of Lowell (City), Watermark Environmental, Inc. (Watermark) is submitting this Notification and Certification of Self-implementing Cleanup and Disposal Plan for PCB Remediation Waste – Revision 1 (Revised Plan) at 239.1 Jackson Street in Lowell, Massachusetts. This work is being conducted under a USEPA Brownfields Remediation Grant, number BF96130901. As you may know, Mr. Alan Peterson (USEPA) serves as the case officer.

Watermark previously prepared a Notification and Certification of Self-Implementing Cleanup and Disposal of PCB Remediation Waste Plan (Original Plan) in August 2011. USEPA did not approve this Original Plan and provided comments on the Original Plan in September 2011. In November 2011, representatives from Watermark, the USEPA, the City, the developer of the property Trinity Appleton Four LTD Partnership and Trinity Appleton LP (Trinity), and Trinity's environmental consultant (McPhail Associates, Inc.) met to discuss the Original Plan, the USEPA's comment letter, and the steps necessary to address EPA's concerns. As a result of that meeting, a plan to address EPA's concerns was developed and included, amongst other items, additional soil sampling for PCBs throughout Parcels 8 and 9 (the Property).

Prior to conducting an additional round of PCB soil sampling at the Property, a Site Specific Quality Assurance Project Plan (SS-QAPP) Addendum was prepared February 2, 2012 and approved by the USEPA on March 8, 2012. The additional subsurface PCB soil sampling effort was conducted between March 28 and 29, 2012. Results for PCBs in soil from this most recent sampling event were below regulatory limits of both MCP and TSCA. Based on the USEPA's comment letter, agreements made during the November 2011 meeting, and the results of the March 2012 sampling event, this Revised Plan has been prepared.

On behalf of the City, we are asking for your approval of this PCB Cleanup Plan, as it is a requirement that USEPA approves sampling and analysis plans for projects funded by a Brownfields grant. Watermark has a Generic EPA-approved Quality Assurance Project Plan (RFA 08063).

If you have any questions regarding this letter, please do not hesitate to contact the undersigned at (978) 452-9696.

Sincerely,
WATERMARK



Olaf Westphalen, PG, LSP
LSP-of-Record

cc: Sarah Brown (City of Lowell – Department of Planning and Development)
Alan Peterson (USEPA)
File 11405-02 / WLC0995

Notification and Certification of Self-Implementing
Cleanup and Disposal Plan for PCB Remediation Waste

Revision 1

239.1 Jackson Street
Lowell, Massachusetts

Watermark Project No.: 11405-02



Watermark

Engineering • Construction • Operations

Prepared by:

Watermark
175 Cabot Street
Lowell, MA 01854

Prepared for:

City of Lowell
Department of Planning and
Development
JFK Civic Center
50 Arcand Drive
Lowell, MA 01852





Watermark Project No.: 11405-02-0002B

**Notification and Certification of Self-Implementing
Cleanup and Disposal Plan for PCB Remediation Waste**

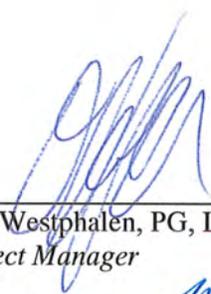
Revision 1

239.1 Jackson Street
Lowell, Massachusetts

Prepared for:



**City of Lowell
Department of Planning and Development
JFK Civic Center
50 Arcand Drive
Lowell, MA 01852**



Olaf Westphalen, PG, LSP
Project Manager

5/17/12
Date



Evan Barman, PE
Project Engineer

5/17/12
Date

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EXECUTIVE SUMMARY

On behalf of the City of Lowell (the City), Watermark Environmental, Inc. (Watermark) has prepared this Notification and Certification of Self-Implementing Cleanup Plan – Revision 1 (Revised Plan) in accordance with 40 CFR 761.61(a)(3) to address polychlorinated biphenyl (PCB) impacts in the soil at the property formerly known as 307 Jackson Street, Lowell, Massachusetts. This Revised Plan specifically addresses the elevated concentrations of PCBs on a portion of Parcel 9, currently known as 239.1 Jackson Street (the Site). The PCB-impacted soil is regulated both under the Massachusetts Department of Environmental Protection (MassDEP) under the Massachusetts Contingency Plan (MCP), and by the United States Environmental Protection Agency (USEPA) under the Toxic Substance Control Act (TSCA).

Releases at the Site are a result of historic use of the Site and the surrounding parcels (the Redevelopment Area) for industrial purposes since the early 1800s. Historically, the Redevelopment Area housed mills, office buildings, a bleach house, a dye house, a boiler house, paint shop, machine shop, and repair shop. Environmental investigations at the Redevelopment Area have observed large quantities of historic debris (wood, brick, glass, ash) in the soil. PCBs in the soil at the Site may be attributed to buried historic caulking or paint. Given the documented site history and uses of the Site, it is considered that the release of PCB containing material occurred prior to 1978; specifically, prior to the mid-1970s, when the Site was utilized for manufacturing and industrial purposes. Based upon historical information, after the mid-1970s the Site was utilized for the storage of dry goods. Furthermore, it is understood that the property was vacant from the mid-1980s until redevelopment began in 2009. Therefore, the release did not likely occur after April 18, 1978¹.

Currently the City, along with Trinity Appleton Four LTD Partnership and Trinity Appleton LP (Trinity), is working to redevelop the Redevelopment Area and the surrounding properties, resulting in approximately 15 acres of new vibrant mixed-use neighborhood, which includes residences. The proposed remediation efforts being taken to address the PCB-impacted soil will prepare the Property for redevelopment efforts prior to the City transferring the Property to Trinity. Currently the PCB-impacted soil at the Site is located at a depth of approximately 10 feet or more below the ground surface and access to the Property is restricted by a perimeter fence.

Some of the previous investigations conducted at the Property, as well as the preparation of this plan and other required plans, are being funded by a Brownfields Assessment Grant (Brownfields Grant BF97184001), which was awarded to the City in 2009. Remediation efforts at the Site will be funded by one of two Brownfields Remediation Grants, co-issued under grant number BF96130901.

Watermark previously prepared a Notification and Certification of Self-Implementing Cleanup and Disposal of PCB Remediation Waste Plan (Original Plan) in August 2011. USEPA did not approve the Original Plan and provided comments on the Original Plan in September 2011. A copy of the USEPA comment letter on the Original Plan is included as Appendix D. In November 2011, representatives from Watermark, the USEPA, the City, Trinity, and Trinity's environmental consultant (McPhail Associates, Inc.) met to discuss the Original Plan, the USEPA's comment letter, and the steps necessary to address EPA's concerns. As a result of that meeting, additional soil sampling for PCBs in the subsurface at the Property was conducted in March 2012 and revisions were made to the proposed cleanup plan.

¹ The applicability of TSCA and associated requirements for cleaning up PCB releases depend partially upon when the release occurred relative to two dates: April 18, 1978 and July 2, 1979 [see 40 CFR 761.3, 761.50(b)(3)].

1.0 INTRODUCTION

On behalf of the City of Lowell (the City), Watermark Environmental, Inc. (Watermark) has prepared this Notification and Certification of Self-Implementing Cleanup and Disposal of Polychlorinated Biphenyl (PCB) Remediation Waste Plan – Revision 1 (Revised Plan) in accordance with requirements of 40 CFR Part 761.61 (a)(3). Currently the City own Parcels 8 and 9, hereafter referred to as “the Property”, and the parcel known as “New Road D.” This Plan pertains to work being conducted at 239.1 Jackson Street, formerly known as 307 Jackson Street on Parcel 9 (Figure 1-1). Specifically, this Plan addresses the remediation of PCB-impacted soil, referred to as the Disposal Site (the Site), in Parcel 9 (Figure 1-2). Remediation work being conducted as part of this Revised Plan is regulated by the United States Environmental Protection Agency (USEPA) under the Toxic Substance Control Act (TSCA) and the Massachusetts Department of Environmental Protection (MassDEP) under the Massachusetts Contingency Plan (MCP).

1.1 Background

Historically, the Property and the adjoining parcels (the Redevelopment Area) had been used for manufacturing and had housed mills, office buildings, a bleach house, a dye house, a boiler house, paint shop, machine shop, and repair shop. The Redevelopment Area was historically part of the Appleton Company Cotton Mill complex, which included a repair shop, boiler house, iron storage, dye house, bleach house, and machine shop. Beginning around 1950 the Redevelopment Area was occupied by Jackson Properties, which included loft buildings, a cotton house, and an office building. Additionally, portions of the Redevelopment Area were leased to small industrial businesses between the 1930s and the mid-1970s. Between 1975 and 2006, the Site was owned by Appleton Trust and was used for storage between the mid-1970s and mid-1980s. The Redevelopment Area was vacant from the mid-1980s until redevelopment began in 2009.

The City is currently working with a developer, Trinity Appleton Four LTD Partnership and Trinity Appleton LP (Trinity), in order to redevelop the Property. The redevelopment will result in the reinvention of approximately 15 acres of vacant and underutilized land, including the Redevelopment Area, as a new vibrant mixed-use neighborhood, which includes residences. Adjacent parcels to the south and southeast of the Property (Parcels 6 and 7) have already been redeveloped with the restoration ending in June 2011. Currently, Parcels 6 and 7 are fully occupied (Figure 1-2).

Numerous environmental investigations have been conducted at the Redevelopment Area. Based on site investigations, PCBs have been detected in soil at low concentrations across the Redevelopment Area. The source of PCBs in soil at the Redevelopment Area may be attributed to paint and caulking historically used on structures and buildings and may be in the soil as evidenced by the wood and other construction debris found in soil at the Property. No elevated concentrations of PCBs have been measured in soil below the historic fill layer. There is no known transformer release that the PCBs are associated with.

In October 2009 a Class B2 partial-RAO was filed for the Property. The RAO identified the contaminants of concern at the Property as being polynuclear aromatic hydrocarbons (PAHs), metals, polychlorinated biphenyls (PCBs) and volatile organic compounds (VOCs) identified in soil, and VOCs identified in groundwater. The vertical extent of impacted soil and groundwater at Parcels 8 and 9 was limited to the historic fill material. A Method 3 Risk Characterization was completed for the Property. Exposure Point Concentrations (EPCs) utilized in the Risk Characterization for PAHs, metals, PCBs and EPH fractions in soil were based upon the average of the concentrations detected, and the EPCs utilized for VPH fractions and VOCs were the maximum concentration detected. The maximum concentration of each contaminant detected in the monitoring wells was utilized as the EPC for groundwater. For indoor air, maximum concentrations of soil gas modified to account for dilution and attenuation were used as the basis for estimated indoor air EPCs. The Method 3 Risk Assessment concluded that soil and groundwater present at the time of the RAO presented a level of No Significant Risk for the current site use. An Activity and Use Limitation (AUL) was recorded for the two parcels with the Northern Middlesex County Registry of Deeds to maintain the condition of No Significant Risk when site usage changes after the redevelopment effort. The AUL maintains a condition of No Significant Risk through requiring:

- Only limited access is permitted to the Property, which is to be controlled by a fence no shorter than 6-foot high;
- Install and maintain asphalt pavement on the driveway easement located in the southwest corner of Parcel 8;
- Concrete slabs are to remain in place;
- Use of the property for multi-unit residential or commercial buildings (is permissible) provided the installation of a vapor intrusion mitigation system, such as a vapor barrier and under slab ventilation system, is incorporated into the design of any future buildings on the Property;
- Use of the Property for single-family residential dwellings, playground, daycare, recreational area, or other uses in which adults or children may come into contact with uncovered soil is prohibited;
- Placement of off-site fill material (if needed) over the existing ground surface for construction of roadways or driveways, without moving or displacing the existing on-site fill material;
- Growing of fruits and vegetables for human consumption is prohibited; and,
- Relocation of PCB, polynuclear aromatic hydrocarbon (PAH), and barium impacted soil in the AUL Area to areas outside of the AUL Area is prohibited unless an LSP renders an Opinion which states that such relocation is consistent with maintaining a condition of NSR.

In the fall of 2010, the City retained Watermark under a USEPA Brownfields assessment grant to conduct site investigation activities to further delineate PCB impacted soil in the subsurface at the Property in preparation for upcoming remediation efforts.

The results of the subsurface investigation were presented to the City in a report titled *Data Summary Report, Parcels 8 and 9 Site Assessment Activities*, dated January 2011. A summary of the results of the subsurface investigation of PCBs in soil are presented below:

- PCBs in soil were detected above 500 mg/kg in two samples. This soil is subject to the USEPA's TSCA regulations because the concentrations exceeded 50 mg/kg;
- The soils with the highest impacts of PCBs (from 17 to 2,200 mg/kg) are in the vicinity of boring SB-108 from depths of 14 to 17.3 feet below grade [elevation 74.18 to 77.48 feet NGVD 1992] (Figure 1-3). Two of the samples, with concentrations of 640 mg/kg and 2,200 mg/kg, exceed MCP Upper Concentration Limit (UCL) for PCBs of 100 mg/kg. These soils contained significant amounts of wood and other building materials; therefore, the presence of PCBs may be attributed to caulking and/or paint; and
- The elevated concentrations of PCBs triggered a new 120-day reporting condition under the MCP. The release was reported to the MassDEP on January 26, 2011 and assigned the Release Tracking Number (RTN) 3-29781.

In August 2011, the PCB release at Parcels 6 and 7 was addressed with a Class B2 partial RAO Statement under RTN 3-26095. The partial RAO identified the contaminants of concern for Parcels 6 and 7 as PAHs, metals, PCBs, and VOCs identified in soil, and VOCs identified in groundwater and sub-slab soil vapor samples. Similar to Parcels 8 and 9, the vertical extent of impacted soil and groundwater at Parcels 6 and 7 was limited to the historic fill material. The horizontal extent of impacted media at Parcels 6 and 7 were limited based on the sub-surface penstock and the canals to the north and south of the Redevelopment Area. A Method 3 Risk Characterization was completed. Exposure Point Concentrations (EPCs) utilized in the Risk Characterization for PAHs, metals, PCBs and EPH fractions in soil were based upon the average of the concentrations detected, and the EPCs utilized for VPH fractions and VOCs were the maximum concentration detected. The maximum concentration of each contaminant detected in the monitoring wells was utilized as the EPC for groundwater. For indoor air, maximum concentrations of soil gas modified to account for dilution and attenuation were used as the basis for estimated indoor air EPCs. The Method 3 Risk Assessment concluded that soil and groundwater present at the time of the RAO presented a level of No Significant Risk for the current site use. An Activity and Use Limitation (AUL) was recorded for the two parcels with the Northern Middlesex County Registry of Deeds

to maintain the condition of No Significant Risk when site usage changes after the redevelopment effort. The AUL maintains a condition of No Significant Risk through requiring:

- A minimum of three feet of clean soil is placed in all landscaped areas, and all non-landscaped areas be covered with concrete or asphalt
- Concrete and paved areas must be well maintained with potholes and large cracks repaired within 6 months
- Excavations must be completed in accordance with a Soil Management Plan and a Health and Safety Plan (both of which must be prepared by a Licensed Site Professional [LSP]), and must be completed within 6 months and covered with a comparable barrier to the one previously in place immediately following the completion of the project
- The subject property must not be used for a single family residence or for fruit and vegetable gardening
- Relocation of soil from within the AUL area to areas outside of the AUL or off-site must be done so under the supervision of an LSP and in accordance with the Remediation Waste Management Provisions of the MCP at 310 CMR 40.0030 and 310 CMR 40.0040

Watermark previously prepared a Notification and Certification of Self-Implementing Cleanup and Disposal of PCB Remediation Waste Plan (Original Plan) in August 2011. In preparing the Original Plan, Watermark reviewed the documents filed with the MassDEP, the USEPA, and/or the City summarizing the site assessments within the Redevelopment Area. These reports include:

- Phase I Initial Site Investigation and Tier Classification, RTN 3-26095, Former Appleton Mills, 307 Jackson Street, Lowell, MA, dated July 31, 2007, prepared by Environmental Compliance Services, Inc. (ECS);
- Phase I Environmental Site Assessment and Subsurface investigation Report, 307 Jackson Street, Lowell, MA, dated August 2006, prepared by Watermark;
- Phase I Initial Site Investigation; Phase II Conceptual Scope of Work, RTN 3-26095, Former Appleton Mills, 307 Jackson Street, Lowell, MA, dated August 27, 2009, prepared by McPhail Associates Inc. (MAI);
- Phase II Comprehensive Site Assessment, RTN 3-26095, Former Appleton Mills, 307 Jackson Street, Lowell, MA, dated September 24, 2009, prepared by MAI;
- Release Abatement Measure (RAM) Plan, RTN 3-26095, Former Appleton Mills, 307 Jackson Street, Lowell, MA, October 9, 2009, prepared by MAI;
- Form 1075, Notice of Activity and Use Limitation (AUL), 307 Jackson Street, RTN 3-26095, dated October 13, 2009, prepared by MAI;
- Partial Response Action Outcome Statement, RTN 3-26095, Former Appleton Mills, 307 Jackson Street, Lowell, MA, dated October 14, 2009, prepared by MAI;
- Risk Based Approval, Former Appleton Mills, 307 Jackson Street, Lowell, MA dated July 21, 2010, prepared by MAI;
- Data Summary Report, Parcels 8 and 9 Site Assessment Activities, dated January 2011, prepared by Watermark; and,
- New Street D; Lowell, Massachusetts, Final (PCB) Completion Report, dated April 26, 2011, prepared by MAI.

USEPA did not approve the Original Plan and provided comments on the Original Plan in September 2011. A copy of the USEPA comment letter on the Original Plan is included as Appendix D. In November 2011, representatives from Watermark, the USEPA, the City, Trinity, and Trinity's environmental consultant (McPhail Associates, Inc.) met to discuss the Original Plan, the USEPA's comment letter, and the steps that needed to be made to move forward. As a result of that meeting, a plan to address EPA's concerns was developed and included amongst other items, additional soil sampling for PCBs throughout Parcels 8 and 9. Prior to conducting an additional round of PCB soil sampling at the Property, a Site Specific Quality Assurance Project

Plan (SS-QAPP) Addendum was prepared February 2, 2012 and approved by the USEPA on March 8, 2012. The additional subsurface PCB soil sampling effort was conducted between March 28 and 29, 2012. Results for PCBs in soil from this most recent sampling event were below regulatory limits of both MCP and TSCA. Based on the results of the March 2012 sampling event, this Revised Plan has been prepared.

1.2 Purpose and Scope

This Revised Plan was written to satisfy the requirements for Notification and Certification of Self-Implementing Cleanup and Disposal of PCB Remediation Waste stipulated under 40 CFR 761.61(a)(3) and relies, in part, on the above documents previously developed in support of site investigation activities. The above documents were submitted to the MassDEP, USEPA, or the City under separate cover; additional copies are available upon request. The Site and adjacent parcels were previously closed with a Partial Class B2 Response Action Outcome (p-RAO); however, concentrations of PCBs identified in the soil at the Site in post-RAO investigations were significantly above those reported in the p-RAO, therefore triggered a new MCP notification condition. The p-RAO relied upon two separate AULs, one for Parcel 8 and one for Parcel 9, recorded at the Middlesex County Registry of Deeds. Work conducted at the Site needs to adhere to the conditions set forth in the AUL recorded for the Site. The remainder of this Revised Plan is formatted consistent with 40 CFR 761.61(a)(3).

1.2.1 Content of Notice (Revised Plan) pursuant to 40 CFR 761.61(a)(3):

[A] The nature of the contamination including the types of materials contaminated.

Soil is the only media shown to have been impacted by PCBs at the Redevelopment Area. The presence of PCB-impacted soil at the Redevelopment Area is believed to be related to historic urban fill materials used at the Redevelopment Area. Given the documented site history and uses of the Redevelopment Area, it is considered that the release of PCB containing material (such as caulking or paint) occurred prior to 1978. Specifically, prior to the mid-1970s the Redevelopment Area was utilized for manufacturing and industrial purposes. Based upon historical information, after the mid-1970s the Redevelopment Area was utilized for the storage of dry goods. Furthermore, it is understood that the property was vacant from the mid-1980s until redevelopment began in 2009. Therefore, the release did not likely occur after April 18, 1978.

[B] A summary of the procedures used to sample contaminated and adjacent areas and a table or cleanup site map showing PCB concentrations measured in all pre-cleanup characterization samples.

Procedures used to sample the Site and adjacent areas are summarized in Section 2.0, PCB Characterization Activities. Watermark's 2010 sampling effort was conducted in accordance with Watermark's Generic Quality Assurance Project Plan (QAPP) for Brownfields Assessment and Remediation Site (RFA 08063), which was approved by the USEPA on January 9, 2008. An SS-QAPP Addendum was prepared for the 2010 site characterization activities on July 13, 2010, which was approved by the USEPA on August 6, 2010. Prior to the March 2012 characterization activities, a second SS-QAPP Addendum was prepared and approved by the USEPA on March 8, 2012.

For the work described herein, the MCP Release Abatement Measure (RAM) Plan (to be written) will serve as the SS-QAPP Addendum. Tables and maps showing a summary of all pre-cleanup characterization results for analysis of PCBs are attached and referenced in Section 3.0, Site Remedial Implementation Plan.

[C] The location and extent of the identified contaminated area(s), including topographic maps with sample collection sites cross referenced to the sample identification numbers in the data summary from [B].

Maps depicting the location and extent of contaminated areas cross-referenced to sample identification numbers are included with this Revised Plan in Figures 1-3 and 2-1, and Tables 2-1 and 2-2 referenced in Section 3.0, Site Remedial Implementation Plan.

[D] A cleanup plan for the site including schedule, disposal technology, approach and contingencies in the event of the discovery of higher concentrations, wider distributions or other obstacles that would force a change in the cleanup approach.

The proposed cleanup plan with schedule, disposal technology, and contingencies is included in Section 3.0, Site Remedial Implementation Plan.

[E] A written certification signed by the owner of the property.

A signed certification by the Site owner, the City, is included in Appendix A.

The contact person for this project on behalf of the City is:

Ms. Sarah Brown
Environmental Officer
50 Arcand Drive
Lowell, MA 01852
Phone: (978) 674-4252
Fax: (978) 446-7014
SBrown@lowellma.gov

2.0 PCB CHARACTERIZATION ACTIVITIES

The following sections discuss the PCB characterization activities which have taken place from 2006 to 2010 over the entire Redevelopment Area. The initial investigations are related to the release RTN 3-26095 which includes all of the Redevelopment Area, formerly 307 Jackson Street. In the fall of 2010 Watermark conducted further characterization activities at the Property, which are described in Section 2.1. Concentrations of PCBs in soils at the Property exceeded those previously reported, triggering a new MCP notification condition. The new release was assigned the release tracking number RTN 3-29781.

As a result of the November 2011 meeting with USEPA and other interested parties, an additional round of PCB delineation soil sampling was conducted in March 2012. This round of PCB soil sampling was limited to the Property since Parcels 6 and 7 are currently developed. Sampling methods are discussed in Section 2.2, and results from this sampling round are discussed in Sections 2.1 and 2.2 as appropriate.

2.1 PCB Characterization on Adjacent Parcels

An MCP Phase I investigation of the Redevelopment Area was conducted by ECS in 2006. Based on a review of reports prepared by ECS, in 2006 eight soil borings, each of which was completed as a monitoring well, were advanced with a hollow stem auger (HSA) drill rig as part of a site investigation. Soil samples collected from 2-foot split spoon samplers from the borings were analyzed for:

- VOCs by USEPA Method 8260B;
- Acid-extractable semi-volatile organic compounds (SVOCs) by US EPA Method 8270C;
- Extractable petroleum hydrocarbons (EPH) by MADEP EPH Method;
- PCBs by USEPA Method 8082 (extraction by Method 3546, microwave extraction);
- Priority pollutant 13 metals by USEPA Method 6010B/7471A; and
- Asbestos by EPA's Interim Method for Determination of Asbestos in Bulk Insulation, 1982.

PCB results from these eight soil boring are discussed in the applicable sections below. Approximate monitoring well locations are shown in Figure 1-3.

An ASTM Phase I Environmental Site Assessment and Subsurface Investigation was completed by Watermark in August 2006 on behalf of the City of Lowell. Watermark advanced soil borings with an HSA drill rig, collected and analyzed soil samples from a 2-foot split spoon sampler, and collected and analyzed groundwater samples from existing wells. Soil samples were analyzed for:

- VOCs by USEPA Method 8260B;
- SVOCs by US EPA Method 8270C;
- EPH by MADEP EPH Method;
- Volatile petroleum hydrocarbons (VPH) by MADEP VPH Method;
- PCBs by USEPA Method 8082 (extraction by Method 3546, microwave extraction); and
- Metals by USEPA Method 6010B/7471A.

PCB results from this investigation are discussed in appropriate sections below. Approximate investigation locations are shown in Figure 1-2.

Separate phases of subsurface investigations were subsequently completed across the Redevelopment Area by MAI. The first phase of investigation, completed at Parcels 6, 7, and 8 from March 6 through March 13, 2008, was completed outside of the footprints of the existing buildings and consisted of seven borings advanced with an HSA drill rig (MAI-1 through MAI-7) and twelve test pits (TP-1 through TP-12). A second phase of investigation, performed across the Redevelopment Area from May 27 through June 10, 2009, consisted of nine borings (MAI-8 through MAI-16) and eight test pits (TP-20 through TP-27). Soil samples were collected with a

2-foot split spoon sampler or composited over an entire test pit (see Table 2-1 for exact sample intervals), and were analyzed for:

- VOCs by MCP 8260B/5035-high;
- Polynuclear aromatic hydrocarbons (PAHs) by MCP 82790C – SIM;
- Metals by MCP 5000/7000 series;
- PCBs by 8082 (extraction by Method 3546, microwave extraction).

Approximate locations of these sampling locations are shown on Figure 1-3.

During May and June 2010, two additional rounds of test pits were excavated in the New Road D Parcel by MAI. The test pits were excavated to facilitate soil sampling in an attempt to define the southern, eastern and western extents of PCB-impacted soil. Samples collected during the 2010 investigation were analyzed for PCBs by 8082 with extraction method 3540C, soxhlet extraction. These samples were collected over a 2-foot interval. Watermark reviewed the sampling procedures, sample locations, sampling interval, and laboratory data packages from these sampling efforts. The data are representative of the conditions in New Road D at the time, and the data is useable for making cleanup decisions. Approximate locations of these test pits are shown on Figure 1-3.

A description of soil sample results for PCBs by parcel is provided below.

Parcel 6

Parcel 6 is located south of the western portion of the Property. A total of four soil samples were collected and analyzed for PCBs from Parcel 6. Of the four samples analyzed, only one sample had a detection above the laboratory's reporting limit. The detection was in sample B-125 from 10 to 12 feet below ground surface (ft bgs). The detection 0.15 mg/kg of aroclor 1260 is below the MCP Method 1 S-3/GW-2 and S-3/GW-3 Cleanup Standard² of 3 mg/kg and the USEPA's TSCA Cleanup Criteria for High Occupancy Areas (HOAs) of 10 mg/kg³. Sample locations for Parcel 6 are shown on Figure 1-3 and sample results are presented in Table 2-1. This parcel has achieved MCP closure with a Class B2 partial RAO as discussed in Section 1.1.

Parcel 7

Parcel 7 is located south and southeast of the Site. A total of 11 soil samples were collected and analyzed for PCBs from Parcel 7. Of the 11 samples analyzed, two samples had detections above the laboratory's reporting limit. The detections were in sample B-126 from 1 to 3 ft bgs, and from sample TP-26 S-1 (0-7') from 0 to 7 ft bgs. Depths given for the samples are measured from the pre-construction ground surface. Sample locations in Parcel 7 are currently covered by pavement or clean fill material. Both detections are below the MCP Method 1 S-3/GW-2 and S-3/GW-3 Cleanup Standard of 3 mg/kg and the USEPA's TSCA Cleanup Criteria for HOAs of 10 mg/kg. Sample locations for Parcel 7 are shown on Figure 1-3 and sample results are presented in Table 2-1. This parcel has achieved MCP closure with a Class B2 partial RAO as discussed in Section 1.1.

² MCP Method 1 S-3/GW-2 and S-3/GW-3 Cleanup Standards are applicable for the soil across the Remediation Area. The soil is classified as an S-3 soil because the impacted soils are inaccessible as they are either under a building or permanent structure, or are located at depth. Furthermore, an AUL has already been recorded for the Redevelopment Area, further restricting access. Groundwater is characterized as GW-2 due to the presence of occupied buildings on Parcels 6 and 7, and the planned future occupied buildings on Parcels 8 and 9 (the Property). Groundwater is also characterized as GW-3 as all groundwater within the commonwealth of Massachusetts is characterized as GW-3.

³ The clean-up level of 10 mg/kg for PCBs applicable in this case as the material is being addressed as part of a self-implementing cleanup of soil in a future High Occupancy Area which will be located under a cap in the future. The Property is being designated as a High Occupancy Area based on its future use as a residence, and the cap being placed on the PCB impacted area will consist of no less than 10 inches (25 cm) of compacted soil with concentrations of <1 mg/kg of PCBs which meets the requirements of a cap set forth in CFR 264.310(a). Note that a soil cap, if installed, will need to be no less than 36 inches in thickness to comply with MCP requirements. A deed restriction will also be recorded to prevent access to the PCB-impacted soil.

Parcel 8

Parcel 8 is located east of the Site. A total of 46 soil samples were collected and analyzed for PCBs from Parcel 8 between 2006 and 2012. Of the 46 samples analyzed, 30 samples had detections above the laboratory's reporting limit. Of the 30 samples with detections of above the laboratory's reporting limit, 3 samples exceed the MCP Method 1 S-3/GW-2 and S-3/GW-3 Cleanup Standard of 3 mg/kg, but not the USEPA's TSCA Cleanup Criteria for HOAs of 10 mg/kg. The three samples which exceeded the MCP Method 1 S-3/GW-2 and S-3/GW-3 Cleanup Standard were samples SB-112 (10-12'), SB-114 (9-11'), and TP-304 S-2 (2-4') with concentrations of 6 mg/kg of aroclor 1260 and 7.4 mg/kg and 8.47 mg/kg of aroclor 1254 (maximum concentration), respectively. Although these individual samples exceed the MCP Method 1 S-3/GW-2 and S-3/GW-3 Cleanup Standard, the calculated Exposure Point Concentration (EPC) for Parcel 8 is below the applicable MCP Method 1 S-3/GW-2 and S-3/GW-3 Cleanup Standards, and the TSCA Standard for soil in an HOA. Sample locations for Parcel 8 are shown on Figure 1-3 and sample results are presented in Table 2-1.

This part of the Property has achieved MCP closure with a Class B2 partial RAO as discussed in Section 1.1.

In March 2012, in order to address concerns raised by the USEPA in their September 28, 2011 letter, additional soil samples were collected from Parcel 8. The locations of these samples are presented on Figure 1-3, and the analytical results from this sampling round are included in the discussion above. None of the samples collected in March 2012 exceeded MCP or TSCA standards for PCBs in soil.

New Street D

A total of 10 soil samples were collected and analyzed for PCBs from the New Street D portion of the Property. Of the 10 samples analyzed, 9 samples had detections above the laboratory's reporting limit. Of the nine samples with detections of above the laboratory's reporting limit, six of the soil samples exceed both the MCP Method 1 S-3/GW-2 and S-3/GW-3 Cleanup Standard of 3 mg/kg and the USEPA's TSCA Cleanup Criteria for HOAs of 10 mg/kg. The six soil samples which exceed both cleanup criteria ranged in concentration from 13 mg/kg to 185 mg/kg with the maximum concentration being detected in sample TP-303 S-1 (0-2'). Note that although this sample was shallow at the time of collection, the soil in question was subsequently covered with approximately 12 feet of clean imported fill as part of construction activities. Sample locations for Parcel 8 are shown on Figure 1-3 and sample results are presented in Table 2-1.

PCBs identified within the New Street D portion of the property have limited mobility and the primary routes of exposure to humans would be through direct contact, incidental ingestion and inhalation of dust. Given the paved surface road, the depth from finished grade of the elevated PCB concentrations (a minimum of 10 feet below the new roadway, and the highest PCB concentration will be approximately 14 feet below the new roadway), and that the utilities are to be located above the PCB impacted fill material, the exposure pathway to the PCBs is mitigated. Therefore, in accordance with 40 CFR 761.61(c), a risk-based approach was proposed to address the release of PCBs within the New Street D portion of the Property. On December 7, 2010, the U.S. EPA issued a letter to the City of Lowell entitled "PCB Risk-Based Disposal Approval under 40 CFR 761.61 (c)". The letter included approval conditions that the City of Lowell must comply with. MAI completed the work and recorded a Deed Restriction for New Road D. A PCB Final Completion Report was submitted to the USEPA by MAI on April 26, 2011.

2.2 Parcel 9 PCB Delineation

Nine soil samples were collected from various locations across Parcel 9 between 2006 and 2009. Three of the nine samples, MW-2L/ECS-6, TP-21 S1, and TP-22 S1, exceeded the MCP Method 1 S-3/GW-2 and S-3/GW-3 Cleanup Standard of 3 mg/kg. Sample TP-22 S1, which was collected over an 8-foot interval, exceeds the USEPA's TSCA Cleanup Criteria for HOAs of 10 mg/kg with a concentration of 13.1 mg/kg.

As of October 2009, this part of the Property had achieved MCP closure with a Class B2 partial RAO as discussed in Section 1.1.

In the fall of 2010, Watermark delineated the impacts of PCBs to the soil in the vicinity of previously advanced test-pits, TP-21, TP-22, and TP-23, in preparation for upcoming remediation efforts (Figure 2-2). The fall 2010 investigation included samples on a 10-foot grid, collected over no more than a 2-foot vertical interval, and were

analyzed for PCBs via soxhlet extraction. The methodology used during this sampling effort is discussed in Section 2.2.1, and the analytical results from this sampling round are discussed in Section 2.3.

In March 2012, in order to address concerns raised by the USEPA, additional soil samples were collected from Parcel 9. The methodology used during this sampling effort is discussed in Section 2.2.2, and the analytical results from this sampling round are discussed in Section 2.3.

2.2.1 Fall 2010 Sampling

The soil sampling was conducted in two mobilizations, with the second mobilization focusing on further delineating the elevated levels of PCBs detected in the first round of sampling. The following sections describe Watermark's fall 2010 sampling effort.

2.2.1.1 Soil Sampling Procedures

GeoSearch, Inc. of Fitchburg, Massachusetts, was the drilling contractor used to perform the field investigation. Soil samples were collected on a 10-foot grid in accordance with TSCA regulations 40.761 Subpart O using a hollow stem auger drill rig via a split-spoon sampler. Note that since the Site is undergoing construction activities, approximately 10 feet of clean soil had been added to the study area, as part of the construction of New Street D, since the initial soil borings and test pits investigations took place. Therefore, in accordance with the SS-QAPP, borings were advanced with an auger and without collecting split-spoon samples through the recently placed fill at the Site until the depth which represented the ground surface during the initial Site Investigations was reached. Continuous soil sampling was conducted from this target depth, which represented the previous ground surface, to ten feet below the target depth, in a series of 2-foot split-spoon samples. Soil samples were characterized in the field by a Watermark scientist. In addition, soil samples were screened for signs of contamination in the field using visual, photoionization detector (PID) jar headspace, and olfactory indicators. Field observations were documented in the field boring log forms which were previously submitted to the City as part of the Data Summary Report, Parcels 8 and 9 Site Assessment Activities, dated January 2011. Cuttings from the drilling process and equipment decontamination water were drummed and stored on-site for later disposal. Disposal documents are presented in Appendix B. The bottom ten feet of each boring was backfilled using grout, while the upper part of the boring (which represented the recently placed fill material) was backfilled with recently placed fill material.

Soil samples were collected from each of the split-spoons and submitted to a laboratory for analyses of PCBs. The first round of soil samples, from boring SB-101 through SB-109, were submitted for PCB analyses and were extracted via Method 3546, microwave extraction. Once the PCB results were received, these samples were resubmitted for extraction and reanalysis via PCB 3540C, soxhlet extraction method.

Once data from the first round was reviewed, five additional borings were advanced to further delineate PCB concentrations detected in borings from the first round. The second round took place on October 14, 2010. GeoSearch advanced the five borings, SB-201 through SB-205, as shown on Figure 2-2. The advancement of the borings, characterization of the soil, collection of soil samples, backfilling of the borings, and handling of the investigation derived waste, were conducted in the same manner as they were during the first round. Samples from the second round of sampling, borings SB-201 through SB-205, were analyzed via the PCB Soxhlet Extraction Method. Samples from borings SB-202 and SB-205 were placed on-hold at the laboratory to await the results from SB-203 and SB-204 to see if further delineation was necessary. On November 5, 2010 three additional samples, SB-202 (12-14'), SB-202 (16-18'), and SB-205 (12-14'), were analyzed for PCBs via 8082 and extraction method PCB 3540C, the soxhlet extraction method, to further aid in the delineation of PCBs at the Site.

During both rounds, field sampling equipment (stainless steel split-spoons, spoons, and bowls) was decontaminated in between the collection of each sample to avoid cross contamination from one depth interval to the next. Decontamination was performed by washing the equipment with a solution of Alconox and water, and then rinsing the equipment with clean water. Four rinsate samples were collected during the first mobilization in accordance with the SS-QAPP Addendum by running laboratory grade distilled water over a decontaminated stainless steel spoon and bowl, then collecting the water in sample containers. These samples

were analyzed for the presence of PCBs. Results for the four rinsate samples were all non-detect above the laboratory reporting limit.

Throughout the field investigation, a total of four duplicate samples were collected and analyzed in accordance with the SS-QAPP. Three of the duplicate samples were soil samples associated with the first round of sampling, and the fourth duplicate sample was a soil sample associated with the second sampling round. Results are discussed in Section 2.3.

2.2.1.2 Field Observations

Based on field observations, soil was characterized as urban fill material and consisted primarily of fine sand with lesser amounts of fines, medium to coarse sand, and gravel. The fill material also included varying amounts of brick, concrete, wood, mortar, plastic, glass, felt, slag, coal, and ash. These observations are consistent with previous observations in this area.

Odors were observed at nine boring locations: SB-103, SB-105, SB-106, SB-107, SB-109, SB-201, and SB-205. Black staining was observed at eight boring locations: SB-103, SB-104, SB-107, SB-109, SB-201, and SB-205. These observations are consistent with previous observations in this area. There is no correlation between elevated concentrations of PCBs in soil and the observation of staining or odor.

PID jar headspace readings ranged from background to 1,243 parts per million Volume (ppmV), which was detected at boring SB-103 at a depth of 14-16 feet below grade [elevation 76.85 to 74.85 feet NGVD 1992]. High headspace readings are consistent with previous observations in this area.

2.2.2 March 2012 Sampling

In March 2012, in order to address concerns raised by USEPA in their September 28, 2011 letter, Watermark conducted another round of PCB soil sampling at the Property.

2.2.2.1 Soil Sampling Procedures

TDS, Inc. of Sterling, Massachusetts, was the drilling contractor used to perform the field investigation. Soil samples were collected from nine additional boring locations at the Property using a hollow stem auger drill rig via a split-spoon sampler. Prior to drilling, each of the boring locations was surveyed, and the current elevations compared to the elevations prior to redevelopment efforts. In areas where clean, imported fill had been added for construction purposes the imported fill was augered through to reach the original surface grade prior to collecting soil samples. Continuous soil sampling was conducted the depth which represented the previous ground surface, to ten feet below the target depth, in a series of 2-foot split-spoon samples. Soil samples were characterized in the field by a Watermark scientist. In addition, soil samples were screened for signs of contamination in the field using visual, PID jar headspace, and olfactory indicators. Cuttings from the drilling process were used to backfill the boring from which they were generated.

Decontamination procedures were performed, and quality assurance samples were collected in accordance with the 2012 SS-QAPP Addendum, and as described in Section 2.2.1.1.

Soil samples were collected from each of the split-spoons and submitted to a laboratory. The samples from the uppermost and lower most intervals, providing there was enough sample recovery, were analyzed for PCBs via PCB 3540C, soxhlet extraction method. The remaining soil samples were held by the laboratory for possible analysis following the results of the samples which were analyzed.

Results of this sampling effort are discussed in Section 2.3.

2.2.2.2 Field Observations

Based on field observations, soil was characterized as urban fill material and consisted primarily of fine sand with lesser amounts of fines, medium to coarse sand, and gravel. The fill material also included varying amounts of brick, concrete, wood, mortar, clinkers, slag, coal, and ash. These observations are consistent with previous observations in this area.

No odors or staining were observed in any of the borings advanced as part of the March 2012 sampling effort. The maximum PID jar headspace reading was 0.7 ppmV, which was only slightly above background concentrations in the area which ranged from non-detect to 0.2 ppmV.

2.3 Analytical Results (Fall 2010 and March 2012)

Soil samples were analyzed for PCBs as stated in Section 2.0. Soil analytical results for Parcel 9 are presented in Table 2-2, and the Data Analytical Packages are included in Appendix C. Data in Table 2-1 are compared to the TSCA cleanup standard for PCBs in soil with a cap in a High Occupancy Area (HOA). The TSCA cleanup standard was selected as a possible appropriate TSCA cleanup standard for the Site.

Of the 79 analytical soil samples collected for PCB analysis at Parcel 9, seven samples exceeded the TSCA cleanup standard of 10 mg/kg. The seven samples which exceeded TSCA cleanup standards are all located within the bounds of the Site, and were delineated as part of the Fall 2010 sampling effort. Sampling results for PCBs in soil samples collected outside of the Site, but within Parcel 9 between 2006 and 2012 are all below both MCP and TSCA standards.

As discussed above, extensive sampling has been performed within the bounds of the Site such that the soil impacts have been well characterized vertically (at 2-foot intervals) and horizontally (at 10-foot intervals). The analytical results are presented graphically on Figure 2-1, displaying the analytical results by the elevation of the soil.

The only PCB aroclor detected was aroclor PCB 1254. Samples exceeding the TSCA cleanup standard ranged from 17 to 2,200 mg/kg, with the highest detection in SB-108 at a depth of 16 to 17.3 feet below ground surface. Two of the soil samples, SB-108 (14-16) and SB-108 (16-17.3), exceeded 50 mg/kg at concentrations of 640 mg/kg and 2,200 mg/kg respectively. Soils which exceed 50 mg/kg of PCBs are regulated under the US EPA's TSCA program. Both of these soil samples were noted as having a large quantity of wood in the sample interval; however, no oil or petroleum impacts were noted. The concentrations of PCBs in soil are not consistent with the Class B2 partial-RAO for RTN 3-26095, which includes Parcels 8 and 9.

2.4 Summary of Groundwater Sampling Results

Groundwater at the Property has been sampled periodically for PCBs since 2006. Table 2-3 presents a summary of the sampling results for PCBs at the Property. PCBs have never been detected above the laboratory's minimum reporting level, and therefore PCBs in groundwater are not viewed as an issue at the Property. The average depth to groundwater across the Property is 9 feet to over 20 feet below ground surface (Figure 3-1). Groundwater at the Property generally flows to the north towards the Lower Pawtucket Canal (Figure 3-2).

2.5 Summary of Required PCB-Impacted Soil Remediation

Parcels 6, 7, 8, and the majority of Parcel 9 (excluding the Site) do not require remediation under the USEPA's TSCA Program as concentrations of PCBs in soil were below the TSCA cleanup standard and an adequate amount of soil sampling has been performed. Although some individual samples from Parcels 6, 7, 8, and the majority of Parcel 9 (excluding the Site) exceeded the Method 1 S-3/GW-2 and S-3/GW-3 Soil Cleanup Standards, the parcel-wide Exposure Point Concentration (EPC) is below the Soil Cleanup Standard and no Hot Spots were detected, remediation of PCBs in soil is not necessary at Parcels 6, 7, 8, and the majority of Parcel 9 (excluding the Site) per the MCP; furthermore, each discrete result is below the USEPA's TSCA Cleanup Criteria for HOAs.

The New Street D Parcel had detections above the USEPA's TSCA Cleanup Criteria for HOAs of 10 mg/kg. To address these elevated concentrations of PCBs in soil, MAI submitted a Risk Based Approval to the USEPA on June 12, 2010. The Risk Based Approval stated that the detected PCBs in the New Road D are a minimum of 10 feet below the new roadway, and the highest PCB concentration are approximately 14 feet below the new roadway (approximate elevation 98 feet NGVD 1998). Utilities within the roadway are located above the PCB-impacted soil. A deed restriction has been recorded limiting access to this soil. On December 7, 2010, the U.S. EPA issued a letter to the City of Lowell entitled "PCB Risk-Based Disposal Approval under 40 CFR 761.61 (c)". The letter included approval conditions that the City of Lowell must comply with.

PCBs identified below New Street D have limited mobility and the primary routes of exposure to humans would be through direct contact, incidental ingestion and inhalation of dust. Given the paved surface road, the depth from finished grade of the elevated PCB concentrations and that the utilities are to be located above the PCB impacted fill material, the exposure pathway to the PCBs has been eliminated. Therefore, in accordance with 40 CFR 761.61 (c), and the USEPA approval letter dated December 7, 2010, the PCB release located under the road has been properly remediated. On April 26, 2011, MAI submitted a PCB Remediation Final Completion Report to the USEPA, documenting the Site's closure using Risked Based Approval and compliance with the conditions set forth in the USEPA's approval letter such as capping of the soil with both soil and asphalt.

As all other areas of PCB impacted soil have been properly addressed and no longer pose a risk, only the Site, located in a portion of Parcel 9, currently requires remediation of PCB-impacted soil under TSCA and the MCP. By addressing concerns raised by the USEPA after submitting the Original Plan and modifying the proposed remediation plan, Watermark and the City are submitting this Revised Plan with the intent of receiving an approval letter to proceed with the planned remediation.

3.0 SITE REMEDIAL IMPLEMENTATION PLAN

The following sections outline the remediation effort which will take place to address the PCB-impacted soil at the Site, located in a portion of Parcel 9.

3.1 Cleanup Goals

Due to the concentrations of PCBs in the soil and the requirements of the MCP and TSCA, soil at the Site needs to be addressed in order to protect public health and welfare, specifically for any possible future residents at the Site. Remediation goals for soil at the Site are to:

- Achieve the TSCA clean-up level of no soil on the Site with a concentration of PCBs above 10 mg/kg⁽⁴⁾ (Maximum concentration in soil <10mg/kg);
- Meet the MCP Method 1 Soil Cleanup Standards for S-3/GW-2 and S-3/GW-3 with an EPC average for PCBs in soil of less than 3 mg/kg;
- Achieve a condition of No Significant Risk (NSR) for PCBs in soil with respect to the MCP and be in compliance with TSCA cleanup requirements; and
- Prepare the Site, from an environmental standpoint, to support redevelopment.

3.2 Remedial Implementation Plan

The following sections outline the remediation effort which will be used at the Site to address PCBs in Soil. The remediation effort will be conducted in accordance with this Revised Plan, and a post-RAO RAM Plan, which will be submitted to the MassDEP prior to work commencing at the Site.

3.2.1 Overview

Soil samples with PCB concentrations greater than 10 mg/kg were collected from SB-105, SB-108, SB-203, and SB-204 (Figure 2-2). The area of elevated PCB concentrations is bordered by samples with concentrations of PCBs less than 9 mg/kg as follows: to the west by borings SB-202, to the north by SB-103, SB-104, SB-102 and TP-23, and to the east by SB-106, and SB-205. Investigation efforts did not extend to the south because the soil to the south has already been addressed by MAI with EPA consent under a Risk Based Approval.

The targeted soil samples with elevated PCB concentrations elevated were collected between elevations 74.18 and 80.85 feet NGVD 1992. Soil above and below the targeted elevations have concentrations of PCBs less than 9 mg/kg. As a conservative measure, the proposed remediation effort will include excavation of soil between elevation 73.0 to 82.0 feet NGVD 1992 at the above mentioned sample locations (Figure 2-1). Note that the impacted soil is located approximately 10 to 16 feet below the current ground surface. Figure 3-1 presents a cross-section through the Site showing the relative depths of the impacted material and the initial ground surface prior to redevelopment activities. The impacted soil will then be loaded onto trucks and transported to a permitted off-site disposal facility.

The City will bid out and secure a separate contractor to excavate, manage, dispose of excavated soils off-site, and to backfill the excavation. Watermark will assist the City in preparing the bid specification package; including, compiling geotechnical data and performance specifications for the sheet piling, designating soil stockpiling procedures, designating the required erosion control measures, and designing the post-excavation sampling plan. The Final Bid Package will include the following elements:

⁽⁴⁾ The clean-up level of 10 mg/kg for PCBs applicable in this case as the material is being addressed as part of a self-implementing cleanup of soil in a future High Occupancy Area which will be located under a cap in the future. The Property is being designated as a High Occupancy Area based on its future use as a residence, and the cap being placed on the PCB impacted area will consist of no less than 10 inches (25 cm) of compacted soil with concentrations of <1 mg/kg of PCBs which meets the requirements of a cap set forth in CFR 761.61(a)(7), 761.75(b), and 264.310 (a). Note that a soil cap, if installed, will need to be no less than 36 inches in thickness to comply with MCP requirements. A deed restriction will also be recorded to prevent access to the PCB-impacted soil.

- Design package including:
 - General detail, cross-section, and note drawings; and
 - Geotechnical testing results and evaluation.
- Bid specifications in Construction Specification Institute (CSI) format including:
 - Summary of work;
 - Submittal procedures;
 - Health and safety;
 - Decontamination;
 - Temporary facilities and controls;
 - Earthwork (which includes the excavation of PCB-impacted soil);
 - Excavation and fill;
 - Metal sheet piling; and
 - Transportation and disposal.

Based on the depth to water at the Site, as previously measured in groundwater monitoring wells and observed in soil borings, dewatering activities are not expected to be needed to complete the excavation (Figure 3-1).

Once remediation activities are complete, Watermark will perform a risk characterization and record a deed restriction as discussed in Section 3.2.10.

3.2.2 Site Preparation

In accordance with Massachusetts regulations, the area of excavation will be marked out and DigSafe notified a minimum of three business days prior to excavation activities commencing. Additionally, all required local permits will be obtained by the selected excavation contractor.

The Excavation Area is shown on Figure 2-2. The southern boundary of the Excavation Area is defined by the parcel boundary between Parcel 9 and New Street D, as PCB impacts to New Street D have already been addressed, as discussed in Section 2.1. Samples collected from borings, SB-102, SB-103, SB-104, SB-106, SB-202, SB-205, and TP-23 will serve as the lateral extents and post-excavation sidewall samples in the westerly, northerly, and easterly directions.

Site security will also be established prior to excavation to ensure that the general public cannot access the Site throughout the remediation effort. Part of the site security will be established by the perimeter fence located around the Site as required by the Site's AUL. The hot-zone will be delineated using high visibility construction fencing and/or barricades to deter authorized on-site personnel from unintentionally entering the hot zone. All personnel will enter and exit the hot zone through a clearly delineated Contaminant Reduction Zone where decontamination procedures will occur to mitigate the chance of tracking PCB-impacted soil or other items into the Support Zone.

Due to the steep grades and excavation depths at the Property, geotechnical information associated with the construction of New Road D will be used to help assist with the design of sheet piling necessary to access the impacted soils at the Property. The sheet piling will be installed along the southern parcel boundary as shown on Figure 2-2. Excavation supports are required by OSHA regulation based on the anticipated depth of the excavation. Additionally, based on the depth, the excavation supports must be designed by a Professional Engineer. These excavation supports will also serve to limit the disturbance of the new road, protect both the new road and the utilities, and protect on-site workers working in the vicinity of the excavation. Once the excavation has been properly backfilled and compacted, the sheet piling will be removed.

The location of the excavation area will be surveyed prior to excavation by a Massachusetts Licensed Professional Land Surveyor. The surveyor will also establish initial elevations of the ground surface prior to excavation. Throughout the excavation activities, elevations will be established and monitored by the excavation contractor.

3.2.3 Soil Excavation

The impacted soil will be excavated using standard excavation equipment. Watermark will be on-site providing oversight throughout the remediation activities to ensure adherence to this plan and the bid specifications. Excavation will occur only within the sheet-piling area and will be conducted in such a manner as to prevent the spilling of impacted soils onto the unimpacted ground surface. Soil within the sheet piling will be excavated in one-foot lifts to an elevation of 73 feet NGVD 1992, before backfilling. Prior to loading the soil onto trucks, the soil will be segregated and characterized as further explained in Section 3.2.6. All of the soil excavated between 82 feet and 73 feet NGVD will be assumed to be impacted by PCBs and handled, stockpiled, and disposed of as such. The excavated soil will be subsequently loaded onto trucks and transported to a permitted off-site disposal facility. Soil excavated from above elevation 82 feet NGVD 1992 will be stockpiled for reuse at the Site. The excavation, transportation and disposal will be conducted under the guidance of a Licensed Site Professional (LSP) to ensure that remediation activities are conducted in accordance with the MCP, and a RAM Plan. The excavation area will then be backfilled to existing grade using the non-impacted soil which was excavated and stockpiled from above elevation 82 feet NGVD 1992 as well as clean geotechnically suitable, imported backfill material to make up the difference.

Groundwater in this area of the Property is at elevation 71.0 NGVD 1992; therefore, dewatering will likely not be needed during the excavation. Excavation of six cells of soil (each 10-feet by 10-feet by 2-feet) will generate an estimated 44 cubic yards (or 66 tons) of soil (in-place) for off-site disposition. Since additional soil will need to be removed and disposed of in order to remove the targeted soil in each of the six cells, the proposed amount of soil to be disposed of is estimated to be up to approximately 315 cubic yards (or 472.5 tons).

3.2.4 Environmental Monitoring

Environmental monitoring will occur regularly throughout the excavation activities. Discrete air monitoring stations will be designated around the Site, and will be visited on a regular basis to screen ambient air. Ambient air will be screened for VOCs using a PID and dust using a personal DataRAM monitor. Additionally, the breathing zone of the on-site workers will also be monitored for dust and VOCs throughout the excavation activities in accordance with a site specific health and safety plan.

Dust action levels for the Site for PM₁₀ particulates (e.g. particles whose aerodynamic diameter is less than 10 micrometers) have been set at 0.012 milligrams per cubic meter sustained for 30 minutes at the fence line. This level was calculated using the maximum concentration of PCBs in soil at the Site, 2,200 mg/kg. The conservative calculations used to determine exposure concentrations for carcinogenic and non-carcinogenic effects to respirable dust assuming the dust is 100% PCBs are included in Appendix E. The action level for VOCs in air is 5 ppmV sustained for 5 minutes based on OSHA's short-term exposure limit of 5 ppm for vinyl chloride. Although vinyl chloride is not a contaminant of concern at the Site, chlorinated VOCs have been detected in groundwater at the Property, so the most conservative action level was adopted.

If VOC levels in the breathing zone or at one of the air monitoring stations exceed the established action levels, then work will stop until proper steps [either allowing the air to clear or donning additional Personal Protective Equipment (PPE)] will be taken to protect on-site workers. If dust or VOC levels exceed the established action levels, then dust suppression measures will be implemented to reduce fugitive dust or VOCs to within acceptable levels. Dust and VOC suppression methods may include, but are not limited to; dampening the soil with water, applying foam, covering stockpiled materials (portions of the stockpile may be uncovered if the pile is still actively being used), reducing the speed of work to reduce the amount of dust or VOCs released, or, if necessary, ceasing work until wind levels reduce to a speed which will no longer cause the release of fugitive dust or VOCs from the Site.

3.2.5 Post-Excavation Confirmatory Soil Sampling

All excavation activities will be based on elevation as determined by the pre-characterization samples. After the excavation(s) have reached their projected limits, Watermark will collect post-excavation confirmatory soil samples from the bottom of the excavation on a five-foot grid pattern in accordance with 40 CFR 761.283(b)(2) to confirm that the excavation has met its objective. Grab samples will be collected from discrete locations, not composited, to a depth of 3-inches below the surface (bottom) of the excavation. Post-excavation soil samples

will be analyzed for PCBs via EPA Method 8082 using extraction method 3540C, the soxhlet extraction method. Samples will be collected and analyzed in accordance with the RAM Plan which will serve as the SS-QAPP Addendum to Watermark's Generic Brownfields QAPP. In accordance with the RAM Plan, which will be submitted to the USEPA under separate cover, one duplicate sample will be collected for every 20 soil samples. Additionally, one equipment rinsate sample will be collected from a decontaminated piece of sampling equipment after every 20 soil samples.

Post-excavation confirmatory sidewall samples will not be collected as existing soil data from the following borings will serve as sidewall samples: SB-102, SB-103, SB-104, SB-106, SB-202, SB-205, and TP-23.

3.2.6 On-site Material Handling and Storage

Excavated soils will be stored on-site until they are reused during the backfilling process, or are shipped off-site for proper disposition. As stated in Section 2.2.1, PCB-impacted soils at the Site were recently covered with approximately 10 feet of clean fill material. Soil which is excavated from this clean fill layer above elevation 82 feet NGVD 1992, will be stored on-site in a stockpile deemed the Recently Placed Fill Stockpile. In order to assure that PCB-impacted soil is not accidentally placed in the Recently Placed Fill Stockpile, a target depth for the point in which soils should be excavated as if impacted by PCBs has been conservatively set at 82 feet NGVD 1992, one or more feet above the PCB-impacted soil. Once the target elevation of 82 feet NGVD 1992 has been reached, all excavated materials will be placed in a second, completely separate, stockpile deemed the PCB-Impacted Soil Stockpile. The PCB-Impacted Soil Stockpile will be characterized for disposal purposes as described in the following section. All soil within the PCB-Impacted Soil Stockpile will be disposed of as soil with greater than 50 ppm PCB, based on the pre-characterization of the soil.

All stockpiled materials at the Site will be stored on 6-mil polyethylene (poly) sheeting with berms around the edges of each individual stockpile to prevent possible run-off from impacting downstream receptors. When soil is not actively being added to or removed from a stockpile, the stockpile will remain covered with the cover secured. Stockpiles will be staged on the northern edge of the Site in the Stockpile Area as identified on Figure 1-3. As a secondary control measure, hay bales or other filtering material (filter fabric) will be placed between the Stockpile Area and the Lower Pawtucket Canal to prevent any possible runoff from entering the canal.

3.2.7 Waste Characterization Sampling

After excavation and staging, soil in the PCB-Impacted Soil Stockpile will be collected and analyzed at an off-site laboratory for waste characterization parameters likely including the following: TCLP RCRA 8 metals via EPA Method 1311 and EPA Method 6000/7000 series, total RCRA 8 metals via EPA Method 6000/7000 series, VOCs via EPA Method 8260, SVOCs via EPA Method 8270, PCBs via EPA Method 8082 (extraction by method 3540C), Pesticides via EPA Method 8081, Herbicides via EPA Method 8151, Ignitibility via EPA Method 1010, Flammability via EPA Method 1010, Corrosivity via EPA Method 9045, and pH via EPA Method 9045.

3.2.8 On-Site Reuse of Materials

Soils excavated from above elevation 82 feet NGVD 1992 will be used as the initial layer of backfill in the excavation. After this soil is compacted, it will be covered with clean, geotechnically suitable, imported, and verified clean backfill material, or other fill material which has been tested and found to be suitable for reuse.

3.2.9 Off-Site Transportation and Disposal of Soil

After the PCB-impacted soil has been properly waste characterized and accepted for disposal by the receiving facility, it will be loaded onto trucks and transported for off-site disposition (by others under a separate contract with the City) at a TSCA-approved landfill. Watermark will coordinate with the City's contractor to ensure the proper paperwork is completed and submitted to the USEPA and the MassDEP following delivery to the receiving facility.

3.2.10 Post Remediation Activities

Once all excavation activities are complete, Watermark will perform a risk assessment for the Site based on post-excavation conditions, and a deed restriction will be recorded for the Site at the Middlesex County Registry

of Deeds. The deed restriction will state that the Site is being closed with an Interim Cap as it is a low occupancy area⁵. The deed restriction will also state that prior to any development activities, the USEPA will be notified that the Site will be developed into a high occupancy area, and construction at the Site will meet the cap requirements under CFR 761.61 (a)(7), CFR 761.75 (b), and CFR 264.310 (a). In addition, the existing AUL, which was filed as part of the partial Class B2 RAO, will be reviewed to determine if it needs to be amended.

⁵ Although the clean-up level of 10 ppm is based on a High-Occupancy Area, and the cap will meet the cap requirements of a High-Occupancy Area, the deed restriction will state that it is an Interim Cap for a Low-Occupancy Area. By recording it as such, the USEPA will be notified and involved in the capping process during redevelopment of the Site for residential purposes (High Occupancy).

TABLES

**Table 2-1
Summary of PCBs in Soil Sample Results – Adjacent Parcels
Self-Implementing Clean Up Plan - Revision 1
239.1 Jackson Street, Lowell, Massachusetts**

PARCEL 6

Sample Name	Soil Cleanup Standards		B-125	B-125	B-130	TP-24 S1 (0-12')
	Method 1 Soil Cleanup Standards S-3/GW-2 and S-3/GW-3	TSCA Cleanup Criteria for HOA	6/8/2006	6/8/2006	9/27/2006	5/28/2009
Sampling Date			10-12'	15-20'	0-1'	0-12
Sample Depth			82.7	77.7	94.7*	93*
Top of Sample Elevation			80.7	72.7	93.7*	81*
Bottom of Sample Elevation						
Aroclor 1254	3	10	ND(1.2)	ND(1.2)	ND(0.087)	ND(0.0379)
Aroclor 1260	3	10	0.15	ND(1.2)	ND(0.087)	ND(0.0379)

PARCEL 7

Sample Name	Soil Cleanup Standards		MW-2R/ ECS-3	MW-3R/ ECS-2	MW-4R/ ECS-1	B-126	B-127	B-128	B-129	TP-11 0-6'	TP-25 S1 (0-8')	TP-26 S1 (0-7')
	Method 1 Soil Cleanup Standards S-3/GW-2 and S-3/GW-3	TSCA Cleanup Criteria for HOA	4/11/2006	4/11/2006	4/11/2006	6/13/2006	6/13/2006	6/13/2006	6/13/2006	3/13/2008	5/28/2009	5/28/2009
Sampling Date			0-2'	0-2'	0-2'	1-3'	1-3'	1-3'	1-3'	0-6	0-8	0-7
Sample Depth			89.9	88.5	88.3	88.8	87.1	86.9	87.3	88.4*	88.2*	78.8*
Top of Sample Elevation			87.9	86.5	86.3	86.8	85.1	84.9	85.3	82.4*	80.2*	71.8*
Bottom of Sample Elevation												
Aroclor 1254	3	10	ND(0.032)	ND(0.0296)	ND(0.0296)	ND(0.1)	ND(0.1)	ND(0.085)	ND(0.086)	ND(0.0417)	ND(0.0388)	2.97
Aroclor 1260	3	10	ND(0.032)	ND(0.0296)	ND(0.0296)	0.12	ND(0.1)	ND(0.085)	ND(0.086)	ND(0.0417)	ND(0.0388)	ND(0.379)

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Sample Name	Soil Cleanup Standards		MW-1R/ ECS-8	MW-1R/ ECS-8	TP-20 S1 (0-11')	TP-201 (2'-4') + (4'-6') COMP	TP-202 (0'-2') + (2'-4') COMP	TP-202 (6'-8')	TP-203 (0'-2') + (2'-4') COMP	TP-301 S-1+S-2 (4'-8')	TP-303 S-1 (0-2')	TP-303 S-3 (4'-6')
	Method 1 Soil Cleanup Standards S-3/GW-2 and S-3/GW-3	TSCA Cleanup Criteria for HOA	4/13/2006	4/13/2006	5/28/2009	5/25/2010	5/25/2010	5/25/2010	5/25/2010	6/11/2010	6/11/2010	6/11/2010
Sampling Date			0-4'	13'-17'	0-11'	2'-6'	0-4'	6'-8'	0-4'	4'-8'	0-2'	4'-6'
Sample Depth			92.7	79.7	82*	79.8*	83.8*	77.8*	82.4*	82*	86*	82*
Top of Sample Elevation			88.7	77.7	71*	75.8*	79.8*	75.8*	78.4*	78*	84*	80*
Bottom of Sample Elevation												
Aroclor 1254	3	10	ND(0.0131)	ND(0.045)	14.6	1.9	27.3	0.578	3.51	13	185	24.2
Aroclor 1260	3	10	0.177	ND(0.045)	ND(1.19)	ND	ND	ND	ND	ND (2.37)	ND (25.3)	ND (5.01)

Only aroclors detected are presented

ND = Not detected above the lab reporting limits shown in parenthesis.

TSCA = Toxic Substance Control Act of the United State Environmental Protection Agency

HOA = High Occupancy Area as defined by the HTRW Center of Expertise Environmental Regulatory Fact Sheet 99-06

Bolded values exceed the TSCA Cleanup Criteria for HOA

Samples from Borings SB-110 through SB-114 were analyzed via the PCB Extraction Method 3546

Elevation in feet NGVD 1992 as surveyed by Dana Perkins, Inc. on June 30, 2006 and October 13, 2010.

*Elevations estimated, inferred from "Subsurface Excavation Plan" by McPhail Associates, dated July 2010

1 - Sample TP-304 S-2 (2-4) was replaced by sample SB-112 (8-9) which was sampled in the same location

Prepared by: JPR

Checked by: ELM

**Table 2-1
Summary of PCBs in Soil Sample Results – Adjacent Parcels
Self-Implementing Clean Up Plan - Revision 1
239.1 Jackson Street, Lowell, Massachusetts**

PARCEL 8

Sample Location	Soil Cleanup Standards		MW-3L	MW-4L			SB-110					SB-111				
			MW-3L/ ECS-5	MW-4L/ ECS-4	MW-4L/ ECS-4	SB-110 (6-8)	SB-110 (8-10)	SB-110 (10-12)	SB-110 (12-14)	SB-110 (14-16)	SB-111 (6-8)	SB-111 (8-10)	SB-111 (10-12)	SB-111 (12-14)	SB-111 (14-16)	
Sample Name	Method 1 Soil Cleanup Standards S-3/GW-2 and S-3/GW-3	TSCA Cleanup Criteria for HOA	4/12/2006	4/11/2006	4/11/2006	9/9/2010	9/9/2010	9/9/2010	9/9/2010	9/9/2010	9/8/2010	9/8/2010	9/8/2010	9/8/2010	9/8/2010	
Sampling Date			1-3'	1-3'	5-7'	6-8 Feet	8-10 Feet	10-12 Feet	12-14 Feet	14-16 Feet	6-8 Feet	8-10 Feet	10-12 Feet	12-14 Feet	14-16 Feet	
Sample Depth			77.2	76.9	72.9	84	82	80	78	76	84.5	82.5	80.5	78.5	76.5	
Top of Sample El			75.2	74.9	70.9	82	80	78	76	74	82.5	80.5	78.5	76.5	74.5	
Bottom of Sample			ND(0.0326)	ND(0.0328)	ND(0.0352)	0.14	0.71	1	0.51	0.29	0.21	1.1	1.9	2.1	1.2	
Aroclor 1254	3	10	ND(0.0326)	ND(0.0328)	ND(0.0352)	0.14	0.71	1	0.51	0.29	0.21	1.1	1.9	2.1	1.2	
Aroclor 1260	3	10	ND(0.0326)	ND(0.0328)	ND(0.0352)	ND (0.11)	ND (0.10)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.22)	ND (0.22)	ND (0.10)		

PARCEL 8 (Continued)

Sample Location	Soil Cleanup Standards		SB-112				SB-113				SB-114				TP-304	INJ-104		MW-203		MW-204			
			SB-112 (6-8)	SB-112 (8-9) ¹	SB-112 (10-12)	SB-112 (12-13.25)	SB-113 (6-8)	Dup-4	SB-113 (8-10)	SB-113 (10-12)	SB-113 (12-14)	SB-114 (5-7)	SB-114 (7-9)	SB-114 (9-11)	SB-114 (11-12)	TP-304 S-2 (2-4) ¹	INJ-104 (2-4ft)	INJ-104 (10-12ft)	MW-203 (2-4ft)	MW-203 (8-10ft)	MW-204 (2-4ft)	Dup-2	MW-204 (8-10ft)
Sample Name	Method 1 Soil Cleanup Standards S-3/GW-2 and S-3/GW-3	TSCA Cleanup Criteria for HOA	9/9/2010	9/9/2010	9/9/2010	9/9/2010	9/9/2010	9/8/2010	9/9/2010	9/9/2010	9/9/2010	9/9/2010	9/9/2010	9/9/2010	6/11/2010	2/8/2012	2/8/2012	2/9/2012	2/9/2012	2/9/2012	2/9/2012	2/9/2012	2/9/2012
Sampling Date			6-8 Feet	8-9 Feet	10-12 Feet	12-13.25 Feet	6-8 Feet	6-8 Feet	8-10 Feet	10-12 Feet	12-14 Feet	5-7 Feet	7-9 Feet	9-11 Feet	11-12 Feet	2-4 Feet	2-4 Feet	10-12 Feet	2-4 Feet	8-10 Feet	2-4 Feet	2-4 Feet	8-10 Feet
Sample Depth			84	82	80	78	83	83	81	79	77	85	83	81	79	82*	76	68	76	70	76	76	70
Top of Sample El			82	80	78	76.75	81	81	79	77	75	83	81	79	77	80*	74	66	74	68	74	74	70
Bottom of Sample			0.71	0.29	ND (0.56)	0.83	0.97	1	1.2	0.86	0.33	1	1.3	7.4	0.89	8.47	0.17	ND (0.11)	ND (0.12)	ND (0.11)	ND (0.13)	ND (0.12)	ND (0.12)
Aroclor 1254	3	10	0.71	0.29	ND (0.56)	0.83	0.97	1	1.2	0.86	0.33	1	1.3	7.4	0.89	8.47	0.17	ND (0.11)	ND (0.12)	ND (0.11)	ND (0.13)	ND (0.12)	
Aroclor 1260	3	10	ND (0.10)	ND (0.11)	6	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.68)	ND (0.11)	ND (1.68)	ND (0.12)	ND (0.11)	ND (0.12)	ND (0.11)	ND (0.13)	ND (0.12)	ND (0.12)	

PARCEL 8 (Continued)

Sample Location	Soil Cleanup Standards		SB-301		SB-302		SB-303		SB-304		SB-305		SB-306		
			SB-301 (2-4ft)	SB-301 (8-10ft)	SB-302 (0-2ft)	SB-302 (8-10ft)	SB-303 (0-2ft)	SB-303 (8-10ft)	SB-304 (0-2ft)	SB-304 (8-10ft)	SB-305 (0-2ft)	SB-305 (8-10ft)	SB-306 (10-12ft)	SB-306 (18-20ft)	Dup-1
Sample Name	Method 1 Soil Cleanup Standards S-3/GW-2 and S-3/GW-3	TSCA Cleanup Criteria for HOA	3/28/2012	3/28/2012	3/28/2012	3/28/2012	3/28/2012	3/28/2012	3/28/2012	3/28/2012	3/28/2012	3/28/2012	3/29/2012	3/29/2012	
Sampling Date			2-4 Feet	8-10 Feet	0-2 Feet	8-10 Feet	10-12 Feet	18-20 Feet	18-20 Feet						
Sample Depth			76	70	78	70	78	70	79	71	83	75	75	75	
Top of Sample El			74	68	76	68	76	68	77	69	81	73	73	73	
Bottom of Sample			0.22	ND (0.13)	ND (0.11)	ND (0.12)	0.33	ND (0.12)	0.33	ND (0.12)	0.42	0.70	0.49	ND (0.12)	ND (0.12)
Aroclor 1254	3	10	0.22	ND (0.13)	ND (0.11)	ND (0.12)	0.33	ND (0.12)	0.33	ND (0.12)	0.42	0.70	0.49	ND (0.12)	ND (0.12)
Aroclor 1260	3	10	ND (0.11)	ND (0.13)	ND (0.11)	ND (0.12)	ND (0.17)	ND (0.12)	ND (0.11)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	

Only aroclors detected are presented

ND = Not detected above the lab reporting limits shown in parenthesis.

TSCA = Toxic Substance Control Act of the United State Environmental Protection Agency
HOA = High Occupancy Area as defined by the HTRW Center of Expertise Environmental Regulatory Fact Sheet 99-06

Bolded values exceed the TSCA Cleanup Criteria for HOA

Samples from Borings SB-110 through SB-114 were analyzed via the PCB Extraction Method 3546

Elevation in feet NGVD 1992 as surveyed by Dana Perkins, Inc. on June 30, 2006 and October 13, 2010.

*Elevations estimated, inferred from "Subsurface Excavation Plan" by McPhail Associates, dated July 2010

1 - Sample TP-304 S-2 (2-4) was replaced by sample SB-112 (8-9) which was sampled in the same location

Prepared by: JPR

Checked by: ELM

**Table 2-2
Summary of PCBs in Soil Sample Results- Parcel 9
Self-Implementing Clean Up Plan - Revision 1
239.1 Jackson Street, Lowell, Massachusetts**

Sample Location	Method 1 Soil Cleanup Standards S-3/GW-2 and S-3/GW-3	TSCA Cleanup Criteria for HOA									
Sample Name			MW-1L/ECS-7	MW-2L/ECS-6	MAI-13 0-2'	MAI-13 6.5-8.5'	MAI-14 0-2'	MAI-14 6-8'	TP-21 S1 (0-8.5')	TP-22 S1 (0-5') ¹	TP-23 S1 (0-3')
Sampling Date			4/13/2006	4/12/2006	8/28/2009	8/28/2009	8/28/2009	8/28/2009	5/28/2009	5/28/2009	5/28/2009
Sample Depth			0-4'	0-6'	0-2	6.5-8.5	0-2	6-8	0-8.5	0-5	0-3
Top of Sample Elevation			78.8	78.4	79*	72.5*	79*	73*	81*	80*	80.4*
Bottom of Sample Elevation			74.8	72.4	77*	70.5*	77*	71*	72.5*	75*	77.4*
PCB 1254	3	10	0.45	4.88	ND(0.0388)	ND(0.0362)	0.184	ND(0.0412)	13.1	5.47	2.47
PCB 1260	3	10	0.0957	0.686	ND(0.0388)	ND(0.0362)	ND(0.0388)	ND(0.0412)	ND(1.02)	1.99	ND(0.222)

Sample Location	Method 1 Soil Cleanup Standards S-3/GW-2 and S-3/GW-3	TSCA Cleanup Criteria for HOA	SB-101					SB-102				
Sample Name			SB-101 (7-7.75)	SB-101A (9-11)	SB-101A (11-13)	SB-101A (13-15)	SB-101A (15-17)	SB-102 (10-12)	SB-102 (12-14)	SB-102 (14-16)	SB-102 (16-18)	
Sampling Date			9/9/2010	9/9/2010	9/9/2010	9/9/2010	9/9/2010	9/8/2010	9/8/2010	9/8/2010	9/8/2010	
Sample Depth			7-7.75 Feet	9-11 Feet	11-13 Feet	13-15 Feet	15-17 Feet	10-12 Feet	12-14 Feet	14-16 Feet	16-18 Feet	
Top of Sample Elevation			76.67	74.67	72.67	70.67	68.67	77.71	75.71	73.71	71.71	
Bottom of Sample Elevation			75.92	72.67	70.67	68.67	66.67	75.71	73.71	71.71	69.71	
PCB 1254	3	10	1.8	2.5	5.4	ND (0.12)	ND (0.13)	ND (0.11)	2.1	0.49	0.21	
PCB 1260	3	10	ND (0.21)	ND (0.54)	ND (0.57)	ND (0.12)	ND (0.13)	ND (0.11)	ND (0.27)	ND (0.11)	ND (0.12)	

Sample Location	Method 1 Soil Cleanup Standards S-3/GW-2 and S-3/GW-3	TSCA Cleanup Criteria for HOA	SB-103					SB-104				
Sample Name			SB-103 (10-12)	SB-103 (12-13.3)	SB-103 (14-16)	SB-103 (16-18)	SB-103 (18-18.5)	SB-104 (10-12)	SB-104 (12-14)	Dup-1	SB-104 (14-16)	SB-104 (16-17.5)
Sampling Date			9/7/2010	9/7/2010	9/7/2010	9/7/2010	9/7/2010	9/7/2010	9/7/2010	9/7/2010	9/7/2010	9/7/2010
Sample Depth			10-12 Feet	12-13.3 Feet	14-16 Feet	16-18 Feet	18-18.5 Feet	10-12 Feet	12-14 Feet	12-14 Feet	14-16 Feet	16-17.5 Feet
Top of Sample Elevation			80.85	78.85	76.85	74.85	72.85	80.96	78.96	78.96	76.96	74.96
Bottom of Sample Elevation			78.85	77.55	74.85	72.85	70.85	78.96	76.96	76.96	74.96	70.96
PCB 1254	3	10	4.4	2.5	0.49	0.19	ND (0.12)	2.8	4.3	4.6	2.3	0.41
PCB 1260	3	10	ND (0.53)	ND (0.55)	ND (0.11)	ND (0.11)	ND (0.12)	ND (0.22)	ND (1.1)	ND (1.1)	ND (0.25)	ND (0.15)

Sample Location	Method 1 Soil Cleanup Standards S-3/GW-2 and S-3/GW-3	TSCA Cleanup Criteria for HOA	SB-105					SB-106			SB-107			
Sample Name			SB-105 (10-12)	SB-105 (12-14)	SB-105 (14-16)	SB-105 (16-18)	SB-105 (18-18.5)	SB-106 (10-12)	SB-106 (12-14)	SB-106 (18-20)	SB-107 (10-12) ¹	SB-107 (12-13) ¹	SB-107 (17-19)	SB-107 (19-21)
Sampling Date			9/7/2010	9/7/2010	9/7/2010	9/7/2010	9/7/2010	9/8/2010	9/8/2010	9/8/2010	9/8/2010	9/8/2010	9/8/2010	
Sample Depth			10-12 Feet	12-14 Feet	14-16 Feet	16-18 Feet	18-18.5 Feet	10-12 Feet	12-14 Feet	18-20 Feet	10-12 Feet	12-13 Feet	17-19 Feet	
Top of Sample Elevation			80.95	78.95	76.95	74.95	72.95	81.15	79.15	73.15	81.01	79.01	75.01	
Bottom of Sample Elevation			78.95	76.95	74.95	72.95	72.45	79.15	77.15	71.15	79.01	78.01	73.01	
PCB 1254	3	10	17	4	0.32	0.22	ND (0.15)	0.46	5.9	0.69	1.1	0.73	6.4	
PCB 1260	3	10	ND (2.2)	ND (0.56)	ND (0.11)	ND (0.11)	ND (0.15)	ND (0.11)	ND (0.54)	ND (0.13)	ND (0.10)	ND (0.11)	ND (1.0)	

NOTES:
 Only aroclors detected are presented
 ND = Not detected above the lab reporting limits shown in parenthesis.
 TSCA = Toxic Substance Control Act of the United State Environmental Protection Agency
 HOA = High Occupancy Area as defined by the HTRW Center of Expertise Environmental Regulatory Fact Sheet 99-06
 J = Estimated value
Bolded values exceed the TSCA Clean-up Criteria for HOA
 Samples from Borings SB-101 through SB-109 and SB-201 through SB-205 were extracted via the PCB Soxhlet Extraction Method 3540C; Samples from Borings SB-110 through SB-114 were analyzed via the PCB Extraction Method 3546
 Elevation in feet NGVD 1992 as surveyed by Dana Perkins, Inc. on October 13, 2010.
 *Elevations not surveyed, inferred from "Subsurface Excavation Plan" by McPhail Associates, dated July 2010
 ** Minimum laboratory reporting limit exceeds one or more of the regulatory criteria.
 1 - Sample TP-22 S1 (0-5') was replaced by samples SB-107 (10-12) and SB-107 (12-3') which were collected from the same location

Prepared by: ELM
 Checked by: LKT

**Table 2-2
Summary of PCBs in Soil Sample Results- Parcel 9
Self-Implementing Clean Up Plan - Revision 1
239.1 Jackson Street, Lowell, Massachusetts**

Sample Location	Method 1 Soil Cleanup Standards S-3/GW-2 and S-3/GW-3	TSCA Cleanup Criteria for HOA	SB-108						SB-109					
			SB-108 (10-12)	SB-108 (12-14)	Dup-2	SB-108 (14-16)	SB-108 (16-17.3)	SB-108 (19-21)	SB-109 (10-12)	Dup-3	SB-109 (12-13.5)	SB-109 (14-16)	SB-109 (16-16.3)	SB-109 (19-21)
Sample Name														
Sampling Date			9/7/2010	9/7/2010	9/7/2010	9/7/2010	9/7/2010	9/7/2010	9/8/2010	9/8/2010	9/8/2010	9/8/2010	9/8/2010	9/8/2010
Sample Depth			10-12 Feet	12-14 Feet	12-14 Feet	14-16 Feet	16-17.3 Feet	19-21 Feet	10-12 Feet	10-12 Feet	12-13.5 Feet	14-16 Feet	16-16.3 Feet	19-21 Feet
Top of Sample Elevation			81.48	79.48	79.48	77.48	75.48	73.48	81.19	81.19	79.19	77.19	75.19	73.19
Bottom of Sample Elevation			79.48	77.48	77.48	75.48	74.18	71.48	79.19	79.19	77.69	75.19	74.89	71.19
PCB 1254	3	10	8.6	4.5	2.9	640	2200	1.1	3.7 J	1.6 J	2.2	0.18	0.35	0.18
PCB 1260	3	10	ND (1.1)	ND (0.54)	ND (0.43)	ND (64) **	ND (290) **	ND (0.11)	ND (0.53)	ND (0.21)	ND (0.21)	ND (0.11)	ND (0.11)	ND (0.12)

Sample Location	Method 1 Soil Cleanup Standards S-3/GW-2 and S-3/GW-3	TSCA Cleanup Criteria for HOA	SB-201					SB-202		
			SB-201 (0-2)	SB-201 (2-4)	Dup-6	SB-201 (4-6)	SB-201 (6-8)	SB-201 (8-10)	SB-202 (12-14)	SB-202 (16-18)
Sample Name										
Sampling Date			10/14/2010	10/14/2010	10/14/2010	10/14/2010	10/14/2010	10/14/2010	10/14/2010	10/14/2010
Sample Depth			0-2 Feet	2-4 Feet	2-4 Feet	4-6 Feet	6-8 Feet	8-10 Feet	12-14 Feet	16-18 Feet
Top of Sample Elevation			80	78	78	76	74	72	79.3	75.3
Bottom of Sample Elevation			78	78	78	76	74	72	77.3	73.3
PCB 1254	3	10	0.15	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.12)	ND (0.11)	4.3	8.1
PCB 1260	3	10	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.12)	ND (0.11)	ND (0.55)	ND (0.71)

Sample Location	Method 1 Soil Cleanup Standards S-3/GW-2 and S-3/GW-3	TSCA Cleanup Criteria for HOA	SB-203					SB-204				SB-205	
			SB-203 (10-12)	SB-203 (12-14)	SB-203 (14-16)	SB-203 (16-17.25)	SB-203 (18-20)	SB-204 (10-12)	SB-204 (12-14)	SB-204 (14-16)	SB-204 (16-18)	SB-204 (18-19.75)	SB-205 (12-14)
Sample Name													
Sampling Date			10/14/2010	10/14/2010	10/14/2010	10/14/2010	10/14/2010	10/14/2010	10/14/2010	10/14/2010	10/14/2010	10/14/2010	10/14/2010
Sample Depth			10-12 Feet	12-14 Feet	14-16 Feet	16-17.25 Feet	18-20 Feet	10-12 Feet	12-14 Feet	14-16 Feet	16-18 Feet	18-19.75 Feet	12-14 feet
Top of Sample Elevation			81	79	77	75	73	81	79	77	75	73	79.1
Bottom of Sample Elevation			79	77	75	73.75	71	79	77	75	73	71	77.1
PCB 1254	3	10	5.4	26	17	0.88	ND (0.13)	6.2	19	4.3	0.98	2.4	3.5
PCB 1260	3	10	ND (0.45)	ND (2.3)	ND (1.6)	ND (0.11)	ND (0.13)	ND (0.58)	ND (2.1)	ND (0.62)	ND (0.14)	ND (0.23)	ND (0.55)

Sample Location	Method 1 Soil Cleanup Standards S-3/GW-2 and S-3/GW-3	TSCA Cleanup Criteria for HOA	SB-307		SB-308		SB-309	
			SB-307 (0-2ft)	SB-307 (8-10ft)	SB-308 (0-2ft)	SB-308 (8-10ft)	SB-309 (5-7ft)	SB-309 (17-19ft)
Sample Name								
Sampling Date			3/28/2012	3/28/2012	3/29/2012	3/28/2012	3/29/2012	3/29/2012
Sample Depth			0-2 Feet	8-10 Feet	0-2 Feet	8-10 Feet	5-7 Feet	17-19 Feet
Top of Sample Elevation			78	70	78	70	87	75
Bottom of Sample Elevation			76	68	76	68	85	73
PCB 1254	3	10	ND (0.11)	ND (0.15)	0.34	ND (0.12)	ND (0.13)	ND (0.12)
PCB 1260	3	10	ND (0.11)	ND (0.15)	ND (0.11)	ND (0.12)	ND (0.13)	ND (0.12)

NOTES:

An asterisk (*) following a detection limit indicates that the minimum laboratory reporting limit exceeds one or more of the regulatory criteria.

Only aroclors detected are presented

ND = Not detected above the lab reporting limits shown in parenthesis.

TSCA = Toxic Substance Control Act of the United State Environmental Protection Agency

HOA = High Occupancy Area as defined by the HTRW Center of Expertise Environmental Regulatory Fact Sheet 99-06

J = Estimated value

Bolded values exceed the TSCA Clean-up Criteria for HOA

Samples from Borings SB-101 through SB-109 and SB-201 through SB-205 were extracted via the PCB Soxhlet Extraction Method 3540C; Samples from Borings SB-110 through SB-114 were analyzed via the PCB Extraction Method 3546

Elevation in feet NGVD 1992 as surveyed by Dana Perkins, Inc. on October 13, 2010.

**Elevations not surveyed, inferred from "Subsurface Excavation Plan" by McPhail Associates, dated July 2010

Prepared by: ELM

Checked by: LKT

**Table 2-3
Summary of Groundwater Results
Self-Implementing Clean Up Plan - Revision 1
239.1 Jackson Street, Lowell, Massachusetts**

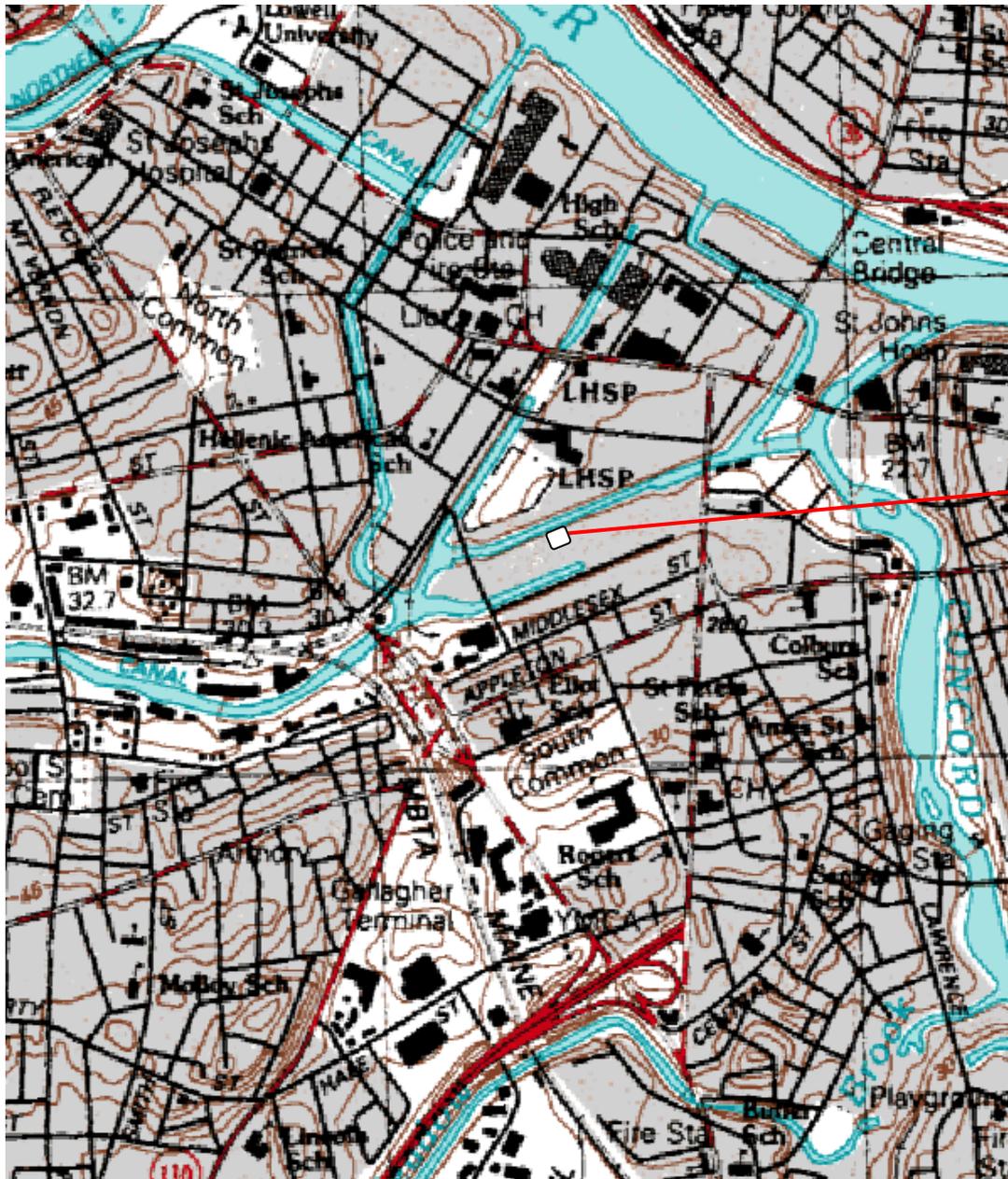
LOCATION		MAI-14	MW-1R/ ECS-8	MW-1L/ ECS-7	MW-1L/ ECS-7	MW-2L/ ECS-6	MW-2R/ ECS-3	MW-2R/ ECS-3	MW-3L/ ECS-5
SAMPLING DATE		9/1/2009	4/24/2006	4/24/2006	6/20/2006	4/24/2006	4/24/2006	6/20/2006	4/24/2006
SAMPLED BY	RCGW-2	MAI	ECS	ECS	Watermark	ECS	ECS	Watermark	ECS
Polychlorinated Biphenyls (ug/l) Arochlor 1016-1268	5	ND(0.307)	ND(0.0204)	ND(0.0204)	ND(0.2)	ND(0.022)	ND(0.025)	ND(0.2)	ND(0.0208)

LOCATION		MW-3R / ECS-2	MW-3R / ECS-2	MW-3R / ECS-2	MW-4L/ ESC-4	MW-4L/ ECS-4	MW-4R / ECS-1	MW-4R / ECS-1
SAMPLING DATE		4/24/2006	6/21/2006	9/1/2009	4/24/2006	6/21/2006	4/24/2006	6/21/2006
SAMPLED BY	RCGW-2	ECS	Watermark	MAI	ECS	Watermark	ECS	Watermark
Polychlorinated Biphenyls (ug/l) Arochlor 1016-1268	5	ND(0.0253)	ND(0.2)	ND(0.266)	ND(0.0225)	ND(0.2)	ND(0.024)	ND(0.2)

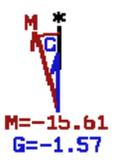
Notes:
 RCGW-2 is the Reprutable Concentration for GW-2 category groundwater
 MAI - McPhail and Associates, Inc.
 ECS - Environmental Compliance Services, Inc.
 Watermark - Watermark Environmental, Inc.

Prepared by: ELM
 Checked by: OW

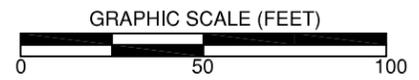
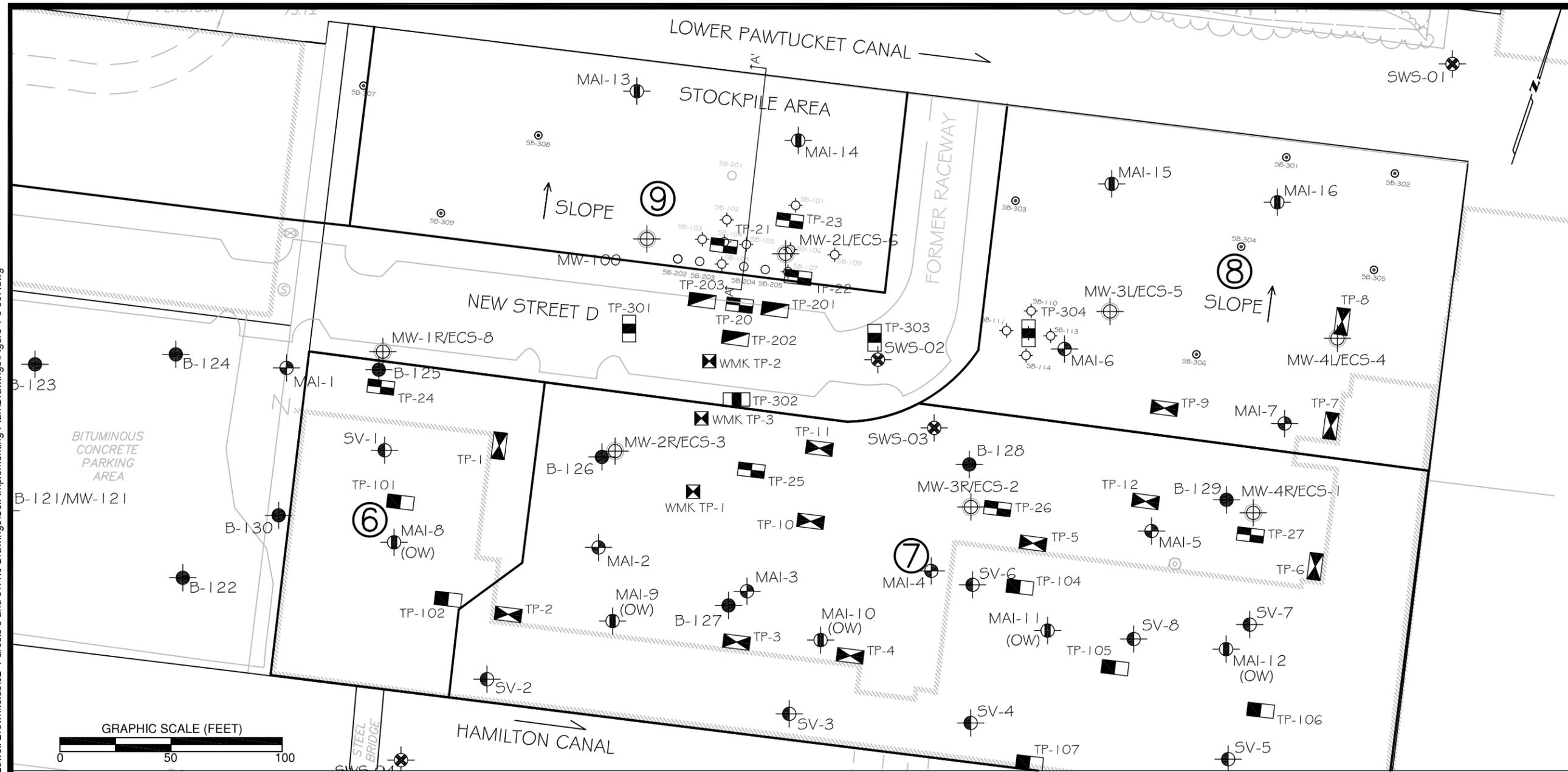
FIGURES



Site Location

SITE LOCATION MAP			
Parcel 9 239.1 Jackson Street Lowell, Massachusetts			
	<p>Self-Implementing Cleanup Plan – Revision 1</p>	<p>Scale: 1:25,000 Source: www.trails.com Note: Site location outline depicts general Site location; see Figure 1-2 for parcel boundaries.</p>	<p>FIGURE 1-1</p>

Plot Date: 6/23/2010 11:57:14 AM File Path: J:\01 Projects\11405 City of Lowell Brownfields\02- Parcels 8 and 9\11.0 Drawings\Self Implementing Plan\Drawings\Figure 1-3 307.dwg



LEGEND

- APPROXIMATE LOCATION OF TEST PIT PERFORMED BY DB ENVIRONMENTAL SERVICES, INC. ON MAY 28, 2009 FOR McPHAIL ASSOCIATES, INC.
- APPROXIMATE LOCATION OF TEST PIT PERFORMED BY DB ENVIRONMENTAL SERVICES, INC. DURING THE PERIOD OF MARCH 12 TO 17, 2009 FOR McPHAIL ASSOCIATES, INC.
- APPROXIMATE LOCATION OF TEST PIT PERFORMED BY WATERMARK ON MARCH 12, 2009 FOR McPHAIL ASSOCIATES, INC.
- APPROXIMATE LOCATION OF TEST PIT PERFORMED BY W. L. FRENCH ON MARCH 6 AND 7, 2008 FOR McPHAIL ASSOCIATES, INC.
- APPROXIMATE LOCATION OF BORING PERFORMED BY CARR-DEE CORP. DURING MAY 27 TO JUNE 2, 2009 FOR McPHAIL ASSOCIATES, INC.
- APPROXIMATE LOCATION OF TEST PIT PERFORMED BY DB ENVIRONMENTAL SERVICES ON 6/18/2010 FOR McPHAIL ASSOCIATES, INC.
- APPROXIMATE LOCATION OF TEST PIT PERFORMED BY J. DERENZO CO. ON MAY 26, 2010 FOR McPHAIL ASSOCIATES, INC.
- APPROXIMATE LOCATION OF SUB SLAB VAPOR SAMPLE PERFORMED BY McPHAIL ASSOCIATES, INC. ON MAY 28 AND 29, 2009
- APPROXIMATE LOCATION OF BORING PERFORMED BY NEW HAMPSHIRE BORING ON MARCH 11, 12, AND 13, 2008 FOR McPHAIL ASSOCIATES, INC.
- APPROXIMATE LOCATION OF BORING PERFORMED BY OTHERS
- APPROXIMATE LOCATION OF OBSERVATION WELL INSTALLED BY OTHERS
- GEOLOGICAL CROSS-SECTION LOCATION (SEE FIGURE 3-1)
- APPROXIMATE LIMITS OF PARCEL BOUNDARY
- PARCEL NUMBER
- ROUND 1 BORING
- ROUND 2 BORING
- MARCH 2012 BORING

Note: the figure depicts site structural features as recorded on February 8, 2008 and does not represent current site conditions

Reference: Base drawing was created by McPhail Associates, Inc. consulting geotechnical engineers.



Self-Implementing Cleanup Plan - Revision 1
239.1
Jackson Street
Lowell, Massachusetts

MARK	DATE	DESCRIPTION

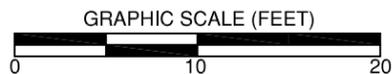
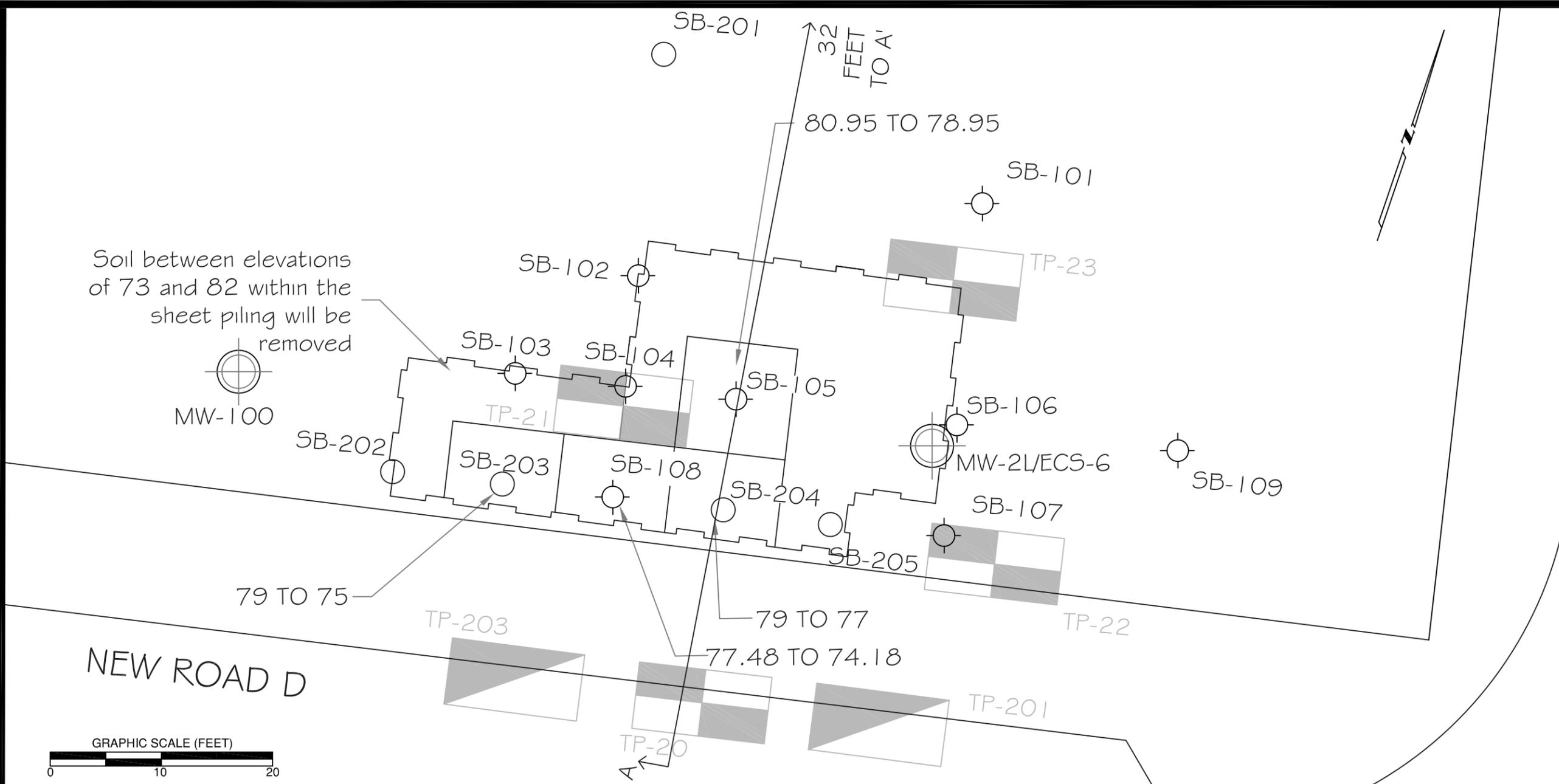
PROJECT NO: 11405-02
 MODEL FILE: Figure 1-3 307.dwg
 DRAWN BY: MEJ
 CHK'D BY: ELM
 COPYRIGHT WATERMARK 2010

SHEET TITLE

SITE PLAN

FIG. 1-3

Plot Date: 6/23/2010 11:57:14 AM File Path: J:\01 Projects\11405 City of Lowell Brownfields\02- Parcels 8 and 9\11.0 Drawings\Self Implementing Plan\Drawings\Figure 2-2 307.dwg



LEGEND

- APPROXIMATE LOCATION OF TEST PIT PERFORMED BY DB ENVIRONMENTAL SERVICES, INC. ON MAY 28, 2009 FOR McPHAIL ASSOCIATES, INC.
- APPROXIMATE LOCATION OF OBSERVATION WELL INSTALLED BY OTHERS
- APPROXIMATE LOCATION OF TEST PIT PERFORMED BY J. DERENZO CO. ON MAY 26, 2010 FOR McPHAIL ASSOCIATES, INC.

- PROPOSED LOCATION OF SHEET PILING
- PARCEL NUMBER
- ROUND 1 BORING
- ROUND 2 BORING
- PCB SOIL REMEDIATION AREA
- ELEVATION (IN NGVD 1992) OF PCB IMPACTED SOIL
- GEOLOGICAL CROSS-SECTION LOCATION (SEE FIGURE 3-1)

Reference: Base drawing was created by McPhail Associates, Inc. consulting geotechnical engineers.



Self-Implementing Cleanup Plan - Revision 1
239.1 Jackson Street
Lowell, Massachusetts

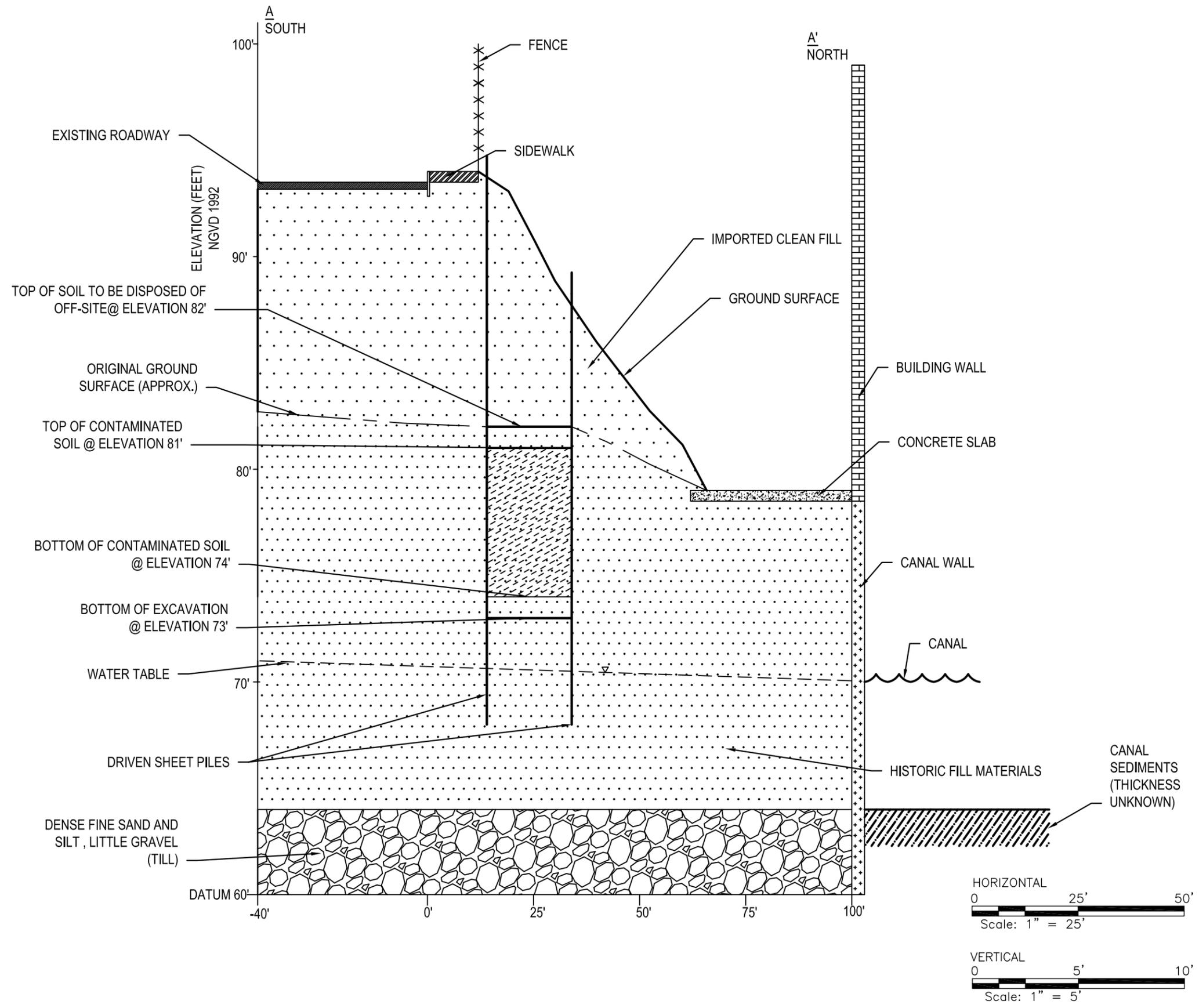
MARK	DATE	DESCRIPTION

PROJECT NO: 10025
MODEL FILE: Figure 2-2 307.dwg
DRAWN BY: MEJ
CHK'D BY: ELM
COPYRIGHT WATERMARK 2010

SHEET TITLE
PCB REMEDIATION AREA

FIG.2-2
SHEET 1 OF 1

Plot Date: 6/23/2010 11:57:14 AM File Path: J:\01 Projects\11405 City of Lowell Brownfields\02- Parcels 8 and 9\11.0 Drawings\Self Implementing Plan\Drawings\Figure 3-1.dwg



*Self-Implementing Cleanup
Plan - Revision 1
239.1 Jackson Street
Lowell, Massachusetts*

MARK	DATE	DESCRIPTION

PROJECT NO: 10025
 MODEL FILE: Figure 3-1.dwg
 DRAWN BY: MEJ
 CHK'D BY: ELM
 COPYRIGHT WATERMARK 2010

SHEET TITLE

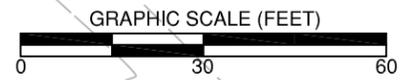
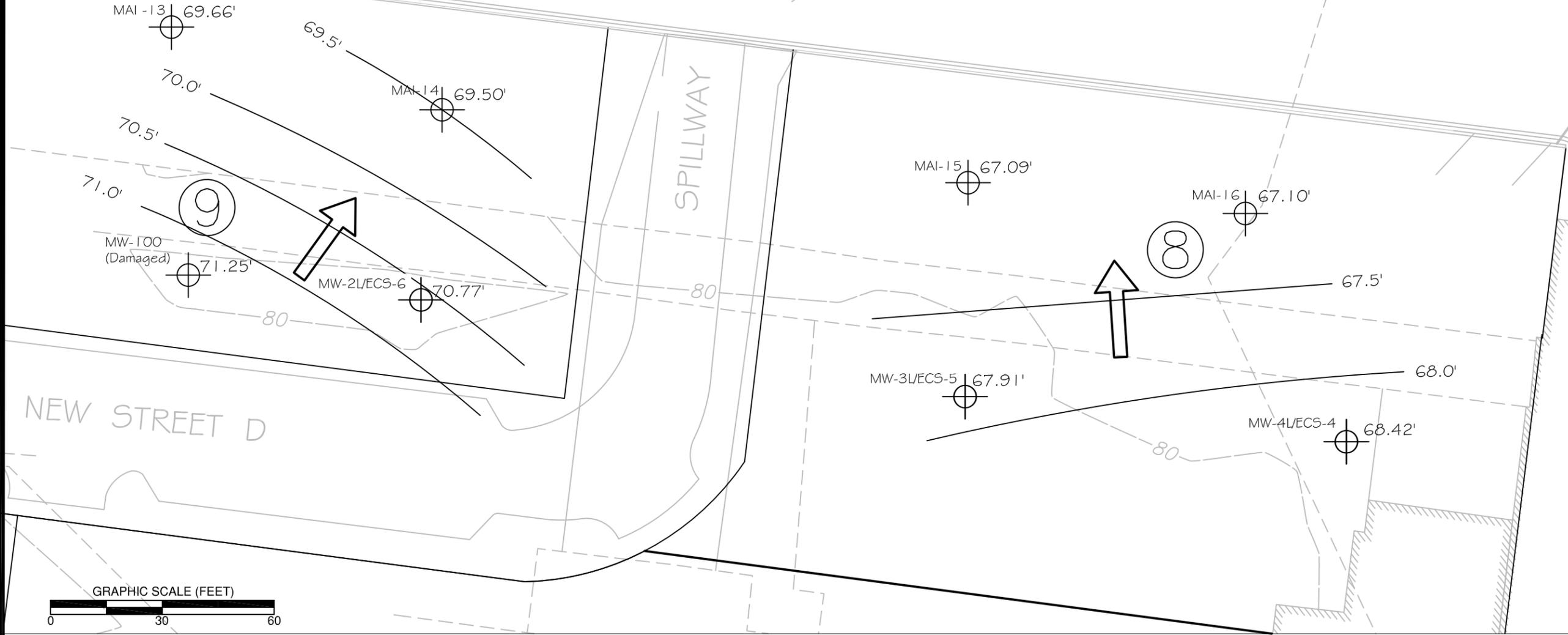
**CROSS - SECTION
A-A'**

FIG.3-1

SHEET 1 OF 1

PAWTUCKET CANAL

(aka Lower or Main Canal)



LEGEND

- MONITORING WELL W/ GROUNDWATER ELEVATION (FEET)
- APPROXIMATE LIMITS OF PARCEL BOUNDARY
- PARCEL NUMBER
- GROUNDWATER ELEVATION (FEET)
- INFERRED GROUNDWATER FLOW DIRECTION
GROUNDWATER ELEVATIONS MEASURED ON 9/14/2010



Self-Implementing
Cleanup Plan - Revision 1
239.1 Jackson Street
Lowell, Massachusetts

MARK	DATE	DESCRIPTION

PROJECT NO: 11405-02
FILE: FIGURE 3-2
DRAWN BY: MEJ
CHK'D BY: ELM
COPYRIGHT WATERMARK 2010

SHEET TITLE
**GROUNDWATER
CONTOUR
MAP**

Reference: Base drawing was created by McPhail Associates, Inc. consulting geotechnical engineers.

FIG.3-2
SHEET 1 OF 1

Plot Date: 6/23/2010 11:57:14 AM File Path: J:\01 Projects\11405 City of Lowell Brownfields\02- Parcels 8 and 9\11.0 Drawings\Self Implementing Plan\Drawings\Figure 3-2.dwg

APPENDIX A
Certification

Property Owner Certification Pursuant to 40 CFR 761.61(a)(3)(i)(E)

**Notification and Certification of Self-Implementing
Cleanup and Disposal of PCB Remediation Waste
239.1 Jackson Street
Lowell, Massachusetts**

The Notification and Certification of Self-Implementing Cleanup and Disposal of PCB Remediation Waste (Notification) describes response actions that will be conducted at 239.1 Jackson Street in Lowell, Massachusetts (the Site).

As the property owner and party responsible for conducting the proposed cleanup described in the Notification, the City of Lowell certifies that all sampling plans, sample collection procedures, sample preparation and extraction procedures, instrument and chemical analysis procedures used to assess or characterize the PCB contamination at the Site are on file and available for EPA inspection at the City of Lowell's Department of Planning and Development, 50 Arcand Drive, Lowell, Massachusetts.

To access these files, please contact Ms. Sarah Brown at (978)674-4252 to arrange an appointment and identify the specific records to be inspected.



Bernard Lynch, City Manager
City of Lowell, MA

Date 5/14/12

The contact person for this project on behalf of the City is:

Ms. Sarah Brown
Environmental Officer
50 Arcand Drive
Lowell, MA 01852
Phone: (978) 674-4252
Fax: (978) 446-7014
SBrown@lowellma.gov

APPENDIX B
Soil Disposal Documentation

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator ID Number MP9784467200	2. Page 1 of 1	3. Emergency Response Phone 800 966-1102	4. Manifest Tracking Number 001031307 GBF			
5. Generator's Name and Mailing Address City Of Lowell 375 Merrimack Street Lowell MA 01852		Att: Adam Baacke Generator's Site Address (if different than mailing address) City Of Lowell 193.1 & 239.1 Jackson Street Lowell MA 01852						
Generator's Phone: 978 446-7200								
6. Transporter 1 Company Name ENPRO SERVICES, INC.				U.S. EPA ID Number MAD980670004				
7. Transporter 2 Company Name				U.S. EPA ID Number				
8. Designated Facility Name and Site Address ENPRO SERVICES OF VERMONT, INC. 54 AVENUE D WILLISTON VT 05495				U.S. EPA ID Number VTR000517052				
Facility's Phone: 802 860-1200								
9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers		11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
		No.	Type					
X	1. RQ NA3082, Hazardous waste, liquid, n.o.s. (tetrachloroethylene, trichloroethylene), 9, PGIII	001	DM	050	G	D039	D040	D043
X	2. RQ UN3432, Polychlorinated biphenyls, solid 9, PGII	002	DM	306	K	MA02	VT01	
	3.							
	4.							
14. Special Handling Instructions and Additional Information 1)(L,E) ground water contaminated with trace solvents ERG#171 2)(S,T) IDW Soil Borings (PCBs 0-2200 mg/kg) OUT OF SERVICE DATE: 9/7/10 ERG#171 ER CONTACT: ENPRO SERVICES, INC. - 24 HOURS - (800) 966-1102								
ENPRO JOB# 7647-10								
15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent. I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.								
Generator's/Offero's Printed/Typed Name Watermark Environmental Inc. Signature John J. Haley Month 01 Day 20 Year 11								
16. International Shipments <input type="checkbox"/> Import to U.S. <input type="checkbox"/> Export from U.S. Port of entry/exit: City of Lowell, MA Date leaving U.S.: 01/20/11								
17. Transporter Acknowledgment of Receipt of Materials								
Transporter 1 Printed/Typed Name Jeff Hanlon Signature [Signature] Month 01 Day 20 Year 11								
Transporter 2 Printed/Typed Name _____ Signature _____ Month _____ Day _____ Year _____								
18. Discrepancy								
18a. Discrepancy Indication Space <input type="checkbox"/> Quantity <input type="checkbox"/> Type <input type="checkbox"/> Residue <input type="checkbox"/> Partial Rejection <input type="checkbox"/> Full Rejection								
18b. Alternate Facility (or Generator) _____ U.S. EPA ID Number _____								
Facility's Phone: _____								
18c. Signature of Alternate Facility (or Generator) _____ Month _____ Day _____ Year _____								
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)								
1. H141		2. H141		3. _____		4. _____		
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a								
Printed/Typed Name Jeffrey A. Baker Signature [Signature] Month 03 Day 01 Year 11								

APPENDIX C
Analytical Data Packages
(Not included in this version due to size)

APPENDIX D
USEPA Comment Letter



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION I

5 POST OFFICE SQUARE, SUITE 100
BOSTON, MASSACHUSETTS 02109-3912

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

September 28, 2011

Olaf Westphalen, LSP
Watermark
175 Cabot Street
Lowell, Massachusetts 01854

Re: Self-Implementing On-Site Cleanup Notification under § 761.61(a)
239.1 Jackson Street
Lowell, Massachusetts

Dear Mr. Westphalen:

The US Environmental Protection Agency - New England (EPA) has received a Notification dated August 8, 2011 to address PCB contamination at the property identified as 239.1 Jackson Street in Lowell, Massachusetts (the Site). The Notification indicates that PCBs are present in soils that exceed the allowable levels for unrestricted use under the federal PCB regulations at 40 CFR § 761.61(a). You have submitted a Notification for cleanup and disposal of the PCB-contaminated soils under the self-implementing cleanup and disposal (SIP) option at 40 CFR § 761.61(a) on behalf of the City of Lowell.

EPA has reviewed your Notification and **has determined that it is incomplete and does not meet the notification requirements at 40 CFR § 761.61(a)(3)**. Specific comments follow:

1. Please provide the name, title, address, phone/fax numbers, and e-mail address for the person at the City of Lowell who will be the contact for the PCB remedial work.
2. Pages 2-2. Parcels 6-8. Sampling information provided in Table 2-1 indicates sampling depth intervals up to 12 feet and a sample spatial distribution greater than 100 square feet, which is inconsistent with the sampling requirements specified under Subpart N for site characterization. Thus, for purposes of compliance with the TSCA *High Occupancy Areas* PCB cleanup standard of 10 ppm, insufficient data exists to support this conclusion.

3. In the information previously submitted in July 2010 for the new Street D roadway, the City stated that backfilling activities to raise the grade for the road had begun prior to its receipt of information on the PCB contamination in this area. No information was provided at that time indicating that Parcel 9 was also being filled, thus raising the grade. Pages 2-3 and 2-4 of the Notification indicate that sampling was conducted through “recently placed fill at the site”, which is approximately 10-feet. Please clarify when this “new fill” was placed on Parcel 9 (the Site).
4. Page 2.2 According to the Notification, Site sampling conducted between 2006 and 2009 was conducted prior to backfilling with the “new clean soil” (see 2.2.1). Table 2-2 indicates that approximately 8 samples were collected during this time period. A review of the data and Figure 1-2 indicates the following issues:
 - a. Sampling primarily was located on the southeastern portion of the Site. Little to no sampling was conducted on the rest of the Site.
 - i. With exception of the sampling conducted around TP-21, the characterization sampling specified under Subpart N was not met.
 - ii. Please clarify why sampling has not been done on the other portions of the Site. Is sampling proposed for the rest of the Site?
 - iii. A cross section should be provided showing the depth of new fill/clean material that has been added as backfill.

In consideration of the issues identified above and with the exception of the area to be excavated around TP-21, EPA could not approve a cleanup plan under § 761.61(a) for the entire Parcel 9 site, based on the information provided in the Notification.

5. Pages 2-1 and 2-2. The Notification indicates that prior to 2010, PCB samples were extracted/analyzed using method 3546 and 8082, respectively. For the initial soil borings (SB-101 through SB-109), the Notification indicates that the samples were extracted for PCBs using method 3546 but were later re-extracted using method 3540C.
 - a. In its review of the laboratory reports, the sample extraction methods were not clearly identified.
 - b. Please provide the PCB results for both the 3546 and 3540C extracted samples.
6. Page 2-5. The Notification indicates that with exception of Parcel 9 (the Site) PCB impacted soil has been properly addressed and no longer poses a risk.
 - a. Please see previous comment 2 regarding characterization of parcels 6-8.

- b. Given that visual staining and odors were noticed during sampling of the Site and given the PCB concentration identified at depth, the following information is requested. (Note: there is reference to information on these items on Page 3-2, but no specifics were provided.)
 - i. What is the depth to groundwater at the Site and on the other parcels? If available, a groundwater contour map should also be provided.
 - ii. Has groundwater been sampled and analyzed for PCBs? If so, the data should be provided.
7. Page 3-1. Footnote 4. Please be aware that the cap requirements under § 761.61(a)(7) also include compliance with § 761.75(b) criteria, not just § 264.310(a).
8. Pages 3-2 through 3-4.
- a. It is unclear how the soil excavation within the sheet walls will progress. It is not clear how the individual cells identified on Figure 2.2 will be excavated. Further clarification and details are requested on the excavation procedures. (see comment 8.d, below).
 - b. Section 3.2.6 indicates that soil excavated within the clean fill layer will be placed in the stockpile designated as “Recently Placed Fill Stockpile”. Please clarify how this clean fill layer will be segregated from the PCB-contaminated fill. That is, what segregation criteria will be used for this determination?
 - c. Section 3.2.4 provides details on monitoring which will be conducted during excavation activities. Details on air action levels should be provided in this Notification.
 - d. Section 3.2.5 indicates that sidewall samples will be collected inside the sheet piling wall prior to removal of soil in the vicinity of this soil. How will this be conducted, especially for those cells which are located along the sheet pile wall (i.e. SB 108)? Excavation cross sections and details should be provided to explain how the PCB-contaminated soils will be excavated.
 - e. Sections 3.2.6 and 3.2.7.
 - i. These sections seem to infer that PCB-contaminated soils may be managed for cleanup and disposal based on stockpile sampling. This is incorrect. Decisions on cleanup and disposal must be based on “as found” (i.e. unexcavated) PCB concentrations. Thus, for purposes of soils placed in the “Impacted Soil Stockpile”, these PCB-contaminated soils would require management and disposal as a ≥ 50 ppm PCB waste based on the proposed excavation plan. For the soils to be placed into the “Potentially Reusable Soil Stockpile”, information on the excavation protocols is

required to support this potential option. The excavation and segregation must be conducted in a way to minimize/avoid potential dilution/mixing of > 10 ppm PCB-contaminated soils with < 10 ppm PCBs for on-site disposal.

- ii. Please clarify how the PCB-contaminated soils that will be placed in the "Potentially Reusable Soil Stockpile" will be disposed of if they cannot be placed back on the Site.
 - iii. Please be aware that the proposed placement of excavated PCB-contaminated soils back within an excavated area is not specifically authorized under § 761.61(a) and must be approved under § 761.61(c).
- f. Section 3.2.6 – Please note that the requirements under § 761.65(c)(9) would apply to PCB-contaminated soils that will be excavated and stockpiled during this project.

Should you have any questions regarding the above or questions on the PCB regulations at 40 CFR Part 761, please feel free to call me at (617) 918-1527 or Katherine Woodward at (617) 918-1353.

Sincerely,



Kimberly N. Tisa, PCB Coordinator (OSRR07-2)
Remediation & Restoration II Branch

cc: A. Peterson, EPA Brownfields
B. Lynch, Lowell City Manager
MassDEP RTN: 3-29781
File

APPENDIX E
Calculation of Dust Exposure Limit

Exposure Pathway 1 - Absorption through GI Tract (Carcinogen):

$$EXP 1_c = \frac{[OHM] * VR * 1.5 * RAF * EF * ED * EP * C4_c * C5_c}{BW * AP * C6_c}$$

Where:

[OHM] = maximum soil concentration of contaminant (mg/kg)	=	2200	
VR = ventilation rate (L/min)	=	60	Construction Worker
RAF = relative absorption factor (dimensionless)	=	1	
EF = exposure frequency (event/day)	=	1	
ED = exposure duration (hours/event)	=	8	Construction Worker
EP = exposure period (years)	=	1	
C4 _c = conversion factor (m ³ /L)	=	1.00E-03	
C5 _c = conversion factor (mg/kg)	=	60	
BW = body weight (kg)	=	75	Construction Worker
AP = averaging period (years)	=	70	
C6 _c = conversion factor (mg/kg)	=	1.00E+06	

EPC 1 _c = 1.81E-05 m ³ /kg - day
--

Exposure Pathway 2 - Absorption through Lungs (carcinogen):

$$EXP 2_c = \frac{[OHM] * 0.5 * EF * ED * EP * C1_c * C2_c * C3_c}{AP}$$

Where:

C1 _c = conversion factor (ug/mg)	=	1.00E+03
C2 _c = conversion factor (days/hrs)	=	4.17E-02
C3 _c = conversion factor (kg/mg)	=	1.00E-06

EPC 2 _c = 5.24E-03 m ³ /kg - day
--

Summation of Exposures

$$PM_{10} = \frac{ELCR}{((EXP 1_c * SF) + (EXP 2_c * UR))}$$

PM ₁₀ = respirable particulate concentration in air	
ELCR = Excess Lifetime Cancer Risk	= 1.00E-05
SF _{ORAL} = Slope Factor (1/mg/kg/day)	= 2.00E+00
UR = Unit Risk (1/(ug/mg ³))	= 1.00E-04

PM ₁₀ = 2.72E-01 mg/m ³ or 0.27 mg/m ³

Exposure Pathway 1 - Absorption through GI Tract:

$$EXP 1_c = \frac{[OHM] * VR * 1.5 * RAF * EF * ED * EP * C1_{nc} * C2_{nc}}{BW * AP * C6_c}$$

Where:

[OHM] = maximum soil concentration of contaminant (mg/kg)	=	2200	
VR = ventilation rate (L/min)	=	60	Construction Worker
RAF = relative absorption factor (dimensionless)	=	1	
EF = exposure frequency (event/day)	=	1	
ED = exposure duration (hours/event)	=	8	Construction Worker
EP = exposure period (years)	=	1	
C1 _{nc} = conversion factor (m ³ /L)	=	1.00E-03	
C2 _{nc} = conversion factor (mins/hour)	=	60	
BW = body weight (kg)	=	75	Construction Worker
AP = averaging period (years)	=	1	
C6 _c = conversion fraction (mg/kg)	=	1.00E+06	

EPC 1 _c = 1.27E-03 m ³ /kg - day
--

Exposure Pathway 2 - Absorption through Lungs:

$$EXP 2_c = \frac{[OHM] * 0.5 * EF * ED * EP * C4_{nc} * C5_{nc}}{AP}$$

Where:

C4 _{nc} = conversion fraction (days/hrs)	=	4.17E-02
C5 _{nc} = conversion factor (kg/mg)	=	1.00E-06

EPC 2 _c = 3.67E-04 m ³ /kg - day
--

Summation of Exposures

$$PM_{10} = \frac{Hi}{\frac{EXP 1}{RfD_{oral}} + \frac{EXP 2}{RfC}}$$

PM ₁₀ = respirable particulate concentration in air	
HI = Target Hazard Index (unitless)	= 1.00E+00
RfD _{ORAL} = Reference Dose Concentration (mg/kg/day)	= 2.00E-05
RfC = Reference Concentration (mg/m ³)	= 2.00E-05

PM ₁₀ = 1.22E-02 mg/m ³
or
0.012 mg/m ³



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 1

5 POST OFFICE SQUARE, SUITE 100
BOSTON, MA 02109-3912

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

OCT 02 2012

City of Lowell
Attn: Ms. Sarah Brown, Environmental Officer
Department of Planning and Development
JFK Civic Center
50 Arcand Drive
Lowell, Massachusetts 01852

Re: PCB Cleanup and Disposal Approval under 40 CFR §§ 761.61(a) and (c)
Former Appleton Mill, Parcel 9
Lowell, Massachusetts
MassDEP RTN: 3-29781

Dear Ms. Brown:

This is in response to the Notification¹ by the City of Lowell (the City) for approval of a PCB cleanup and disposal plan to address PCB-contaminated fill material located on a portion of the property previously known as 307 Jackson Street and currently identified as Parcel 9, 239.1 Jackson Street (the Site) in Lowell, Massachusetts. The Site contains PCB-contaminated soils that exceed the allowable PCB levels for unrestricted use under the federal PCB regulations at 40 CFR § 761.61(a).

In its Notification, the City is proposing to remove the PCB-contaminated fill with greater than or equal to (\geq) 10 parts per million ("ppm", located at approximately 82 feet to 73 feet NGVD 1929) and to dispose of this fill as a \geq 50 ppm PCB waste at a TSCA-permitted landfill in accordance with § 761.61(a)(5)(i)(B)(2)(iii). The excavation area will be backfilled to grade and a deed restriction will be recorded to identify the Site as a *low occupancy area* as required under § 761.61(a)(8). If a higher end-use is designated in the future, the City will comply with § 761.61(a), which may include construction of a compliant cap under § 761.61(a)(7).

¹ Information was submitted by Watermark Environmental on behalf of the City of Lowell to satisfy the notification requirement under 40 CFR §§ 761.61(a)(3) and (c). Information was provided dated August 8, 2011 (Notification and Certification of Self-Implementing Cleanup and Disposal Plan for PCB Remediation Waste); May 17, 2012 (Notification and Certification of Self-Implementing Cleanup and Disposal Plan for PCB Remediation Waste, Revision 1); September 25, 2012 (email extraction method dates); and, September 28, 2012 (email clarification on NGVD datum). These submissions will be referred to as the "Notification."

With exception of the sidewall verification sampling, the PCB cleanup and disposal plan detailed in the Notification is consistent with the requirements for cleanup and disposal of *PCB remediation waste* under § 761.61(a). Based on the characterization data and the proposed removal plan, EPA has determined that the alternative verification sampling is reasonable and will not create an unreasonable risk to public health or the environment. EPA applies this unreasonable risk standard in accordance with the PCB regulations at 40 CFR § 761.61(c), and the Toxic Substances Control Act, at 15 USC § 2605(e).

The City may proceed with its PCB cleanup in accordance with 40 CFR §§ 761.61(a) and (c); its Notification; and this Approval, subject to the conditions of Attachment 1.

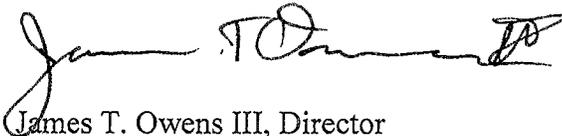
Please be aware that this Approval does not release the City from the cleanup requirements related to other [non-PCB] contaminants, including any requirements under the Massachusetts Department of Environmental Protection (MassDEP) regulations and the Massachusetts Contingency Plan.

Questions and correspondence on this Approval should be directed to:

Kimberly N. Tisa, PCB Coordinator
United States Environmental Protection Agency
5 Post Office Square, Suite 100
Mail Code: OSRR07-2
Boston, Massachusetts 02109-3912
Telephone: (617) 918-1527
Facsimile: (617) 918-0527

EPA shall not consider this project complete until it has received all submittals required under this Approval. Please be aware that upon EPA receipt and review of the submittals, EPA may request any additional information necessary to establish that the work has been completed in accordance with 40 CFR Part 761, the Notification, and this Approval.

Sincerely,



James T. Owens III, Director
Office of Site Remediation & Restoration

cc: O. Westphalen, Watermark
A. Peterson, EPA
MassDEP NERO RTN: 3-29781
File

Attachment 1: Approval Conditions

ATTACHMENT 1:

**PCB CLEANUP AND DISPOSAL APPROVAL CONDITIONS
CITY OF LOWELL – FORMER APPLETON MILL COMPLEX
239.1 JACKSON STREET - PARCEL 9 (“the Site”)
LOWELL, MASSACHUSETTS**

GENERAL CONDITIONS

1. This Approval is granted under the authority of Section 6(e) of the Toxic Substances Control Act (TSCA), 15 U.S.C. § 2605(e), and the PCB regulations at 40 CFR Part 761, and applies solely to *PCB remediation waste* identified in the Notification² and located at the Site. Specifically, this Approval addresses PCB-contaminated fill located on Parcel 9.
2. The City of Lowell (the City) shall conduct on-site activities in accordance with the conditions of this Approval and the Notification.
3. In the event that the activities described in the Notification differ from the conditions specified in this Approval, the conditions of this Approval shall govern.
4. The terms and abbreviations used herein shall have the meanings as defined in 40 CFR § 761.3 unless otherwise defined within this Approval.
5. The City must comply with all applicable federal, state and local regulations in the storage, handling, and disposal of all PCB wastes, including PCBs, PCB Items and decontamination wastes generated under this Approval. In the event of a new spill during response actions, the City shall contact EPA within twenty-four (24) hours for direction on sampling and cleanup requirements.
6. The City is responsible for the actions of all officers, employees, agents, contractors, subcontractors, and others who are involved in activities conducted under this Approval. If at any time the City has or receives information indicating that the City or any other person has failed, or may have failed, to comply with any provision of this Approval, it must report the information to EPA in writing within twenty-four (24) hours of having or receiving the information.

² Information was submitted by Watermark Environmental on behalf of the City of Lowell to satisfy the notification requirement under 40 CFR §§ 761.61(a)(3) and (c). Information was provided dated August 8, 2011 (Notification and Certification of Self-Implementing Cleanup and Disposal Plan for PCB Remediation Waste); May 17, 2012 (Notification and Certification of Self-Implementing Cleanup and Disposal Plan for PCB Remediation Waste, Revision 1); September 25, 2012 (email extraction method dates); and, September 28, 2012 (email clarification on NGVD datum). These submissions will be referred to as the “Notification.”

7. This Approval does not: 1) waive or compromise EPA's enforcement and regulatory authority; 2) release the City from compliance with any applicable requirements of federal, state or local law; or 3) release the City from liability for, or otherwise resolve, any violations of federal, state or local law.
8. Failure to comply with the Approval conditions specified herein shall constitute a violation of the requirement in § 761.50(a) to store or dispose of PCB waste in accordance with 40 CFR Part 761 Subpart D.

NOTIFICATION AND CERTIFICATION CONDITIONS

9. This Approval may be revoked if the EPA does not receive written notification from the City of its acceptance of the conditions of this Approval within 10 business days of receipt of this Approval.
10. The City shall notify EPA in writing of the scheduled date of commencement of on-site activities at least 1 business day prior to conducting any work under this Approval.
11. Prior to initiating onsite work under this Approval, the City shall submit the following:
 - a. a certification signed by its selected contractor(s), stating that the contractor(s) has read and understands the Notification, and agrees to abide by the conditions specified in this Approval;
 - b. a contractor work plan, prepared and submitted by the selected contractor(s) describing the air monitoring that will be employed during soil removal activities. This work plan should also include information on how and where wastes will be stored and disposed of, and on how field equipment will be decontaminated. The City and its contractor(s) shall incorporate any changes EPA deems necessary to comply with the conditions of this Approval and the PCB Regulations at 40 CFR Part 761; and,
 - c. a certification signed by the selected analytical laboratory, stating that the laboratory has read and understands the extraction and analytical method requirements and quality assurance requirements specified in the Notification and in this Approval.

REMEDIAL AND DISPOSAL CONDITIONS

12. The cleanup level for bulk *PCB remediation wastes* (i.e., soils) shall be less than or equal to (\leq) 10 parts per million (ppm). Samples shall be collected on a bulk basis (i.e., mg/kg) and reported on a dry-weight basis. Verification sampling shall comply with 40 CFR Part 761, Subpart O; samples shall be collected from the excavation bottom as described in the Notification.

13. Chemical extraction for PCBs shall be conducted using Methods 3500B/3540C of SW-846 and chemical analysis for PCBs shall be conducted using Method 8082 of SW-846, unless another extraction or analytical method(s) is validated according to Subpart Q.
14. All PCB waste (regardless of concentration) generated as a result of the activities described in the Notification, excluding any decontaminated materials, shall be marked in accordance with § 761.40; stored in a manner prescribed in § 761.65; and, disposed of in accordance with 40 CFR § 761.61(a)(5), unless otherwise specified below:
 - a. Decontamination wastes and residues shall be disposed of in accordance with 40 CFR § 761.79(g).
 - b. Moveable equipment, tools, and sampling equipment shall be decontaminated in accordance with either 40 CFR § 761.79(b)(3)(i)(A), § 761.79(b)(3)(ii)(A), or § 761.79(c)(2).
 - c. PCB-contaminated water generated during decontamination or dewatering shall be decontaminated in accordance with 40 CFR § 761.79(b)(1) or disposed of under § 761.60.

INSPECTION, MONITORING, MODIFICATION AND REVOCATION CONDITIONS

15. The City shall allow any authorized representative of the Administrator of the EPA to inspect the Site and to inspect records and take samples as may be necessary to determine compliance with the PCB regulations and this Approval. Any refusal by City to allow such an inspection (as authorized by Section 11 of TSCA) shall be grounds for revocation of this Approval.
16. Any proposed modification(s) in the plan, specifications, or information in the Notification must be submitted to EPA no less than 14 calendar days prior to the proposed implementation of the change. Such proposed modifications will be subject to the procedures of 40 CFR § 761.61(a)(3)(ii).
17. Any departure from the conditions of this Approval without prior, written authorization from the EPA may result in the revocation, suspension and/or modification of the Approval, in addition to any other legal or equitable relief or remedy the EPA may choose to pursue.
18. Any misrepresentation or omission of any material fact in the Notification or in any future records or reports may result in the EPA's revocation, suspension and/or modification of the Approval, in addition to any other legal or equitable relief or remedy the EPA may choose to pursue.

RECORDKEEPING AND REPORTING CONDITIONS

19. The City shall prepare and maintain all records and documents required by 40 CFR Part 761, including, but not limited to, the records required by Subparts J and K. The City shall maintain a written record of the cleanup and the analytical sampling for activities conducted under this Approval. All records shall be made available for inspection by authorized representatives of the EPA, until such time as EPA approves in writing a request for an alternative disposition of such records.
20. Within 60 days of completion of the cleanup activities described in the Notification and authorized by this Approval, and as required under § 761.61(a)(8)(i)(B), the City shall submit to EPA a certification, signed by a City approving official, that it has recorded the notation on the deed as required under § 761.61(a)(8)(i)(A). A copy of the notation on the deed must also be submitted.
21. The City shall submit a Final Completion Report (Report) to the EPA within 60 days of completion of the activities authorized under this Approval. At a minimum, this Report shall include: a discussion of the project activities; characterization and confirmation sampling analytical results; copies of the accompanying analytical chains of custody; field and laboratory quality control/quality assurance checks; the size of the PCB-contaminated area; and, copies of manifests and certificates of disposal issued by the disposer. The Report shall also include a certification signed by a City official verifying that the authorized activities have been implemented in accordance with this Approval and the Notification.
22. Required submittals shall be mailed to:

Kimberly N. Tisa, PCB Coordinator
United States Environmental Protection Agency
5 Post Office Square, Suite 100
Mail Code: OSRR07-2
Boston, Massachusetts 02109-3912
Telephone: (617) 918-1527
Facsimile: (617) 918-0527
23. No record, report or communication required under this Approval shall qualify as a self-audit or voluntary disclosure under EPA audit, self disclosure or penalty policies.

END OF ATTACHMENT 1

SECTION 01 33 00

SUBMITTALS

PART 1 – GENERAL

1.01 SECTION INCLUDES:

- A. Submittal Procedures
- B. Startup Submittals
- C. Record Drawing Submittals
- D. Outline of Contractor's Technical Execution Plan

1.02 SUBMITTAL PROCEDURES:

- A. Contractor shall transmit each Submittal to Engineer at the following address or hand deliver to Engineer's representative at the Project site:

Watermark Environmental, Inc.
Attn: Evan Barman, PE
175 Cabot Street
Lowell, MA 01854
evan.barman@watermarkenv.com

- B. Contractor shall provide **PDF electronic documents (or four hard copies)** of each submittal to Engineer. Engineer will review submittals.
- C. Contractor shall transmit each submittal with a cover letter signed by Contractor's Project Superintendent.
- D. Contractor shall sequentially number the transmittals (for example, Submittal No. 001). Contractor shall number revised submittals with original number and a sequential alphabetic suffix (for example Submittal No. 001a).
- E. Each submittal shall include Project title, Contractor, Subcontractor or Supplier, title of submittal, Specification section number and, if applicable, Drawing number.
- F. Contractor shall, by signing each submittal, certify that Contractor has reviewed the submittal, and that the submitted information conforms to the requirements of the Work and Construction Documents.
- G. Submittals that do not conform to the requirements of the Construction Documents will be returned with a notation of deficiencies. Contractor shall revise to correct noted deficiencies and resubmit. When revised for resubmission, identify all changes made since previous submission.
- H. Submittals not required by the Construction Documents will not be recognized or processed.

1.03 STARTUP SUBMITTALS

- A. This paragraph specifies submittals that Contractor shall prepare and transmit prior to commencing the Work at the Project site. Additional submittals are specified in other sections of these Specifications.
1. The Contractor shall submit a draft Technical Execution Plan.
 2. The Contractor shall submit the initial Progress Schedule that defines the schedule of Work to be completed. The Progress Schedule shall be in an electronic format as requested by the Owner or Engineer. The project schedule shall be in a Gantt chart format.
 3. The Contractor shall submit a Site Specific Health and Safety Plan as specified in Section 00 73 19 – Health and Safety Requirements, including documentation of workers’ OSHA and TSCA training.
 4. The Contractor shall submit a sheet pile design that is sealed by a professional engineer registered in the State of Massachusetts.
 5. Contractor shall submit the required analytical data for backfill material, graded aggregate, gravel, sand, and topsoil.
 6. Contractor shall submit cut sheets and product information for sheet pile, silt fence, hay bales, non-woven fabric, and grass seed mixture.
 7. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with the requirements indicated:
 - a. Classification per AASHTO and ASTM designations for imported fill material. Imported backfill material shall meet the Department of Environmental Protection Type S-1 soil classification
 - b. Mass Highway classification for ¾ inch crushed stone (MADOT M2.01.04) and for Dense Graded Crushed Stone (MADOT M2.01.7)
 - c. Laboratory compaction curve according to ASTM D698 for native and imported material proposed for fill.
 - d. The maximum density at optimum moisture content for all fill materials shall be determined in accordance with ASTM D698 (Standard Proctor).
 8. Certification from supplier stating that all imported materials meet the specifications and are free from chemical contamination. Analyses shall be conducted for the following: pesticides, volatile organic compounds (VPH), semi-volatile organic compounds (EPH), total petroleum hydrocarbons, RCRA metals, and polychlorinated biphenyls. The soil must meet Massachusetts Department of Environmental Protection (MassDEP) Standards for S-1 type soil for these constituents.

1.04 RECORD DRAWING SUBMITTALS

- A.** The Contractor shall submit Record Drawings that show ‘as-built’ conditions and indicate any deviations from design. If Record Drawings are not satisfactory to Watermark or Owner, Contractor shall revise and re-submit until Watermark or Owner provides approval.

1.05 OUTLINE OF CONTRACTOR’S TECHNICAL EXECUTION PLAN

- A.** Bidders shall submit a draft Technical Execution Plan conforming to the following outline, for Engineer’s approval along with the Bid. Contractor shall revise the Technical Execution Plan as requested by Engineer and submit a final Technical Execution Plan prior to commencing Work. The Technical Execution Plan shall include the following sections, including drawings or figures as necessary:

- 1.** Section A – Project Coordination

- a.** Resume of Project Superintendent(s)
- b.** Identification of key personnel
- c.** List of major equipment, systems, and material, other than listed in Bid Form Schedule E

- 2.** Section B – Progress Schedule

- a.** Contractor’s initial Progress Schedule, based on the milestones

- 3.** Section C – Construction Facilities and Temporary Controls

- a.** Layout of decontamination areas and decontamination facilities
- b.** Layout of Support Zone and other Work Zones
- c.** List of permits and approvals, including contact names, titles and phone numbers
- d.** Proposed design of decontamination stations
- e.** Decontamination methods and equipment
- f.** Procedures to prevent contamination of clean areas
- g.** Vehicle decontamination and inspection procedures
- h.** Procedures for disposal of used PPE
- i.** Procedures for collection, treatment, and disposal or discharge of decontamination residuals

- 4.** Section D – Sheet piling

- a. Detailed description of sheet pile material
 - b. Detailed description of proposed type of sheet piling
 - c. Proposed sheet pile locations
 - d. Detailed description of sheet pile installation means and methods
 - e. Detailed description of sheet pile removal and decontamination
5. Section E – Soil Excavation and Transportation
- a. Detailed description of excavation equipment, transportation and excavation methods
 - b. Proposed stockpile locations
 - c. Truck loading areas and staging areas for empty trucks
 - d. Locations and sizes of utility services required for the Work
6. Section F – Soil Disposal
- a. Name, address, and contract information for the selected disposal facility
 - b. Receiving facility permits and licenses
 - c. Receiving facility hours of operation
 - d. Receiving facility daily capacity limits
7. Section G – Site Restoration
- a. Detailed description of site grading and final grades
 - b. Detailed description of seeding, seed mix, and maintenance

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION

SECTION 01 35 43

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 Decontamination Inspection Logs to Engineer on a daily basis, or as otherwise requested by Engineer.

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 00 73 19 – Health and Safety Requirements.
- C. All PCB handling equipment shall be decontaminated using a cleaning agent approved to remove PCBs from steel.
- D. All PCB handling equipment shall be wipe sampled by the Engineer prior to demobilization. The Engineer shall review the analytical data and release the equipment once the results show the equipment is PCB free.
- E. 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.
- F. 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 00 73 19 – Health and Safety Requirements.

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 Engineer 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 constituents of interest. 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 the drums for off-site disposal.

3.05 MANAGEMENT OF DECONTAMINATION RESIDUALS:

- A. Contractor shall collect decontamination water for off-site disposal.
- B. Contractor shall collect decontamination solids. Contractor shall load decontamination solids along with impacted soil and debris for appropriate disposal.
- C. Contractor shall load contaminated PPE along with impacted soil and debris for appropriate disposal.

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 – GENERAL

1.01 SECTION INCLUDES:

- A. Submittals
- B. Temporary Electric Service
- C. Telephone and Facsimile Service
- D. Temporary Water Service
- E. Temporary Sanitary Facilities
- F. Traffic Control Signs
- G. Work Zones
- H. Enclosures and Fencing
- I. Protection of the Work
- J. Vehicle Access and Parking
- K. Progress Cleaning and Waste Removal
- L. Stockpile Areas
- M. Field Offices
- N. Removal and Restoration of Utilities, Facilities, and Controls

1.02 SUBMITTALS:

- A. Contractor shall prepare and submit a Technical Execution Plan in accordance with specification Section 01 33 00 – Submittal Procedures that includes a section on construction facilities and temporary controls.
- B. Contractor's Technical Execution Plan shall include a drawing that shows the layout of the construction facilities and temporary control Work, including work zones (i.e., Secured Zone, Support Zone, Exclusion Zone, and Decontamination Zone), haul roads, trailer locations, silt fencing, parking areas, site entrance gate, and other pertinent features.
- C. Contractor's Technical Execution Plan shall include a listing of all permits and approvals required for the Work, indicating which permits and approvals have been obtained and which have not been obtained.

1.03 TEMPORARY ELECTRIC SERVICE:

- A. If necessary, Contractor shall furnish and install electrical service from nearest appropriate transformer location. Contractor shall furnish and install main service disconnect and over-current protection. Contractor shall furnish and install electrical connections from main service disconnect to Contractor's facilities, equipment, and office trailer.
- B. If necessary, Contractor shall pay all electric usage costs necessary for the Work including, but not limited to, field offices.

- C. Electrical service characteristics for equipment shall be specified by Contractor in Contractor's Technical Execution Plan.
- D. Contractor will coordinate with local electric utility and obtain any necessary permits.

1.04 TELEPHONE AND FACSIMILE SERVICE:

A. Telephone Service

- 1. If necessary, Contractor shall provide and maintain telephone service to Contractor's Project field office at time of Project mobilization and for the duration of the Work. Contractor shall provide two telephone lines for Contractor's use, one for telephone and one for facsimile.
- 2. If necessary, Contractor shall provide and maintain telephone service to Contractor's Project field office. Contractor shall pay monthly usage costs for all telephone lines.

B. Facsimile Service

- 1. If necessary, Contractor shall provide, maintain, and pay for its own facsimile machine in Contractor's field office at time of Project mobilization and for the duration of the Work.

1.05 TEMPORARY WATER SERVICE:

- A. Contractor shall provide, maintain, and pay for suitable quantity and quality of water for dust control and decontamination, to a location on the Project Site at time of Project mobilization and for the duration of the Work.
- B. Contractor shall provide water conveyance from the water service terminus to any locations on the Project Site where water is used, by Contractor. If required, Contractor shall install a backflow preventor.

1.06 TEMPORARY SANITARY FACILITIES:

- A. Contractor shall provide and maintain temporary portable chemical toilet facilities. The facilities shall be provided at time of Project mobilization and maintained in clean and sanitary condition until Substantial Completion. Contractor shall provide a sufficient number of portable toilets for Contractor and Subcontractor work crews, Owner and visitors, in accordance with usage ratings, or as otherwise directed by Contractor. The temporary portable chemical toilet facilities shall be in accordance with OSHA 29 CFR 1910.120 (3)(i) Table H-120.2.
- B. Contractor shall provide and maintain in clean, good working order, a water hand washing facility for personal decontamination.
- C. Contractor shall provide and maintain in clean, good working order, an emergency eye wash.

- D. Contractor shall provide and maintain, in clean, good working order, any other personal decontamination facilities, as directed by Engineer.

1.07 TRAFFIC CONTROL SIGNS:

- A. Contractor shall furnish, install, and maintain traffic control signs in accordance with requirements of the City of Lowell and as otherwise deemed necessary by Owner for the safety of the public in the work areas solely under the control of Contractor.
- B. Contractor shall furnish, install, and maintain pedestrian traffic control signs in accordance with the City of Lowell's requirements and as otherwise deemed necessary by Owner in the work areas solely under the control of Contractor.

1.08 WORK ZONES:

- A. Contractor shall establish a Secured Zone and Decontamination Zone, as shown on the Drawings and as defined herein.
 - 1. Contractor shall lay out the work zones and establish boundaries, barriers, facilities and controls to ensure that all personnel and equipment exiting the Secured Zone shall pass through the Decontamination Zone before exiting the Project site.
 - 2. Contractor shall furnish, install, and maintain in good condition, orange plastic mesh fencing secured to metal posts or weighted barrels, to delineate the boundaries between the Secured Zone and Decontamination Zone.
- B. Secured Zone
 - 1. Contractor shall establish a general Secured Zone that excludes unauthorized personnel from entering the Work Area.
 - 2. Contractor shall control access to the Secured Zone. Contractor, Owner, Owner's Representative, and Engineer shall be allowed free access to the Secured Zone 24 hours per day, subject to appropriate safety precautions and OSHA training.
 - 3. Contractor shall maintain a log sheet on which all Contractor personnel and visitors must sign in and out upon entering or leaving the Secured Zone.
 - 4. Contractor shall be responsible for the security and safety of equipment, facilities, personnel and materials within the Secured Zone.
- C. Support Zone
 - 1. Contractor shall establish a Support Zone in an area designated by the Owner's Representative for field offices, storage, sanitary facilities, hand wash facilities, and non-construction vehicle parking.
 - 2. The Support Zone shall be an area free of physical and chemical hazards.

3. Contractor shall maintain the support zone in a safe, clean, orderly, and sanitary manner at all times.

D. Exclusion Zone

1. Contractor shall establish an Exclusion Zone within the Secured Zone using the following criteria and other criteria deemed necessary by Engineer:
 - a. Visual surveys of the immediate work site surroundings.
 - b. Consideration of meteorological conditions and the potential for contaminants or other materials to be blown or washed from the area.
 - c. OSHA regulations and other applicable Laws and Regulations.

E. Temporary Activities within the Exclusion Zone

1. Contractor shall establish Temporary Activity Zones within the Exclusion Zone using high-visibility fencing to metal posts to delineate areas where specific types of Work tasks will take place. Temporary Activity Zones shall be revised as necessary and as the Work progresses. Temporary Activity Zones shall be established to include the following tasks:
 - a. Stockpiling of Material: Stockpile areas shall be established as Temporary Activity Zones and signs installed to indicate the type of material stockpiled in each stockpile area. PCB waste shall be identified with signs.
 - b. Storage: Storage areas for materials or equipment shall be established and maintained as Temporary Activity Zones.
 - c. Decontamination: Any temporary decontamination areas shall be marked as Temporary Activity Zones.

F. Decontamination Zone(s)

1. Contractor shall establish a Decontamination Zone outside the Support Zone.
2. Contractor shall provide suitable facilities for personnel decontamination in the Decontamination Zone(s), including emergency eyewash and hand washing facilities.
3. Contractor shall construct a vehicle and equipment decontamination facility within the Decontamination Zone(s), which shall allow for containment and collection of liquid and solid residuals from decontamination.
4. Contractor shall decontaminate in the Decontamination Zone(s) all vehicles which have been in Secured Zone prior to leaving the project site.

5. Contractor shall provide splash protection around the vehicle decontamination facility. Splash protection shall minimize potential contamination from splatter and mist during the vehicle and equipment decontamination process. Splash protection shall be temporary, but stable, and capable of being dismantled in the event of high winds.
6. Contractor shall provide a drainage and collection system for wastewater generated during decontamination procedures.
7. The Equipment Decontamination Area(s) will be bermed and lined to allow collection and treatment of decontamination water generated and to prevent migration of contaminated water. The liner will be fabricated from single sheet of HDPE or similar membrane and will be protected against puncture by the passage of equipment.

G. Barriers

1. Contractor shall furnish, install, and maintain in good condition orange plastic mesh fencing around Secured Zone. The Secured Zone barrier shall restrict access so that all personnel in process areas must pass through the Decontamination Zone(s) before exiting the Project site. Temporary chain link fence may be used in permanent locations. Jackie's Law requires 6-foot high fencing around all open excavations.

1.09 ENCLOSURES AND FENCING:

- A. Contractor shall furnish, install and maintain fencing to ensure safety around stockpile areas, excavation areas, and work zones, and to prevent unauthorized access.
- B. Contractor shall furnish and post signs warning the general public that the Project Site contains physical and chemical hazards and that access is forbidden to unauthorized persons.
- C. Contractor shall furnish and post a sign, minimum size 4 square feet, at each entrance or gate with the following text, or other similar text approved by Contractor

“All Personnel and Visitors Beyond This Point
Must Wear Hard Hat, Safety Glasses, High-
Visibility Vest, and Steel Toe Boots”

- D. Contractor shall establish work zone enclosures and fencing as specified herein above.

1.10 PROTECTION OF THE WORK:

- A. Contractor shall protect installed Work and provide special protection with regard to preventing the spread of contamination to areas outside the Secured Zone.
- B. Contractor shall replace any existing sidewalks, driveways, streets, catch basins, manholes, subsurface facilities, curbs or gutters that are cracked, broken, or otherwise damaged by Contractor, to its original condition, or better, in accordance with the Engineer, Owner, City and County requirements.

1.11 VEHICLE ACCESS AND PARKING:

- A. Contractor shall remove all soil, mud and residuals from vehicle wheels, fenders and tailgates before entering streets.
- B. Contractor shall establish site entrance gates to provide safe and efficient traffic flow to be used under normal circumstances by all personnel and construction vehicles.
- C. Contractor shall designate an on-site parking area to accommodate personal vehicles of Contractor employees, Engineer, Owner and visitors. Construction vehicles shall not be allowed in the areas designated for parking personal vehicles.

1.12 PROGRESS CLEANING AND WASTE REMOVAL:

- A. Contractor shall maintain their Work areas free of waste materials, debris, and rubbish, maintain the Work site in a clean and orderly condition, and collect and remove waste materials, debris, and rubbish from the Work site weekly and dispose off-site.
- B. Contractor shall provide a suitable container, subject to approval by Engineer, for trash generated in the Support Zone and provide weekly pickup of trash.

1.13 STOCKPILE AREAS:

- A. Contractor shall establish stockpile areas for material as necessary for the Work, subject to approval by Engineer, as specified in specification Section 31 00 00, or as otherwise directed by Engineer.

1.14 FIELD OFFICE (TO BE USED BY CONTRACTOR, IF DEEMED NECESSARY):

- A. General requirements for all offices shall be as follows:
 - 1. Structurally sound, weather tight, with floors raised above ground.
 - 2. Thermal insulation compatible with occupancy and storage requirements.
 - 3. Maximum size 36 feet long by 10 feet wide.
- B. Contractor shall furnish their trailer, during the entire period of work.
- C. Contractor shall provide disposal services for Contractor office trash as specified herein above.

1.15 REMOVAL AND RESTORATION OF UTILITIES, FACILITIES, AND CONTROLS:

- A. Contractor shall remove temporary utilities, related equipment, and construction facilities placed or constructed by Contractor during the Work, prior to submitting final Application for Payment.
- B. Contractor shall remove from the Work site all materials, equipment, vehicles, construction facilities, temporary controls, rubbish, debris, and wastes.

- C. Contractor shall dismantle and remove from the Project Site, as directed by Engineer, all fencing provided by Contractor.
- D. The Contractor shall repair and restore all streets, curbs, gutters, sidewalks, driveways, catch basins and other public facilities, to the degree damaged during the Work, in accordance with Engineer, Owner, City, and County requirements.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION

SECTION 01 57 19

TEMPORARY EROSION AND SEDIMENT CONTROLS

PART 1 – GENERAL

1.02 SECTION INCLUDES:

- A. Submittals
- B. Performance Requirements
- C. Surface Water Runoff Control
- D. Inspection and Maintenance

1.03 SUBMITTALS:

- A. Contractor shall submit to Watermark a temporary erosion and sediment control plan (TESC) as specified herein.
- B. Contractor shall submit to Watermark any permits obtained for grading or erosion and sediment control.

1.04 PERFORMANCE REQUIREMENTS:

- A. Permits and Approvals: Contractor shall prepare a temporary erosion and sediment control (TESC) plan and obtain any necessary permits and approvals for erosion and sediment control.
- B. Compliance: Contractor shall be responsible for compliance with requirements of any and all permits and approvals.
- C. Contractor shall employ the following general procedures, or other procedures as required by the approved TESC plan:
 - 1. Run-on Controls: Contractor shall use ditches, berms, pumps, and other methods necessary to divert and drain surface water away from excavations and other work areas.
 - 2. Sediment Controls: Contractor shall take necessary precautions and implement best management practices to prevent sediment from entering roadways, storm sewers, catch basins, or canal.
- D. Dust Control: Contractor shall apply water to stockpiles, open excavations, haul roads, and other work areas as necessary to prevent windborne dust. If continuous visible dust emissions or dust emissions above the action levels are observed or measured to be generated by activities or sources at the Project site, Engineer will direct Contractor to halt work until dust controls are effectively implemented and visible dust emissions cease.

- E.** Odor Control: Contractor shall apply foam, water, tarpaulins, or other methods to control odors from excavation, demolition, and material handling activities at the Project site. In the event that excessive odors are observed or reported at the site boundaries, Watermark may direct Contractor to halt work until odor controls are effectively implemented.
- F.** Street Cleanliness: Where construction vehicle access routes intersect public roads, Contractor shall make provisions to minimize the transport of sediment (mud, soil, or dust) onto the public road. Contractor shall construct haul roads with necessary controls to prevent sediment transport to public streets. If sediment or mud is transported onto a road surface, Contractor shall clean the road thoroughly at the end of each day or more frequently as directed by Watermark. Contractor shall remove sediment from the roads by shoveling or sweeping and sweepings shall be transported to an on-site sediment stockpile area. Street washing shall be allowed only after sediment removal.
- G.** Control of Pollutants Other than Sediment:
1. Vehicle maintenance other than emergency repair shall not be performed on the Project site. New or used hydraulic fluids, fuels, and engine oils shall not be stored at the Project site.
 2. All pollutants that occur on the Project site during construction shall be handled and disposed in a manner that does not contaminate stormwater runoff.
 3. Fueling of Contractor's equipment shall be performed away from storm drain outlets.
 4. Extreme care shall be taken to prevent fuel spills. Contractor's representative shall be present at all time when equipment is being fueled. Contractor shall notify the local Fire Department and other authorities in the event of a spill, as defined by the MCP. Contractor shall immediately notify Owner or Engineer if a fuel spill occurs. Contractor shall be solely responsible for responding to fuel spills, including all costs of removing and disposing materials contaminated by fuel spills.
 5. Contractor shall provide and maintain absorbent materials, shovels, and containers for spill response and cleanup.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

3.01 SURFACE WATER RUNOFF CONTROL

- A.** Contractor shall intercept surface water and divert it away from excavations and work areas through use of dikes, ditches, curb walls, pipes, sumps, or other approved means. The requirement includes temporary works required to protect adjoining properties from surface drainage caused by construction operations.
- B.** Contractor shall prevent surface water runoff from transporting sediment or other contaminants off-site.

3.02 INSPECTION AND MAINTENANCE

- A.** Contractor shall regularly inspect and repair or replace damaged components of temporary erosion and sediment controls. Inspect immediately after rain or flooding events, and inspect daily during prolonged rain events.
- B.** Contractor shall remove sediment deposits and place them in designated spoil areas. Sediment shall not be allowed to flush off-site. If sediment has been in contact with contaminated materials, it shall be incorporated into material to be transported for treatment or disposal.
- C.** Equipment and vehicles shall be prohibited by the Contractor from maneuvering on areas outside of dedicated rights-of-way and easements for construction. Damage caused by construction traffic to erosion and sediment control systems shall be repaired immediately.

END OF SECTION

SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 – GENERAL

1.01 SECTION INCLUDES:

- A. Submittals
- B. References

1.02 SUBMITTALS:

- A. In accordance with specification Section 01 33 00, the Contractor shall provide the following submittals, at least two (2) weeks prior to the start of work.
 - 1. The name, address, and EPA ID No. of the disposal facilities where waste materials are to be received. Include contact person, a copy of the facility permit and telephone number. The disposal facility shall be approved by the Owner or Engineer to receive the material.
 - 2. The facility permit must identify the waste material(s) to be received, and must be accompanied by a statement that the facility has the capacity and authority to accept the waste. Land Disposal Restriction (LDR) forms must also be provided.
 - 3. Contingency Plan for material handling and emergency procedures.
 - 4. Transporter must have notified the EPA and/or other appropriate local government agency in advance of its intentions to transport hazardous materials and, if applicable, receive an identification number.
 - 5. Certifications from the disposal facility that they are permitted to handle and dispose of TSCA hazardous waste.
 - 6. A recent audit of the disposal facility, including agency performing the audit, audit findings, corrective actions, and how and when the corrective actions were implemented.
 - 7. Information on the Waste Transporter, including name, parent company, address, and main point of contact. The Waste Transporter shall be approved by the Owner's Representative to receive the material.
 - 8. Certifications from the Waste Transporter that they are permitted to handle and haul of TSCA hazardous waste.

1.02 REGULATORY REQUIREMENTS:

- 1. All activities related to the work shall be conducted in compliance with all applicable laws, regulations, and requirements which may include, but not be limited to, the United States Environmental Protection Agency (US EPA), United States Department of Transportation (US DOT), Resource Conservation and Recovery Act (RCRA), Toxic Substances Control Act (TSCA), Occupational Safety and Health Administration (OSHA), Massachusetts Department of Environmental Protection (MassDEP), and City of Lowell Fire Department.

2. Contractor is required to secure and maintain all required regulatory permits necessary to perform all aspects of the work.
3. Contractor shall containerize and store waste in accordance with all applicable regulations. All containers are to be appropriately marked/labeled.

1.03 REFERENCES:

- A. United States Environmental Protection Agency
 1. PCB Regulations – 40 CFR 761
 2. Toxic Substances Control Act (TSCA) – 15 U.S.C 2605
- B. Massachusetts Department of Environmental Protection
 1. Massachusetts Contingency Plan – 310 CMR 40.0000

PART 2 – PRODUCTS

2.01 SECTION INCLUDES:

- A. Materials.

2.02 MATERIALS:

- A. Drums: Recovery or salvage drums acceptable for disposal of hazardous waste. Prior approval of drums is required. Drums or containers must meet the required OSHA, EPA (40 CFR Parts 260-264 and 300), and DOT Regulations (49 CFR Parts 171-178). Use of damaged containers shall not be allowed.
- B. Labels: As required by the EPA, OSHA, and MassDEP for handling, transportation, and disposal of hazardous waste.
- C. Absorbent Material: Clay, soil or any commercially available absorbent used for the purpose of absorbing hazardous or potentially hazardous materials.

PART 3 – EXECUTION

3.01 SECTION INCLUDES:

- A. PCB Impacted Soil Hauling
- B. PCB Impacted Soil Disposal

3.02 PCB IMPACTED SOIL HAULING:

- A. All waste shall be handled and transported in accordance with all federal, state and local guidelines and regulations. Contractor is to obtain all permits, licenses, etc., which are necessary for transporting hazardous waste. Contractor shall develop all applicable manifests, Profile Sheets, and any other documentation and coordinate with the Owner regarding proper signatures. Contractor may be required to notify the EPA of the hazardous waste activities, and obtain an EPA identification number specifically for the project, if one is not available.

- B.** Transporters shall maintain waste manifest and shipment record forms. All transporters are required to maintain Waste Transporter documentation, including permit numbers, license plate number of the vehicle, the expiration date of the permit, the type of waste the hauler can take and the treatment, storage and disposal (TSD) facility to which the hauler can take the waste. The transporter must also have all applicable, current waste transportation permits for states where proposed disposal facility is located.
- C.** Contractor shall weigh or otherwise measure materials, vehicles or loads, as Contractor deems necessary for proper loading of vehicles or containers.
- D.** Contractor shall supply all required placard and labeling, and shall have an appropriately trained individual to prepare and sign the hazardous waste manifest, as the DOT shipper.
- E.** Contractor shall line all vehicles hauling PCB waste with a disposable liner. The liner shall be a minimum of 6 mils in thickness and be designed specifically for the type of haul vehicle.
- F.** Contractor shall haul all PCB impacted materials to the approved designated disposal facility for final disposal.
- G.** Contractor shall weigh loaded vehicles at the receiving facility and provide the weigh ticket to the Owner's representative.

3.03 PCB IMPACTED SOIL DISPOSAL:

- A.** All waste shall be disposed of in accordance with all federal, state and local guidelines and regulations. Contractor is to obtain all permits, licenses, etc., which are necessary for disposing of hazardous waste. Contractor shall develop all applicable Land Ban Forms and any other documentation and co-ordinate with the Owner regarding proper signatures. The Contractor may be required to notify the EPA of the hazardous waste activities, and obtain an EPA identification number specifically for the project, if one is not available.
- B.** Engineer shall conduct all profile sampling, as required by the disposal facility. Contractor shall provide Engineer with the disposal facilities requirements a minimum of 3 weeks prior to disposal activities beginning.
- C.** Contractor shall dispose of PCB impacted waste at a facility licensed and permitted for TSCA PCB waste.
- D.** Contractor is responsible for securing appropriate treatment or disposal for the waste streams at a permitted TSDF, in compliance with all requirements, and for obtaining a copy of the waste manifest as executed by the TSDF. If the manifest is not returned within the required time, the contractor shall notify the Owner and initiate an investigation as required.
- E.** Contractor shall furnish all certified copies of manifests (interim storage and final disposal) within regulatory requirements. Within 180 days from the acceptance of the waste by the disposal facility, Contractor shall provide the Owner with Certificate of Disposal documents, as a requirement for final payment.
- F.** Unless directed otherwise, Contractor shall file the annual report and fee report, if applicable, for the hazardous waste shipped and provide closure notification to EPA and MassDEP upon completion of the work.

END OF SECTION

SECTION 31 00 00

EARTHWORK

PART 1 – GENERAL

1.01 SECTION INCLUDES:

- A. Submittals
- B. References

1.02 SUBMITTALS:

- A. In accordance with specification Section 01 33 00, the Contractor shall provide the following submittals, at least two (2) weeks prior to the start of work.
 - 1. Information on the Independent Testing Agencies for field-testing. The testing agency shall be approved by the Owner's Representative for the applicable test methods.
 - 2. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with the requirements indicated:
 - a. Classification per AASHTO and ASTM designations for imported fill material.
 - 3. Certification from supplier stating that all imported materials meet the specifications and are free from chemical contamination. Analyses shall be conducted for the following: pesticides, volatile organic compounds, semi-volatile organic compounds, RCRA metals, and polychlorinated biphenyls. The soil must meet MassDEP Method 1 S-1 soil cleanup standards for these constituents.

1.02 REFERENCES:

- A. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
 - 1. AASHTO T 180 (2001; R 2004) – Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and an 457-mm (18-in) Drop
 - 2. AASHTO T 224 (2001; R 2004) – Correction for Coarse Particles in the Soil Compaction Test
- B. ASTM INTERNATIONAL (ASTM)
 - 1. ASTM C 136 (2006) – Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
 - 2. ASTM D 1140 (2000; R 2006) – Amount of Material in Soils Finer than the No. 200 (75-micrometer) Sieve

3. ASTM D 1556 (2000) – Density and Unit Weight of Soil in Place by the Sand-Cone Method
 4. ASTM D 2167 (1994; R 2001) – Density and Unit Weight of Soil in Place by the Rubber Balloon Method
 5. ASTM D 2434 (1968; R 2006) – Permeability of Granular Soils (Constant Head)
 6. ASTM D 2487 (2006) – Soils for Engineering Purposes (Unified Soil Classification System)
 7. ASTM D 2937 (2004) – Density of Soil in Place by the Drive-Cylinder Method
 8. ASTM D 422 (1963; R 2002e1) – Particle-Size Analysis of Soils
 9. ASTM D 4318 (2005) – Liquid Limit, Plastic Limit, and Plasticity Index of Soils
 10. ASTM D 6938 (2007a) – Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
 11. ASTM D 698 (2007e1) – Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))
- C. U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)
1. EPA SW-846.3-3 (2008, Third Edition, Update IV) Test Methods for Evaluating Solid Waste: Physical/Chemical Methods
- D. Massachusetts Department of Environmental Protection
1. Massachusetts Contingency Plan 310 CMR 40.0975: Identification of Applicable Soil Standards in Method 1

PART 2 – PRODUCTS

2.01 SECTION INCLUDES:

- A. Soil Materials

2.02 SOIL MATERIALS:

- A. All soil materials used shall be free from deleterious, organic, elastic or foreign matter. All imported borrow material sources shall be tested for chemical contamination prior to acceptance and use at the site. The Contractor shall submit analytical results of at least one composite soil sample for each imported material source.
 1. Common Borrow Backfill:
 - a. On-site common backfill shall be the excavated material from the work that is removed to an elevation above 82 feet. The Owner’s Representative on-site shall determine if the soil is reusable as common backfill.

- b.** Imported common backfill shall conform to the MassDOT for Reinforced Fill Material. Contractor shall ensure that the material is free of debris, organic materials and any deleterious material.

2. Topsoil:

- a.** Existing topsoil shall be reused whenever feasible.
- b.** Topsoil shall be obtained from well-drained arable land and shall consist of friable soil of loamy character containing not less than 2 percent nor more than 30 percent organic matter as determined by loss on ignition of oven dried samples ignited at 1200° F.
- c.** Topsoil shall be reasonably free from subsoil, heavy or stiff clay, coarse sand, and other deleterious substances.
- d.** Before delivery it shall be cleaned of all stones larger in size than 2 inches, all roots, sticks, brush, coarse litter, and any substances that would interfere with mixing, planting and maintenance.
- e.** The material shall not contain any salvaged or recycled materials including, but not limited to, bituminous pavement, concrete, demolition debris, glass, brick or wood.

- B.** The Contractor shall test off-site soils brought in for use as backfill for pesticides via Method 8081, volatile organic compounds (VOCs) via Method 8260, semi-volatile organic compounds (SVOCs) via Method 8270, total petroleum hydrocarbons via Method 418.1, RCRA metals by Method 6000/7000 series, and polychlorinated biphenyls by Method 8082. Backfill shall meet the MassDEP Method 1 S-1 soil cleanup standards. Material shall not be brought on-site until tests have been approved by the Owner's Representative.

PART 3 – EXECUTION

3.01 SECTION INCLUDES:

- A.** Site Preparation
- B.** Erosion and Sediment Controls
- C.** Excavation and Fill
- D.** Stockpiling
- E.** Loading
- F.** Backfill and Compaction
- G.** Grading
- H.** Survey

3.02 SITE PREPARATION:

- A.** Prior to commencement of construction activities, the Contractor shall identify known underground and aboveground utilities, and notify Dig Safe Massachusetts 811 (dial 811 to call or 888 344 7233 out of state) a minimum of 72-hours prior to excavation. The Contractor is responsible for the protection of underground utilities.

3.03 EROSION AND SEDIMENT CONTROLS:

- A.** Sedimentation barriers shall be constructed prior to any excavation and/or other construction to ensure that sediment-laden water does not leave the construction site. Drawing C-501 specifies Erosion and Sediment Control measures.

3.04 EXCAVATION AND FILL:

- A.** Temporary sheet piling shall be installed at this Site. This item is specified in specification Section 31 41 16, Sheet Piling.
- B.** The Contractor shall reuse existing, stripped topsoil if possible or appropriate. The Owner's Representative shall decide if stripped soil is appropriate.
- C.** Approximately the first nine feet of excavation, up to an elevation of 82 feet, shall be stockpiled for reuse as common backfill material. The Engineer shall decide how much of the excavated material shall be reused.
- D.** Material from elevation 82 feet to 73 feet, as shown on the Drawings, shall be stockpiled for off-site disposal as PCB TSCA waste.
- E.** Contractor shall verify all existing grade elevations and finish grade elevations before beginning excavation.
- F.** Contractor shall shore excavation walls more than 4 feet high, or provide with equivalent means of protection for employees who may be exposed to moving ground or cave in. Shore vertical excavation walls more than 4 feet high.
- G.** Surface water run-off into excavations shall be prevented. The bottom of all excavations shall be maintained stable, dry and free of water on a continual basis.
- H.** Designated soils from the excavation shall be hauled off-site to an appropriate TSCA-approved disposal facility. Hauling and disposal shall be performed as described in specification 01 74 19. The stockpiling, coordinating, and loading of trucks shall be performed by the Contractor.

3.05 STOCKPILING:

- A.** Contractor shall establish separate stockpiles, as necessary, for management of excavated materials prior to transport of excavated materials for off-site disposal. Separate stockpiles shall be maintained for clean excavated soil and PCB-impacted soils.
- B.** Contractor shall visibly label all PCB impacted soil stockpiles. Signage shall comply with all TSCA regulations.
- C.** Contractor shall not stockpile clean, imported material in the vicinity of the stockpiles of impacted material to avoid any cross contamination.
- D.** Contractor shall be responsible for constructing all stockpiles and for furnishing all waste containers, and for inspection, maintenance, modification and repair of stockpiles and waste containers.
- E.** Stockpile covers shall be 10 mil (minimum thickness) polyethylene sheeting. Stockpile cover sheets shall be of sufficient length and width dimensions to cover each stockpile with no more than two sheets.

- F.** Stockpile bottom liner material shall have a minimum thickness of 20 mils and consist of polyethylene or other impermeable geomembranes that are resistant to weathering and degradation due to contact with impacted materials. The bottom liner shall be integrated into the erosion and sediment control measures, as shown on the Drawings.
- G.** Contractor shall furnish and maintain stockpile covers and liners free of holes or tears. Covers and liners with defects shall be replaced or repaired by Contractor.
- H.** Contractor shall line and cover impacted material stockpiles, manage all liquids that may drain from stockpiles, and prevent precipitation or stormwater runoff from contacting materials contained in stockpiles. Contractor shall furnish a lined berm to contain the stockpile area.
- I.** Contractor shall size, locate and construct impacted soil stockpiles as approved by the Owner's Representative. Contractor shall determine the need for impacted material temporary stockpiles based upon the sequencing of the Work and required rates of loading trucks. Contractor shall exert the highest standard of care with respect to stockpiling impacted materials.
- J.** Stockpile Construction:
1. Stockpile shall not exceed 10 feet in height. Side slopes shall not exceed a slope of one horizontal to one vertical (1H:1V).
 2. Contractor shall protect the geomembrane top cover from damage by handling, traffic, or other means. Contractor shall remove any portion of a cover damaged during installation or by any cause and shall repair it at the Contractor's expense. Contractor shall deploy the top cover in a manner that minimizes wrinkles and differential wrinkles between adjacent panels. Contractor shall overlap adjacent panels a minimum of 4 feet. Contractor shall place appropriate ballast, such as sandbags, on the cover to prevent uplift from wind. Sandbags or other weighting shall be placed along all edges and overlaps at spacing no greater than 10 feet apart.
- K.** Stockpile Management
1. Contractor shall prevent vehicular traffic on the cover and liner.
 2. Contractor shall place impacted materials only in properly constructed bermed areas and maintain material stockpiles, as specified.
 3. Contractor shall not place any designated non-impacted materials in the impacted material stockpiles.
 4. Preventing impacted soil dust from becoming airborne is essential to the Work. Contractor shall manage stockpiles to prevent airborne dust from becoming airborne. Contractor shall place and anchor stockpile covers at the completion of each work day and during periods of rain or wind. Contractor shall cover the stockpiles whenever the stockpiles are not being used. Contractor shall salvage and store unused cover materials for future Project use.
 5. Contractor shall provide run-on controls to divert storm water away from temporary stockpiles. Contractor shall collect accumulated leachate from lined stockpile areas and manage the water as necessary for treatment and discharge.

6. Contractor shall inspect impacted material stockpiles frequently to verify the integrity of the stockpile and cover system. Contractor shall correct any deficiency immediately.
7. After removal and relocation or disposal of stockpiled materials, Contractor shall perform gross decontamination of the stockpile area. Contractor shall remove and load the geomembrane bottom liner and top cover for disposal with the impacted soil and debris at the completion of the Work.
8. Contractor shall stockpile potentially-clean excavated soil on-site in areas approved by Owner's Representative.

3.06 LOADING:

- A. Contractor shall be responsible for loading, decontaminating and inspecting all trucks for off-site treatment or disposal of materials from the Project site. Contractor shall be solely responsible for proper loading of, and abiding by the load limits and weight limits for, all vehicles leaving the Project site, or for any fines, taxes, penalties or judgments resulting from overweight or improperly loaded vehicles.
- B. Contractor shall coordinate disposal directly with the disposal facility. Coordination includes maximum number of loads per day, acceptable hours of disposal, and material acceptance.
- C. Loading operations and hours will be coordinated with the operating hours of landfills or other designated off-site facilities. Loading will be limited to the hours of 7:00 A.M. to 5:00 P.M., Monday through Friday, or as otherwise specified and/or approved.

3.07 BACKFILLING AND COMPACTION:

- A. General:
 1. Contractor shall place on-site reused clean fill and import fill in all excavations and in all depressions resulting from excavation activities to restore the Site to existing grades or as otherwise directed in writing by the Owner's Representative.
 2. Contractor shall maintain proper moisture content of import fill to aid compaction.
 3. Contractor shall remove surplus import fill from the Project site.
 4. Contractor shall use uncontaminated or decontaminated equipment for the placement and compaction of on-site reused clean fill or import fill.
- B. Placement of Common Backfill
 1. Contractor shall place import fill in 12-inch maximum loose lifts, then compact to 90 percent of Standard Proctor Density.
 2. Contractor shall test compacted backfill to verify compaction. Contractor shall provide test results to Owner and Engineer.

3.08 GRADING:

- A.** Fill materials shall be graded to provide a smooth surface, which will readily shed water and provide positive drainage. Areas to receive compacted fill shall be graded to prevent ponding of surface water runoff.
- B.** All rough grading, including shaping and sloping shall be completed prior to the installation of the subgrade material. All grading shall be accomplished within the slope and grade lines as indicated on the Drawings or as necessary to complete the Work.
- C.** Rough grading shall be proof rolled before topsoil is placed.
- D.** Topsoil shall be placed to a depth of 3 inches and be placed to match the existing ground.

3.09 SURVEY:

- A.** It is the Contractor's responsibility to assure that proper elevations, locations, etc. are maintained throughout the construction process. It is the Contractor's responsibility to provide as-built drawings and surveyor services after final construction is complete.

END OF SECTION

SECTION 31 41 16

SHEET PILING

PART 1 – GENERAL

1.01 SECTION INCLUDES:

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

1.02 SUBMITTALS:

- A. In accordance with specification Section 01 33 00, the Contractor shall provide the submittals listed below.
- B. The Contractor shall provide design, fabrication, installation, maintenance, and removal of temporary shoring to complete excavation and backfill at the location indicated on the Drawings.
- C. Submit the following information not less than 20 working days (4 weeks) prior to commencing Work.
 - 1. Fabrication drawings.
 - a. Indicate location and extent of sheet piling, details of top protection, tip reinforcement, splices, and cutoff method.
 - b. Include complete dimensions and details of sheet piling sections.
 - c. Include sequence of driving and detailed drawings of templates or other temporary guide structures.
 - d. Submit proposed procedures for removing driven sheet piling.
 - e. Submit detailed procedures and features for protection of existing structures or other installations.
 - f. Include details of storage and handling procedures.
 - 2. Equipment List. Submit list and size of proposed equipment including cranes, driving equipment, extractors, protection caps, and other installation and removal accessories.
 - 3. Submit material certification, details of sheet piling, mill test reports, piling driving equipment certification, and interlocking joint strength test procedure.
 - 4. Operator Certifications.
- D. Geotechnical subsurface information at the site of the proposed installation is provided and attached to this specification. Contractor shall provide geotechnical assumptions on which the design calculations are based.
- E. Submit temporary shoring design information, signed and sealed by a professional engineer licensed in the Commonwealth of Massachusetts, not less than 15 days prior to commencing Work. Said licensed professional shall be experienced in shoring design.
 - 1. Design Calculations.
 - 2. Design Drawings.

1.03 REFERENCES:

- A. ASTM International
 - 1. ASTM A 328/A 328M (2007) – Standard Specification for Steel Sheet Piling
 - 2. ASTM A 572/A 572M (2007) –Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
- 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.
- D. Site-specific Information:
 - 1. Geotechnical Information prepared by McPhail Associates, April 2011.

1.04 CLOSEOUT SUBMITTALS:

- A. Project Record Documents:
 - 1. Record actual locations of sheet piling and top and bottom elevations certified by a registered professional land surveyor licensed in the Commonwealth of Massachusetts.
 - 2. Provide driving records.

1.05 QUALITY ASSURANCE:

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

PART 2 – PRODUCTS

1.06 SECTION INCLUDES:

- A. Metal Sheet Piling
- B. Components
- C. Fabrication

1.07 METAL SHEET PILING:

- A. Metal sheet piling shall be hot-rolled steel sections conforming to ASTM A 328/A 328M and ASTM A 572/A 572M.
- B. The interlocks of sheet piling shall be free-sliding, provide a swing angle suitable for the intended installation but not less than 5 degrees when interlocked, and maintain continuous interlocking when installed.

- C. General Requirements: Sheet piling shall be sections of the dimensions shown in the Drawings. Provide sheet piling with standard pulling holes.

1.08 COMPONENTS:

- A. Splices and Other Fabrication Appurtenances: Structural Steel ASTM A572/A572M; Grade 50.
- B. Bolts, Nuts and Washers: Unfinished.
 - 1. Bolts: ASTM A307; Grade B.
 - 2. Nuts: ASTM A563 heavy hex type.
 - 3. Washers: ASTM F436.
- C. Finish: Unfinished.
- D. Welding Materials: AWS D1.1; type required for materials being welded.

1.09 FABRICATION:

- A. Fabricate sheet piling to full length and as indicated on Drawings.
- B. Fabricate tees, wyes, corners and cross pieces to match sheet piling sections, with ½-inch minimum web thickness.
- C. Fabricate sheet piling with standard pulling holes.
- D. Clean interlock joint surfaces.

PART 3 – EXECUTION

1.010 SECTION INCLUDES:

- A. Preparation
- B. Monitoring
- C. Templates
- D. Installation
- E. Removal
- F. Installation Records

1.011 PREPARATION:

- A. Verify equipment on-site conforms to 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 sheet pilings are to be installed shall be completed prior to placing sheet pilings. Pilings properly placed and driven shall be interlocked throughout their length with adjacent pilings to form a continuous diaphragm throughout the length or run of piling wall. Perform in accordance with specification Section 31 00 00.

1.012 MONITORING

- A. Contractor shall conduct monitoring of the structures in the vicinity of the sheet piling to document and monitor structural integrity of the structures and any changes caused by vibration during sheet pile installation and removal. Monitoring plans shall be included in the sheet pile design.
 - 1. Contractor shall document initial conditions of structures in the vicinity of the sheet piling to establish baseline conditions.
 - 2. Contractor shall conduct vibration monitoring during the installation and removal of the sheet piling to determine if the vibration may affect the structural integrity of the structures in the vicinity of the work.
 - 3. If it is determined that vibrations during the work are or may affect the structural integrity of structures in the vicinity of the sheet piling work, Contractor shall evaluate alternate method of installation or assess ways to protect the structures.
 - 4. Contractor shall document the final conditions of structures in the vicinity of the sheet piling to establish post work conditions.
 - 5. Contractor shall prepare a report and submit it to the City of Lowell detailing the pre and post construction conditions of structures in the vicinity of the sheet piling and provide an opinion if the work affected the structural integrity of the structures.

1.013 TEMPLATES:

- A. Provide template or driving frame suitable for aligning, supporting, and maintaining sheet piling in correct position during setting and driving:
 - 1. Structural frame sufficiently rigid to resist lateral driving forces.
 - 2. Provide at least two levels of support at 1/3 points not less than 20 feet apart.
 - 3. Provide wood blocking to bear against webs of alternate sheet piling.
 - 4. Provide outer restraints to prevent sheets from warping or wandering.
 - 5. Provide visible markings on templates to verify correct sheet piling location and direction.

1.014 INSTALLATION:

- A. Pile driving equipment shall conform to the following requirements.
 - 1. Hammers shall be steam, air, or diesel drop, single-acting, double-acting, differential-acting, or vibratory type. The driving energy of the hammers shall be as recommended by the manufacturer for the piling weights and subsurface materials to be encountered.

2. Driving hammers shall be maintained in proper alignment during driving operations by use of leads or guides attached to the hammer.

B. Placing and Driving

1. Pilings shall be placed plumb with out-of-plumbness not exceeding 1/8-inch per foot of length and true to line. Place the pile so the face will not be more than 6-inches from vertical alignment at any point. Top of pile at elevation of cut-off shall be within 1/2-inch horizontally and 2-inches vertically of the location indicated. Manipulation of piles to force them into position will not be permitted. Check all piles for heave. Re-drive all heaved piles to the required tip elevation.
2. Pilings shall be driven with the proper size hammer and by approved methods so as not to subject the pilings to damage and to ensure proper interlocking throughout their lengths.
 - a. Use a protecting cap during driving when using impact hammers to prevent damage to the tops of pilings.
 - b. Use cast steel shoe to prevent damage to the tip of the sheet piling.
 - c. Drive each run or continuous length of piling wall alternately in increments of depth to the required depth or elevation.
 - d. If obstructions restrict driving a piling to the specified penetration, remove the obstructions or penetrate them with a chisel beam. If the Contractor demonstrates that removal or penetration is impractical, the Contractor shall make changes in the design alignment of the piling structure as directed to ensure the adequacy and stability of the structure.

C. Pilings driven to refusal or to the point where additional penetration cannot be attained and are extending above the required top elevation in excess of the specified tolerance shall be cut off to the required elevation.

D. Perform continuous inspection during pile driving. Inspect all piles for compliance with tolerance requirements. Bring any unusual problems which may occur to the attention of the Engineer. The Engineer shall inspect the interlocked joints of driven pilings extending above ground. Pilings found to be out of interlock shall be removed and replaced at the Contractor's expense.

1.015 REMOVAL:

A. The removal of sheet pilings shall consist of pulling, decontamination, sorting, cleaning the interlocks, inventorying and storing previously installed sheet pilings as shown and directed.

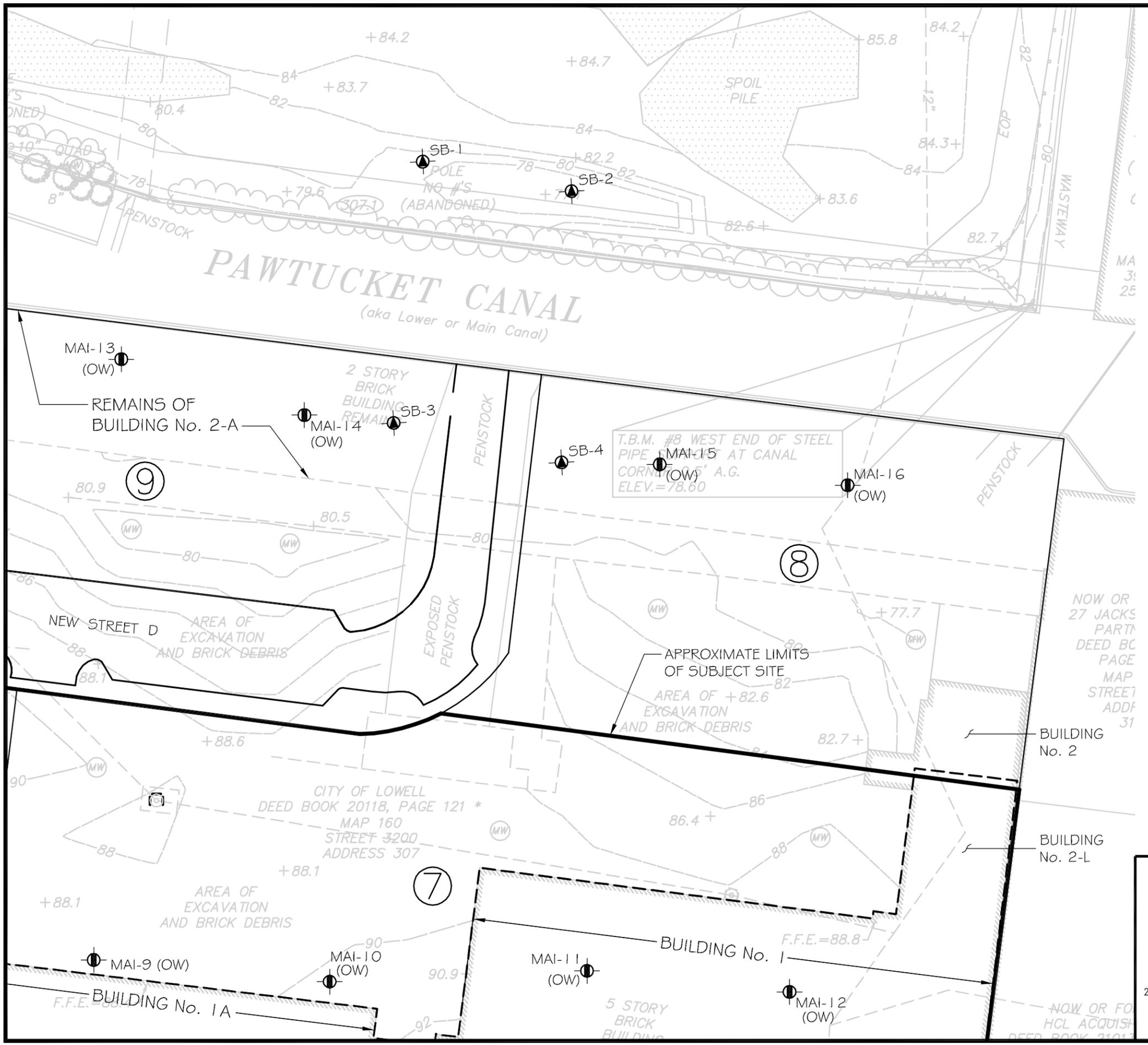
B. The subsurface soil at the project Site is contaminated with PCB. After extracting the piles, they shall be cleaned using steam / pressure washers prior to removal from the "Secure Zone." Follow approved HAZWOPER procedures in specification Section 00 73 19, Specification Section 01 50 00, and specification Section 01 35 43 for decontamination, cleaning, and recovery and disposal of rinsate.

C. All sheet pile shall be wipe tested by the Engineer prior to demobilization. Engineer shall review the results and inform Contractor if and when the sheet pile is PCB free and approved for demobilization.

1.016 INSTALLATION RECORDS:

- A.** Maintain a pile driving record for each sheet pile. Indicate on the installation record:
- 1.** Installation dates and times;
 - 2.** Type and size of hammer;
 - 3.** Total driving time;
 - 4.** Dimensions of driving helmet and cap used;
 - 5.** Pile locations;
 - 6.** Tip elevations;
 - 7.** Ground elevations;
 - 8.** Cut-off elevations; and
 - 9.** Any re-heading or cutting of piles.
- B.** Record any unusual pile driving problems during driving.

END OF SECTION



- LEGEND**
- APPROXIMATE LOCATION OF BORING PERFORMED BY CARR-DEE CORP. DURING MAY 27 TO JUNE 2, 2009 FOR McPHAIL ASSOCIATES, INC.
 - APPROXIMATE LOCATION OF BORING PERFORMED BY CARR-DEE CORP. ON APRIL 8 AND 11, 2011 FOR McPHAIL ASSOCIATES, INC.
 - (OW) — INDICATES OBSERVATION WELL INSTALLED WITHIN COMPLETED BOREHOLE

REFERENCE: THIS PLAN WAS PREPARED FROM A 40-SCALE DRAWING ENTITLED "RECORD CONDITIONS PLAN OF LAND" DATED FEBRUARY 8, 2008 AND PREPARED BY MERIDIAN ASSOCIATES, INC. AND A 50-SCALE DRAWING ENTITLED "PHASE ONE SITE PLAN" DATED MARCH 15, 2008 AND PREPARED BY ICON ARCHITECTURE



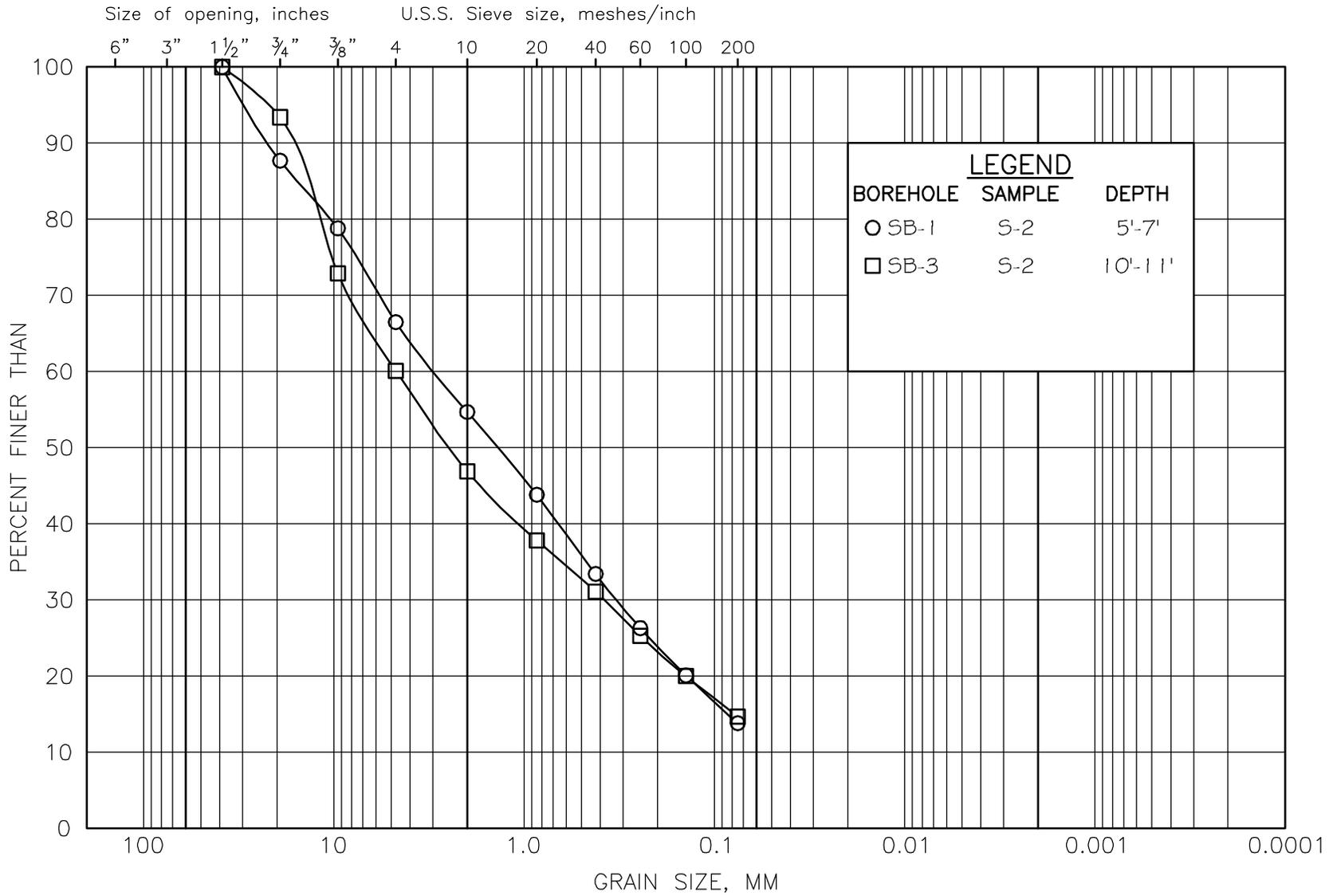
FILE NAME: 201114774-F02

McPHAIL ASSOCIATES, INC.
Geotechnical Engineers
2269 Massachusetts Avenue
Cambridge, MA 02140
617/868-1420
617/868-1423 (Fax)

SIGNATURE BRIDGE			
LOWELL			MASSACHUSETTS
SUBSURFACE EXPLORATION PLAN			
FOR MERIDIAN ASSOCIATES, INC. BY McPHAIL ASSOCIATES, INC. CONSULTING GEOTECHNICAL ENGINEERS			
Date: APRIL 2011	Dwn: F.G.P.	Chkd: P.J.D.	Scale: 1" = 40'
Project No:	4774		

MCPHAIL ASSOCIATES, INC.

M.I.T. GRAIN SIZE SCALE

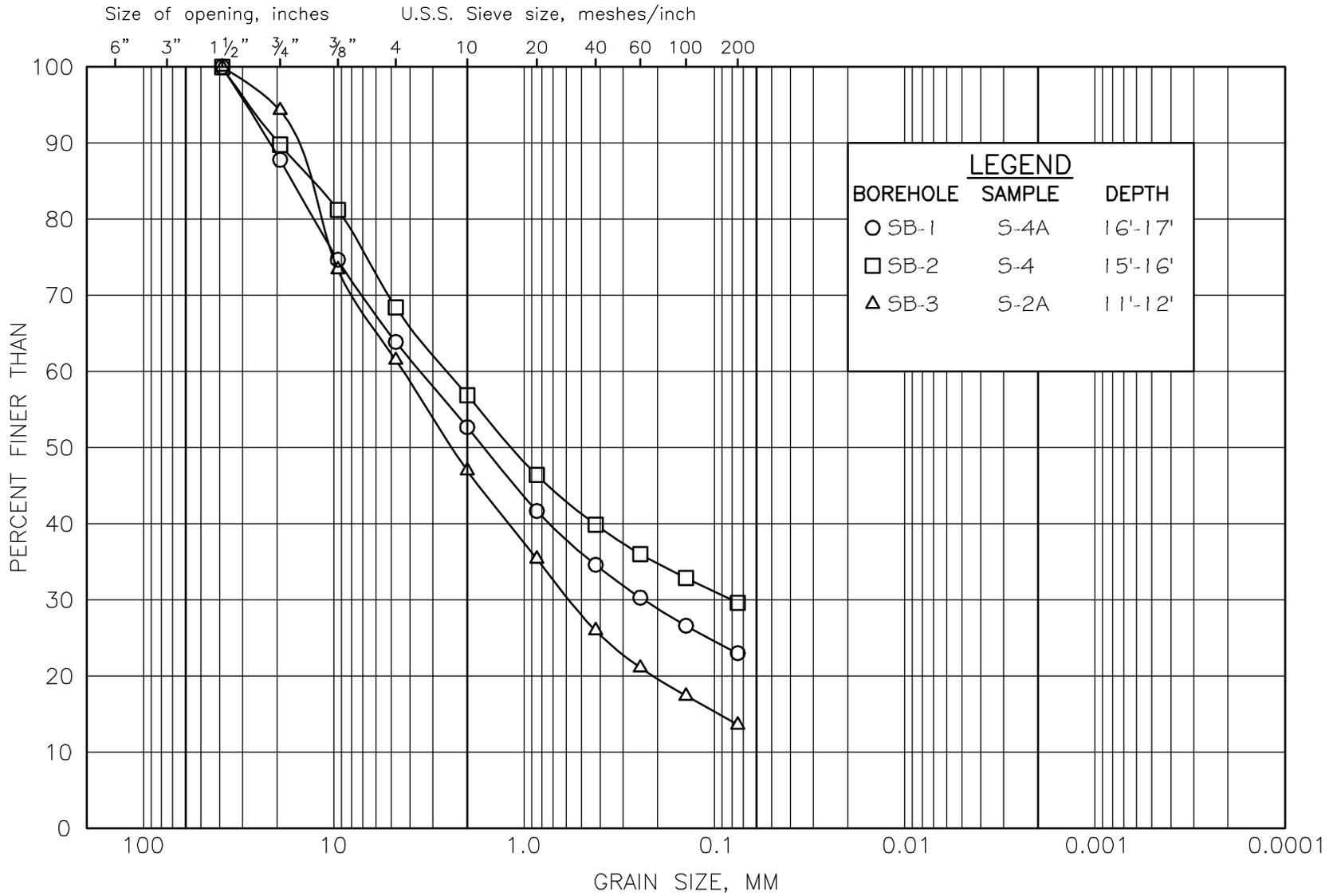


COBBLE SIZE	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT SIZE	CLAY SIZE
	GRAVEL SIZE			SAND SIZE				

GRAIN SIZE DISTRIBUTION
FILL

FIGURE 3

M.I.T. GRAIN SIZE SCALE



COBBLE SIZE	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT SIZE	CLAY SIZE
	GRAVEL SIZE			SAND SIZE				

McPHAIL ASSOCIATES, INC.

GRAIN SIZE DISTRIBUTION
GLACIAL TILL

FIGURE 4



APPENDIX B

**Boring Logs
SB-1 through SB-4**

and

MAI-13 through MAI-16

CARR-DEE CORP.

37 LINDEN STREET

P.O. BOX 67

MEDFORD, MA 02155-0001

Telephone (781) 391-4500

To: McPHAIL ASSOCIATES, INC. 2269 MASS, AVE. CAMBRIDGE, MA

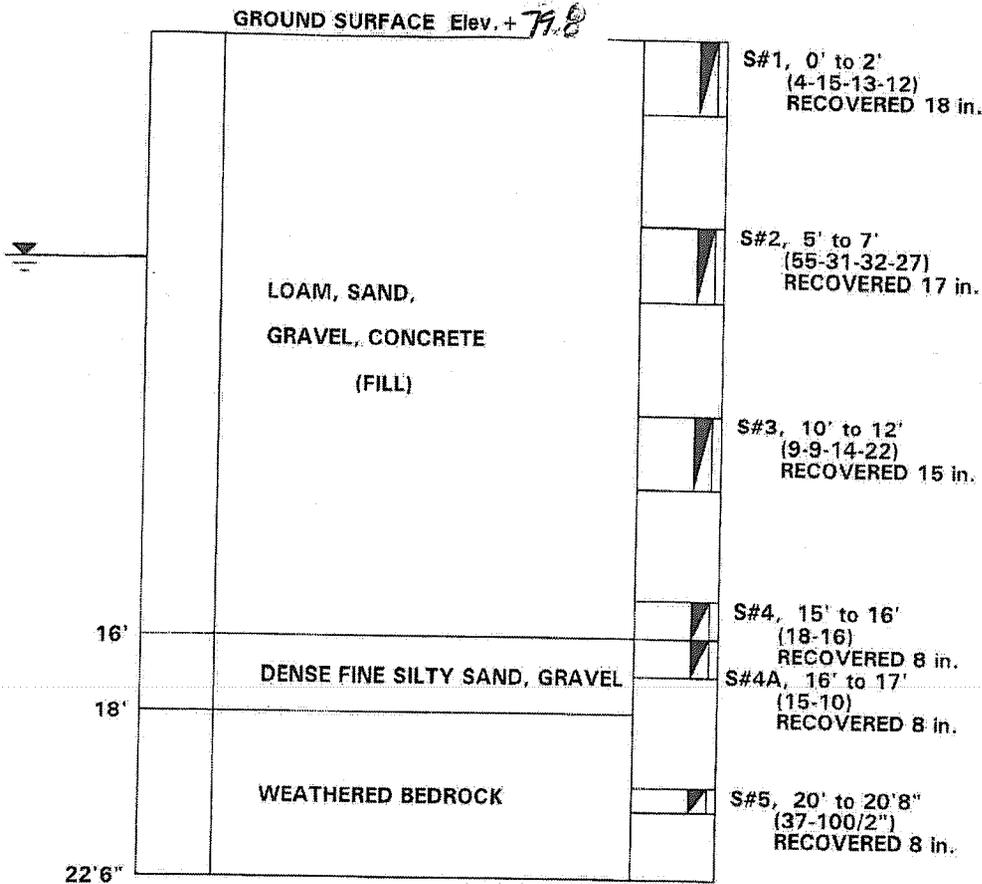
Date: 4-12-2011

Job No.: 2011-51

Location: JACKSON, STREET, LOWELL, MA

Scale: 1 in. = 5 ft.

BORING SB-1



All samples have been visually classified by DRILLER. Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches (±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

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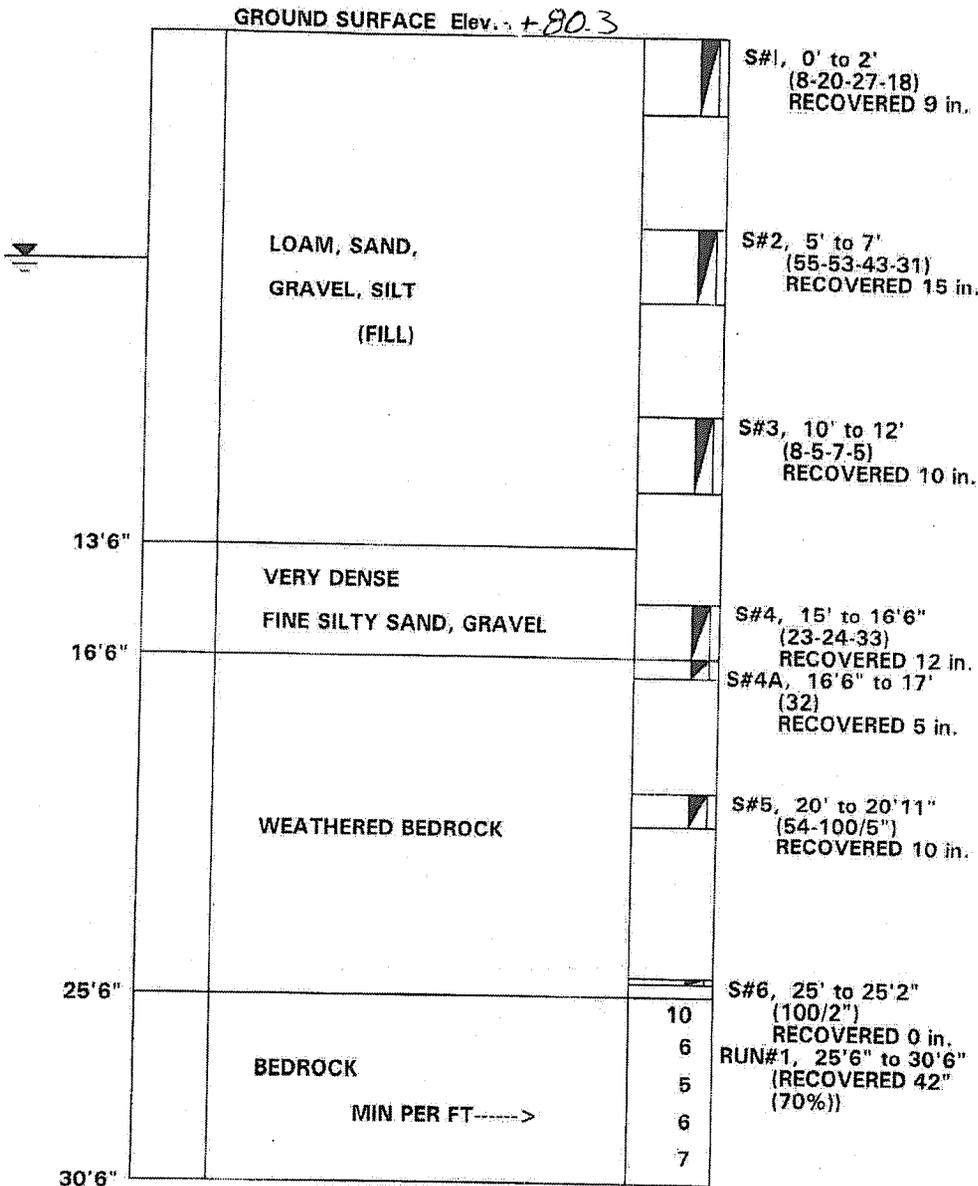
Date: 4-12-2011

Job No.: 2011-51

Location: JACKSON, STREET, LOWELL, MA

Scale: 1 in. = 5 ft.

BORING SB-2



WATER LEVEL 6'
 SIZE OF CASING NW LENGTH 20'0"
 DRILLER: J. DESIMONE, INSPECTOR: T. CORMICAN
 DATE STARTED & COMPLETED 4-8-2011

All samples have been visually classified by DRILLER. Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches (±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

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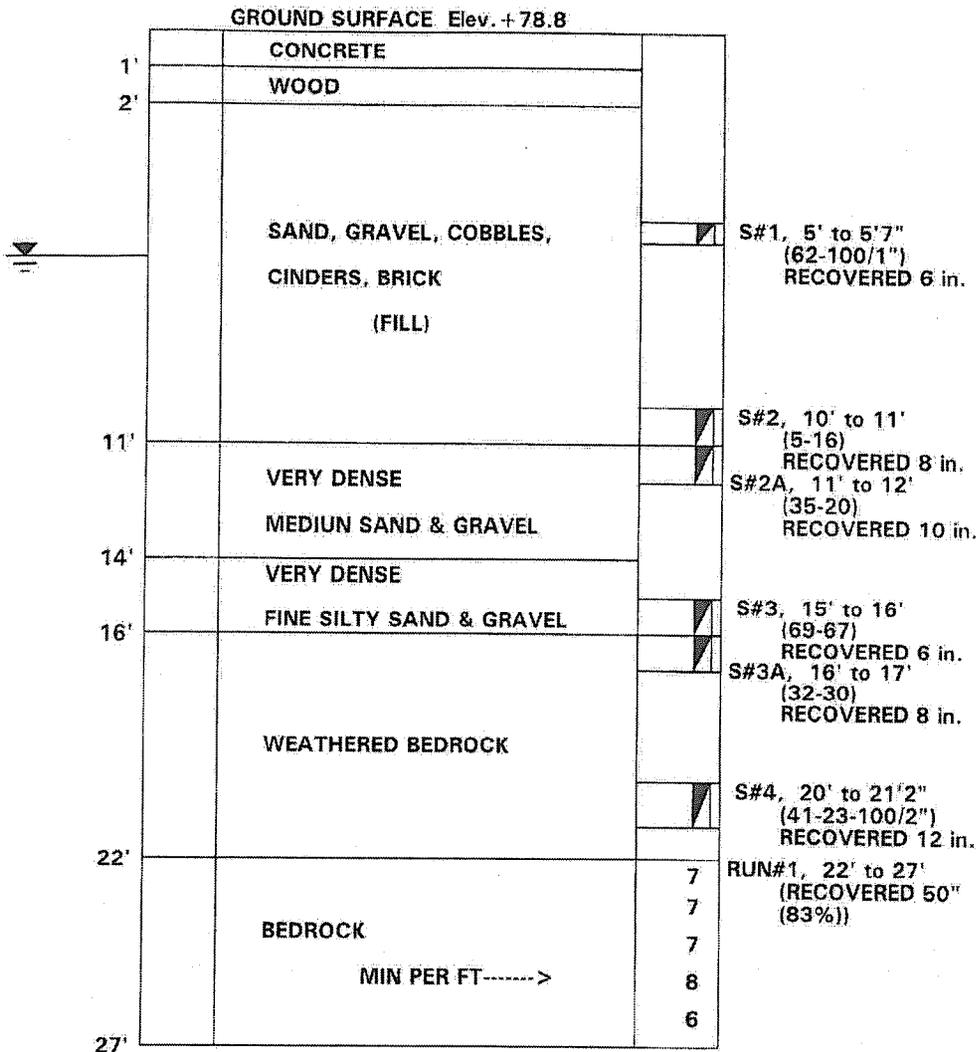
Date: 4-12-2011

Job No.: 2011-51

Location: JACKSON, STREET, LOWELL, MA

Scale: 1 in. = 5 ft.

BORING SB-3



WATER LEVEL 6'
 SIZE OF CASING NW LENGTH 21'0"
 DRILLER: J. DESIMONE, INSPECTOR: T. CORMICAN
 DATE STARTED & COMPLETED 4-11-2011

All samples have been visually classified by DRILLER. Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches (±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

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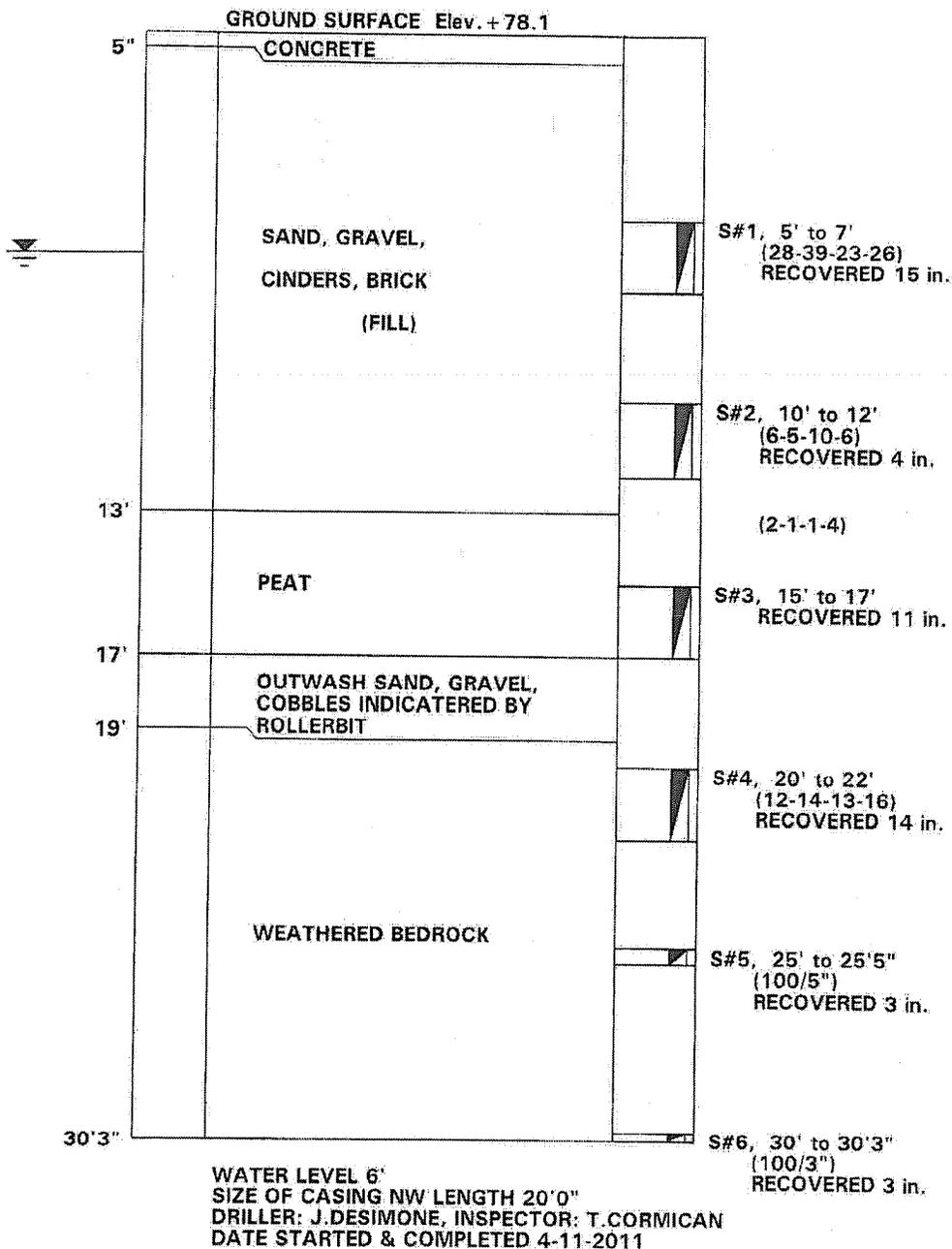
Date: 4-12-2011

Job No.: 2011-51

Location: JACKSON, STREET, LOWELL, MA

Scale: 1 in. = 5 ft.

BORING SB-4



All samples have been visually classified by DRILLER. Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches (±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

CARR-DEE CORP.

37 LINDEN STREET

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Telephone (781) 391-4500

To: McPHAIL ASSOCIATES, INC. 2269 MASS. AVE. CAMBRIDGE, MA

Date: _____

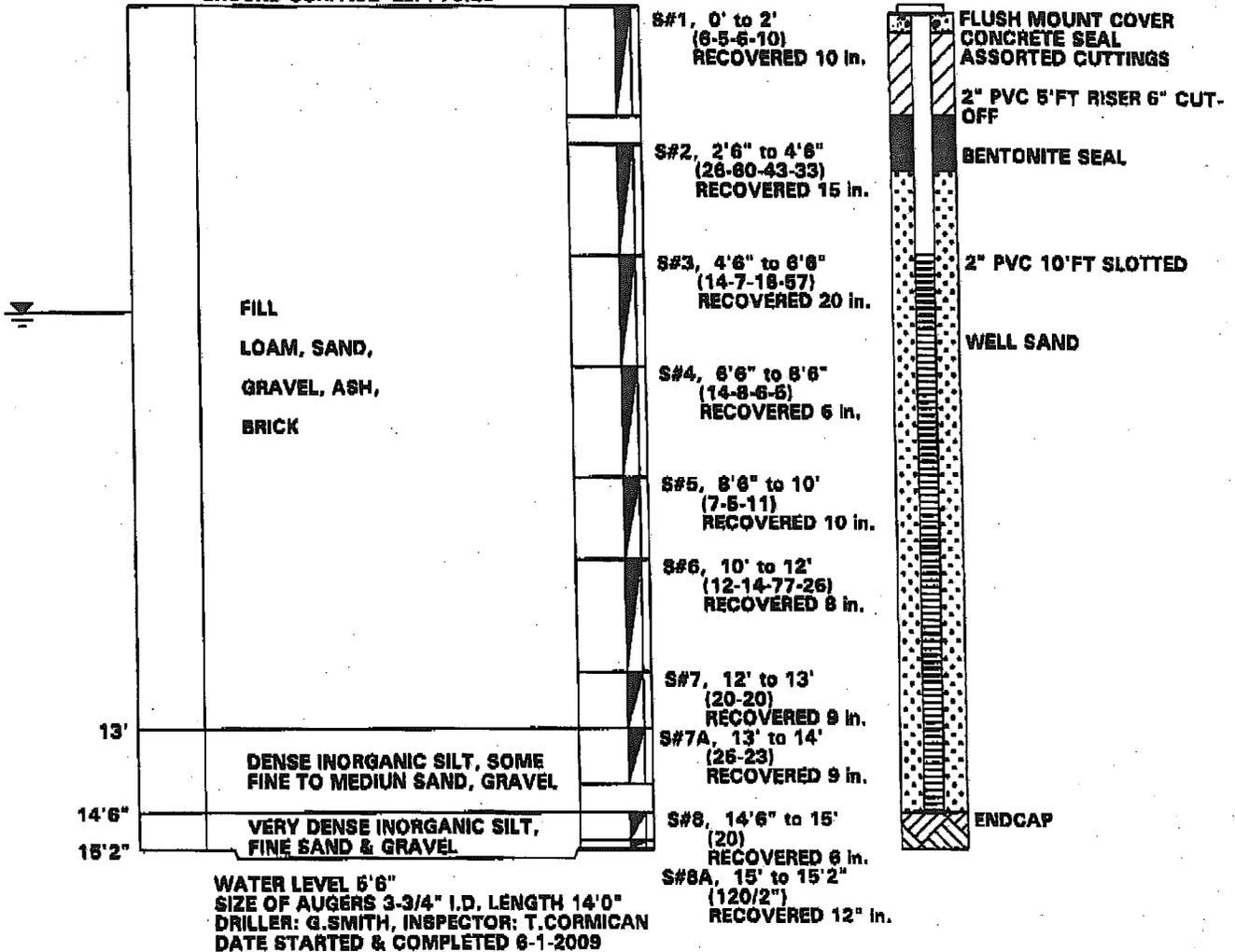
Job No.: 2009-76

Location: 307 JACKSON STREET, LOWELL, MA

Scale: 1 in. = 3 ft.

BORING MAI-13

GROUND SURFACE EL. +78.25



All samples have been visually classified by DRILLER. Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches (±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

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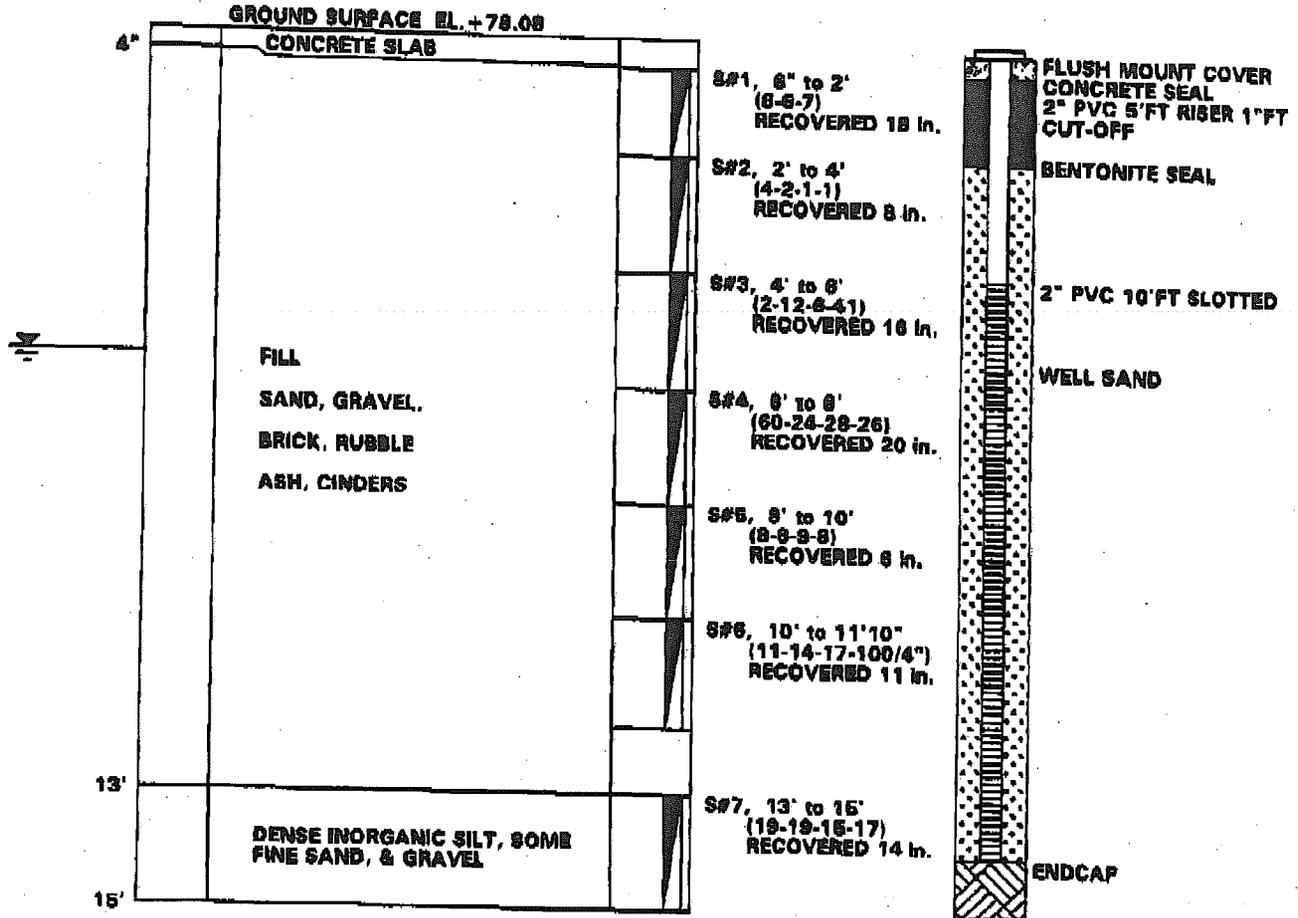
Date:

Job No.: 2009-78

Location: 307 JACKSON STREET, LOWELL, MA

Scale: 1 in. = 3 ft.

BORING MAI-14



WATER LEVEL 5'6"
 SIZE OF AUGERS 3-3/4" I.D. LENGTH 14'0"
 DRILLER: G. SMITH, INSPECTOR: T. CORMICAN
 DATE STARTED & COMPLETED 6-1-2008

All samples have been visually classified by DRILLER. Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches (±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

CARR-DEE CORP.

37 LINDEN STREET

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To: McPHAIL ASSOCIATES, INC. 2269 MASS. AVE. CAMBRIDGE, MA

Date:

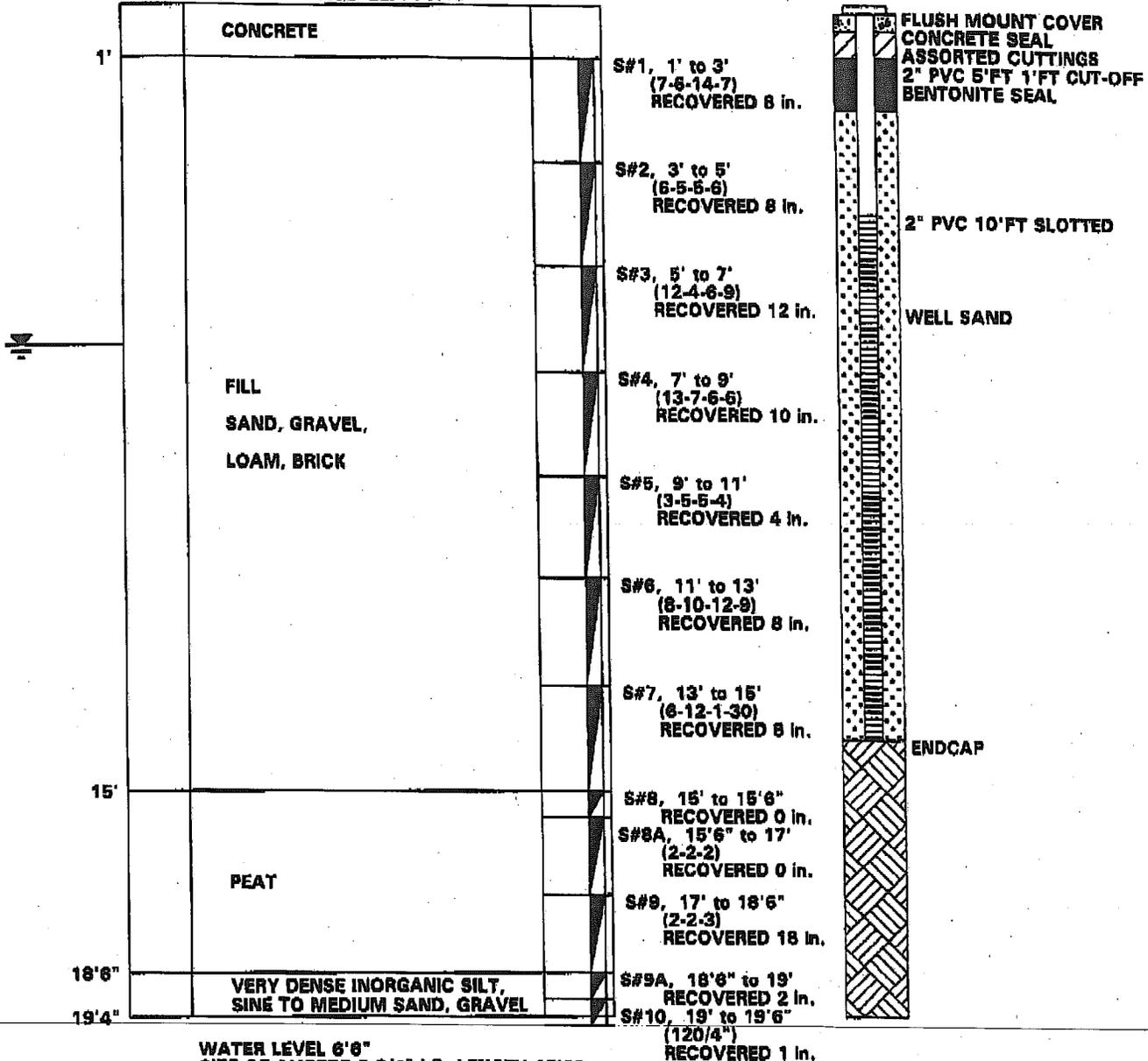
Job No.: 2009-76

Location: 307 JACKSON STREET, LOWELL, MA

Scale: 1 in. = 3 ft.

BORING MAI-15

GROUND SURFACE EL. +78.15



WATER LEVEL 6'8"
 SIZE OF AUGERS 3-3/4" I.D. LENGTH 15'0"
 DRILLER: G. SMITH, INSPECTOR: T. CORMICAN
 DATE STARTED & COMPLETED 6-2-2009

All samples have been visually classified by DRILLER. Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches (±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

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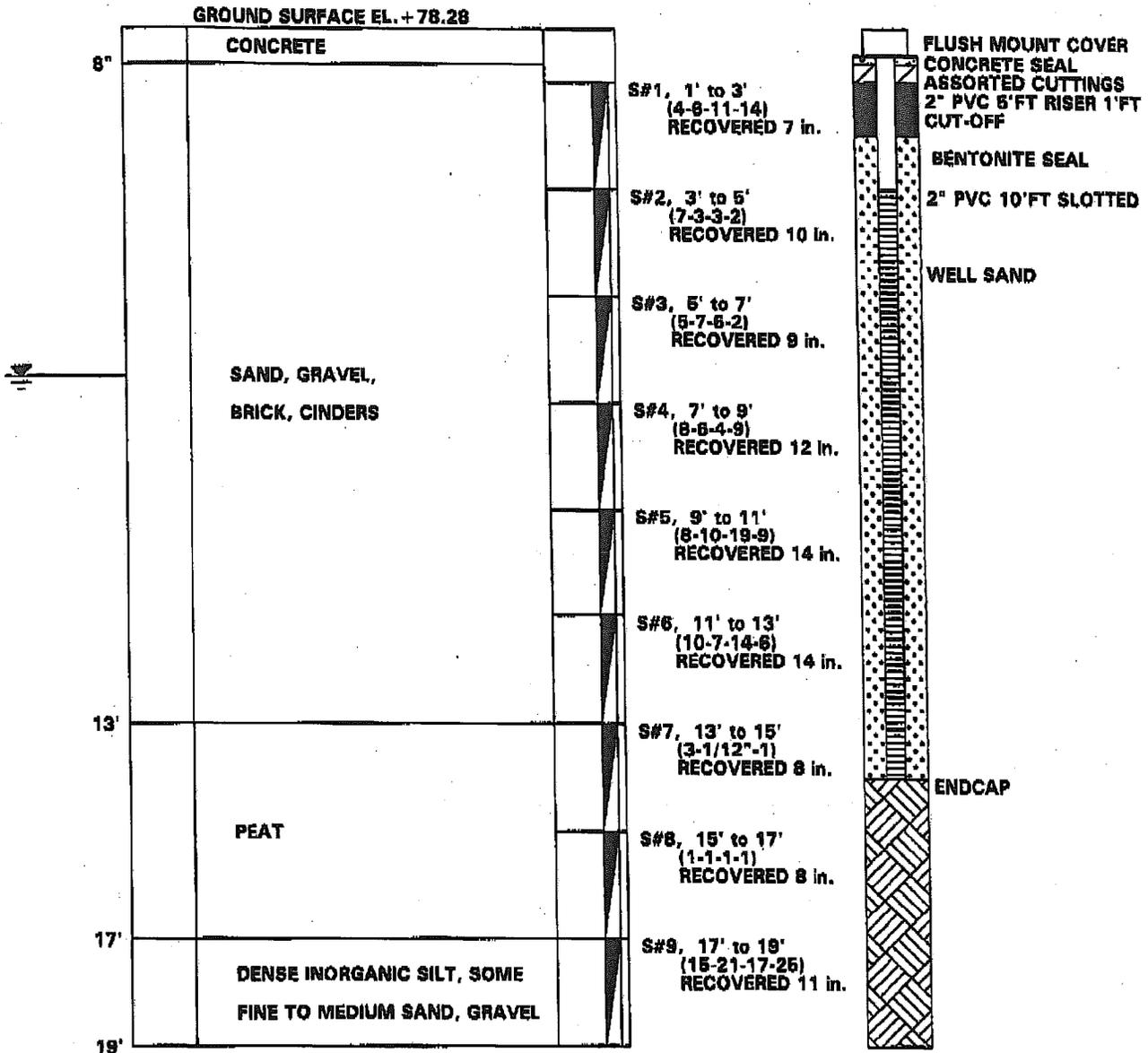
Date:

Job No.: 2009-76

Location: 307 JACKSON STREET, LOWELL, MA

Scale: 1 in. = 3 ft.

BORING MAI-16



WATER LEVEL 6'6"
 SIZE OF AUGERS 3-3/4" I.D. LENGTH 14'0"
 DRILLER: G.SMITH, INSPECTOR: T.CORMICAN
 DATE STARTED & COMPLETED 6-2-2009

All samples have been visually classified by DRILLER. Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in parenthesis indicate the number of blows required to drive Two-inch Split Sampler 6 inches using 140 lb. weight falling 30 inches (±). Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches (±).

SECTION 32 92 21

SEEDING

PART 1 – GENERAL

1.01 SPECIFICATION SECTION INCLUDES:

- A. Quality Assurance
- B. Regulatory Requirements
- C. Delivery, Storage and Protection
- D. Maintenance Service
- E. Seed Mixture
- F. Soil Materials

1.02 QUALITY ASSURANCE:

- A. Contractor shall provide seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.

1.03 REGULATORY REQUIREMENTS:

- A. Contractor shall comply with regulatory agencies for fertilizer and herbicide composition.
- B. Contractor shall provide a certificate of compliance with the MassDOT Standard Specifications for Highways and Bridges indicating approval of the seed mixture.
- C. Each bag of seed shall have an analysis tag showing the results of a test made within 9 months of planting that seed meets the requirements of MassDOT Standard Specifications for Highways and Bridges.

1.04 DELIVERY, STORAGE, AND PROTECTION:

- A. Contractor shall deliver seed mixture in sealed containers. Seed in damaged packaging shall not be accepted.
- B. Contractor shall deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.
- C. Seed that is moldy, wet or otherwise damaged shall not be acceptable.

1.05 MAINTENANCE SERVICE:

- A. Contractor shall maintain seeded areas immediately after placement until grass is well established and exhibits a vigorous growing condition.
- B. Contractor shall be responsible for proper establishment of permanent grass, including watering, reseeding, and any other measures required, at no additional cost to Owner.

PART 2 – PRODUCTS

2.01. SEED MIXTURE:

- A. Seed mixture shall be appropriate for establishment of permanent grass in the Planting Zone in which the Site is located.

- B. Seed mixture shall comply with the seed mixture as specified in the MassDOT Standard Specifications for Highways and Bridges.

2.02. TESTS:

- A. Provide mix formulation for hydroseeding.
- B. Analyze fertilizer to ascertain percentage of nitrogen, phosphorus, potash, soluble salt content, organic matter content, and pH value.

PART 3 – EXECUTION

3.01. AREAS TO BE SEEDED:

- A. Contractor shall seed all areas disturbed by Contractor's Work or as otherwise directed by the Owner's Representative.

3.02. PREPARATION OF SUBSOIL:

- A. Contractor shall prepare subsoil to eliminate uneven areas and low spots. Maintain lines, levels, profiles and contours. Make changes in grade gradual. Blend slopes into level areas.
- B. Contractor shall remove foreign materials, weeds and undesirable plants and their roots.

3.03 PLACING TOPSOIL:

- A. Contractor shall spread topsoil to a minimum depth of 4 inches over area to be seeded.
- B. Contractor shall till topsoil into upper 2 inches of subsoil, and rake smooth.
- C. Contractor shall grade topsoil to eliminate rough, low or soft areas, and to ensure positive drainage. Contractor shall place additional topsoil after final grading if necessary to maintain minimum 2 inches depth of topsoil.

3.04 FERTILIZING:

- A. Contractor shall apply fertilizer in accordance with manufacturer's application directions.
- B. Contractor shall not apply fertilizer at same time or with same machine as will be used to apply seed.
- C. Fertilizer shall be mixed thoroughly into upper 2 inches of topsoil.
- D. Contractor shall lightly water to aid the dissipation of fertilizer.

3.05 SEEDING OR HYDROSEEDING:

- A. Contractor shall apply seed at the rate specified in MassDOT Standard Specifications for Highways and Bridges. Seed shall be applied evenly in two intersecting directions, raked in lightly, and the seed pressed in by manually rolling with a light drum.
- B. Contractor shall not seed areas in excess of that which can be mulched on same day.
- C. Planting Season: As specified in MassDOT Standard Specifications for Highways and Bridges.
- D. Do not sow immediately following rain, when ground is too dry, or during windy periods.

- E. Immediately following seeding, Contractor shall apply mulch to a thickness of 1/8 inches.
- F. Contractor shall apply water with a fine spray immediately after each area has been mulched. Saturate top 4 inches of soil.

3.06 SEED PROTECTION:

- A. Contractor shall identify seeded areas with stakes and string around area periphery. Set string height to 18 inches. Space stakes at 48 inches.
- B. Contractor shall cover seeded slopes where grade is 1:3 or greater with erosion fabric. Roll fabric onto slopes without stretching or pulling. Erosion fabric shall comply with the MassDOT Standard Specifications for Highways and Bridges.
- C. Contractor shall lay fabric smoothly on surface, bury top end of each section in 6-inch (150 mm) deep excavated topsoil trench. Provide 12 inch (300 mm) overlap of adjacent rolls. Backfill trench and rake smooth, level with adjacent soil.
- D. Contractor shall secure outside edges and overlaps at 36 inch (900 mm) intervals with stakes.
- E. Contractor shall lightly dress slopes with topsoil to ensure close contact between fabric and soil.
- F. At sides of ditches, Contractor shall lay fabric laps in direction of water flow. Lap ends and edges minimum 6 inches (150 mm).

3.07 MAINTENANCE:

- A. Contractor shall water to prevent grass and soil from drying out.
- B. Contractor shall immediately reseed areas that show bare spots.
- C. Contractor shall protect seeded areas with warning signs during maintenance period.

END OF SECTION



**BID FORM SCHEDULE A
SCHEDULE OF QUANTITIES AND PRICES
PCB SOIL REMOVAL ACTION
239.1 JACKSON STREET LOWELL, MASSACHUSETTS**

Bid prices listed in this Schedule are based on performance of the Work as specified in the Specifications. Bid prices shall include all overhead, profit, handling, and all other related charges. The estimated quantities in this Schedule A and may vary from actual site conditions.

Bid Item		Unit	Estimated Quantity	Unit Price	Total Amount
A	Mobilization and Demobilization	LS	1		
B1	Temporary Facilities and Controls (Monthly)	Month	1		
B2	Temporary Facilities and Controls (Weekly)	Week			
C	Re-usable Soil Excavation	CY			
D	PCB Impacted Soil Excavation	CY			
E	Sheet Pile Installation	LF			
F	Common Backfill	CY			
G	Top Soil	CY			
H	Backfill and Compaction	CY			
I	Stockpiling, and Loading	CY			
J	Transportation & Disposal	CY			
K	Decontamination	LS	1		
L	Site Restoration	LS	1		
Total Base Bid					

NOTES: LS Denotes Lump Sum, CY Denotes Cubic Yard, SF Denotes Square Foot, LF Denotes Linear Foot

Name of Company/Firm: _____
Printed Name of Authorized Person: _____
Authorized Signature: _____
Title: _____
Date: _____



**SCHEDULE B
LIST OF ADDENDA
PCB SOIL REMOVAL ACTION
239.1 JACKSON STREET
LOWELL, MASSACHUSETTS**

List all Addenda received

<u>NO.</u>	<u>TITLE</u>	<u>DATE</u>
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**SCHEDULE C
SCHEDULE OF MATERIALS – (VARIATIONS AND SOURCES)**

**PCB SOIL REMOVAL ACTION
239.1 JACKSON STREET
LOWELL, MASSACHUSETTS**

VARIATIONS:

MATERIALS SOURCES:



**SCHEDULE D
LIST OF SUBCONTRACTORS**

**PCB SOIL REMOVAL ACTION
239.1 JACKSON STREET
LOWELL, MASSACHUSETTS**

Provide the name of each Subcontractor proposed for the Work, together with the amount payable to each Subcontractor. Work that will be carried out partly or entirely by Bidder's own forces shall be indicated by "Own Forces". Should Bidder wish to separate the Work into two parts or more to be awarded to two or more Subcontractors, without conflicting with the requirements of the Specifications, such separation shall be indicated below. Bidder shall not be allowed to change any Subcontractor except with the prior consent of the City of Lowell.

<u>TYPE OF WORK</u>	<u>NAME AND ADDRESS</u>	<u>APPROXIMATE VALUE</u>
---------------------	-------------------------	--------------------------



**SCHEDULE E
LIST OF EQUIPMENT
PCB SOIL REMOVAL ACTION
239.1 JACKSON STREET
LOWELL, MASSACHUSETTS**

On this form or Bidder's similar form, list all equipment that will be used in the performance of the Work. Such list shall show for each unit, the description of the unit, capacity, condition, age, present location, the name of the owner of the equipment, and all-inclusive hourly rental rates including operator. Such equipment shall be subject to inspection by Engineer to verify the stated information. The equipment rates provided will be used as the basis for payment of any Time and Materials Work that is deemed necessary by the Engineer for completion of the Work.

<u>DESCRIPTION</u>	<u>CAPACITY</u>	<u>CONDITION</u>	<u>AGE</u>	<u>LOCATION</u>	<u>OWNER</u>	HOURLY RENTAL RATE
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**SCHEDULE G
LIST OF PERSONNEL
PCB SOIL REMOVAL ACTION
239.1 JACKSON STREET
LOWELL, MASSACHUSETTS**

List the names of the principal personnel who will be assigned to the Work, including the superintendent, and their experience, and hourly rate. List all categories of personnel and hourly rates for non-principal personnel. This information shall be for the use of the Engineer, and such personnel shall be subject to the approval of the Owner and Engineer.

<u>NAME</u>	<u>POSITION</u>	<u>EXPERIENCE</u>	<u>HOURLY RATE</u>
-------------	-----------------	-------------------	--------------------



**SCHEDULE I
CERTIFICATE OF INSURANCE
PCB SOIL REMOVAL ACTION
239.1 JACKSON STREET
LOWELL, MASSACHUSETTS**

Bidder shall provide a specimen certificate of insurance (proof of insurance) that demonstrates that Bidder carries the coverages required by the Agreement. (Attach Certificate)



**SCHEDULE J
BIDDER'S IRS FORM W-9
PCB SOIL REMOVAL ACTION
239.1 JACKSON STREET
LOWELL, MASSACHUSETTS**

W-9 Payer's Request for Taxpayer Identification Number

Name of Contractor As Shown on Federal
Account _____

Address _____

City, State, Zip Code _____

Taxpayer Identification Number (TIN) _____

OR

Employer ID Number

Social Security Number

CERTIFICATION Under the penalties of perjury, I certify the information provided on this form is true,
correct, and complete.

Signature

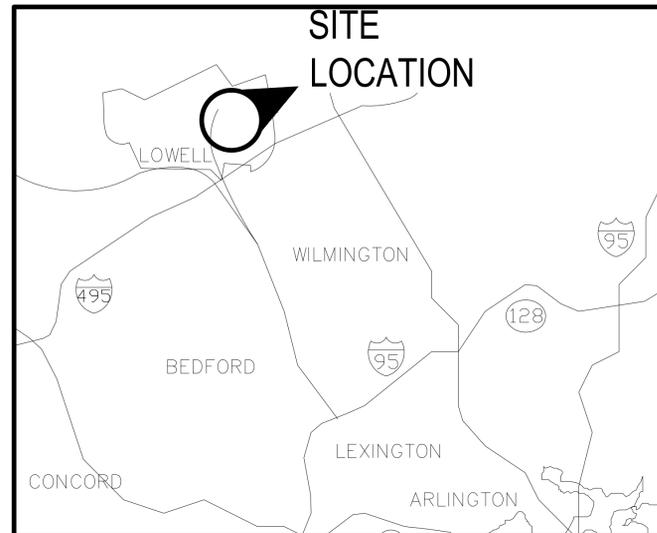
Date

Please check, if this applies to your Company:

Minority-Owned Business Enterprise

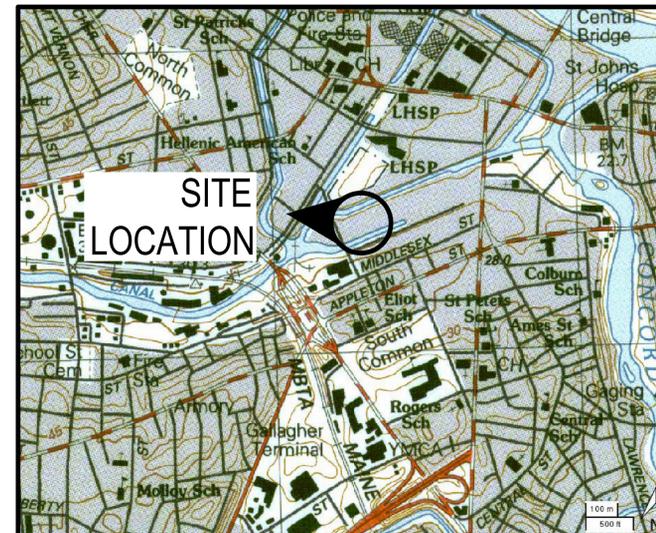
Women-Owned Business Enterprise

PCB SOIL REMOVAL ACTION PARCEL 239.1 JACKSON STREET LOWELL, MASSACHUSETTS



LOCATION OF PROJECT
NOT TO SCALE

IMAGE PUBLIC DOMAIN: COURTESY OF GOOGLE



BASE MAP
NOT TO SCALE

IMAGE PUBLIC DOMAIN: COURTESY MASSGIS

LEGEND

— C — C — C —	COMMUNICATIONS UNDERGROUND	— D — D — D —	FIRE DEPT. CONNECTION ON WALL
□ _C	MANHOLE - COMMUNICATIONS	⊕	STORM DRAINAGE LINE
□ _H	HANDHOLE	⊞	MANHOLE W/STEEL GRATING
○	UTILITY/POWER POLE	⊞	INLET - SURFACE
— E — E — E —	UNDERGROUND ELECTRIC	⊞	INLET - CURB
□ _E	MANHOLE - ELECTRIC	⊞	SLOTTED DRAIN
□ _P	PULLBOX	•	BORING
○ _{GUY}	GUY POLE	■	TEST PIT
⊙	LIGHT POLE	⊞	CATCH BASIN
— S — S — S —	SANITARY SEWER	• WG	WATER GATE
○	MANHOLE	126x74	SPOT GRADE
○	CLEAN OUT	— I — I — I —	IRRIGATION LINE
— W — W — W —	WATER LINE	— FD — FD — FD —	FOUNDATION DRAIN
⊗	VALVE	—————	INTERMEDIATE CONTOURS
□	VALVE BOX	————— 90.00	INDEX CONTOURS
⊙	FIRE HYDRANT		
⊙	POST INDICATOR VALVE		

SHEET INDEX

SHEET NUMBER	TITLE
G-001	COVER SHEET
C-101	EXISTING CONDITIONS PLAN
C-102	SITE PLAN
C-301	SECTION A
C-501	DETAILS

GENERAL NOTES

- EXISTING CONDITIONS AND LIMITS OF PROPERTY OWNERSHIP SHOWN HEREON PROVIDED TO THIS OFFICE BY TRINITY FINANCIAL.
- TOPOGRAPHY SHOWN HEREON BY AN ON THE GROUND STADIA SURVEY PERFORMED BY WATERMARK ON SEPTEMBER 26, 2011.

ABBREVIATIONS

A	ASH	HP	HANDICAP	S	SPRUCE
B	BOTTOM	HYD.	HYDRANT	SF	SILT FENCE
BD	BOLLARD	INV.	INVERT	T	TOP
BIT.	BITUMINOUS	LP	LIGHT POLE	TRI.	TRIPLE
CB	CATCH BASIN	M	MAPLE	U.N.O	UNLESS NOTED OTHERWISE
CBDI	CATCH BASIN DROP INLET	MH	MANHOLE	VCC	VERTICAL CONCRETE CURB
CONC.	CONCRETE	MW	MONITORING WELL	VGC	VERTICAL GRANITE CURB
DH	DRILL HOLE	LSA	LANDSCAPE AREA	VIF	VERIFY IN FIELD
DI	DUCTILE IRON	O	OAK	WCR	WHEEL CHAIR RAMP
DMH	DRAIN MANHOLE	P	PINE	WG	WATER GATE
ELEV	ELEVATION	PK	MASONRY NAIL		
FF	FINISHED FLOOR	PVC	POLYVINYL CHLORIDE		
		RCP	REINFORCED CONCRETE PIPE		
		ST.	STORY		

PCB SOIL REMOVAL ACTION

PARCEL 239.1
JACKSON STREET
LOWELL, MA

THE CITY OF LOWELL
DEPARTMENT OF PLANNING AND DEVELOPMENT

MARK	DATE	DESCRIPTION
A	10/09/14	ISSUED FOR BID

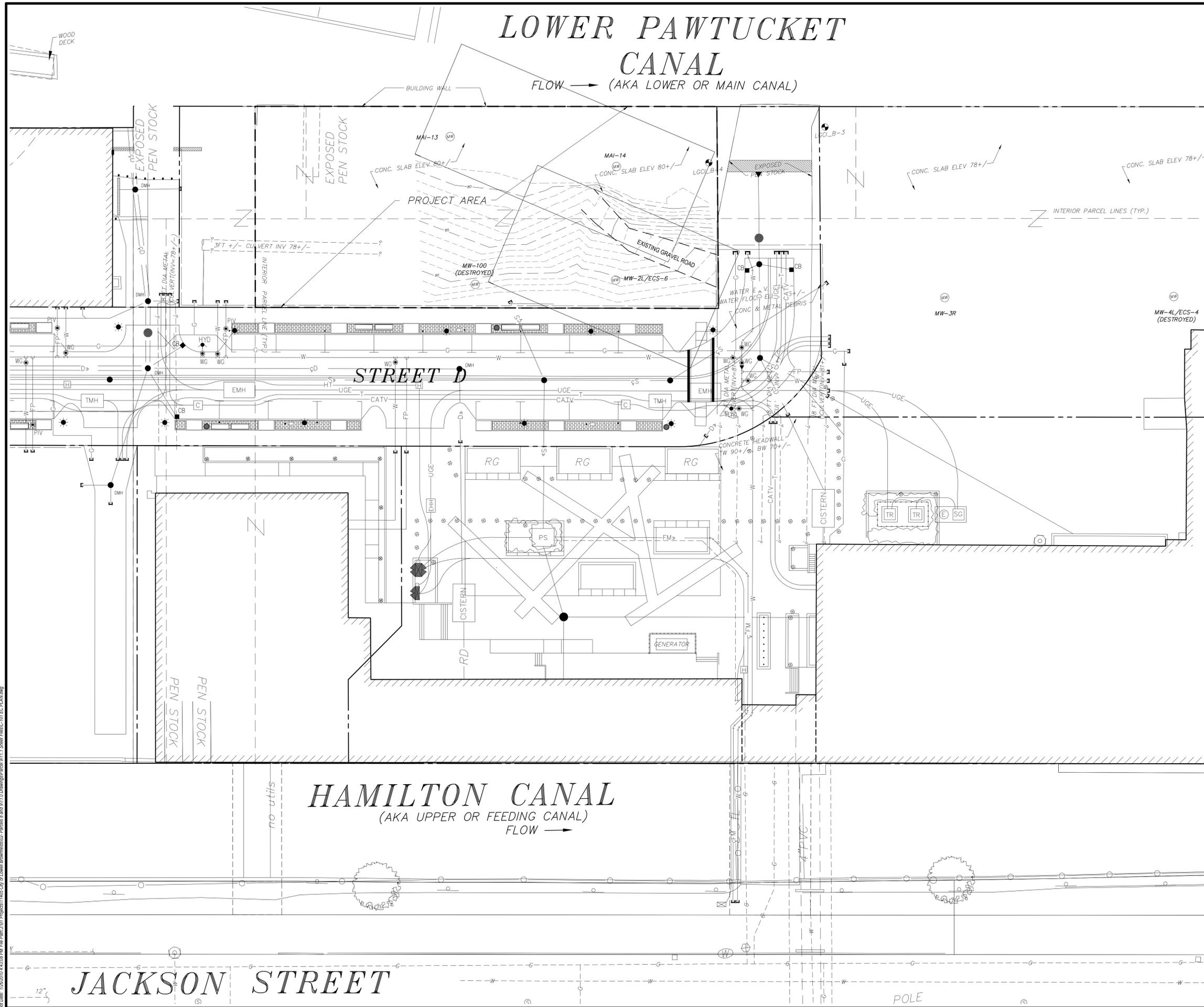
PROJECT NO: 11405-02
MODEL FILE: G-001 COVER SHEET.dwg
DRAWN BY: MEJ
CHK'D BY: RBB
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SHEET TITLE
COVER SHEET

G-001

LOWER PAWTUCKET CANAL

FLOW → (AKA LOWER OR MAIN CANAL)



NOTES:

- SEE SHEET G-001 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.

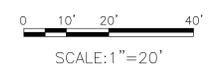
PCB SOIL REMOVAL ACTION
PARCEL 239.1
JACKSON STREET
LOWELL, MA
City
THE CITY OF LOWELL
DEPARTMENT OF PLANNING AND DEVELOPMENT

MARK	DATE	ISSUED FOR BID	DESCRIPTION
A	10/28/14		

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MODEL FILE: C-101 EC PLAN.dwg
DRAWN BY: JIR
CHK'D BY: RBB
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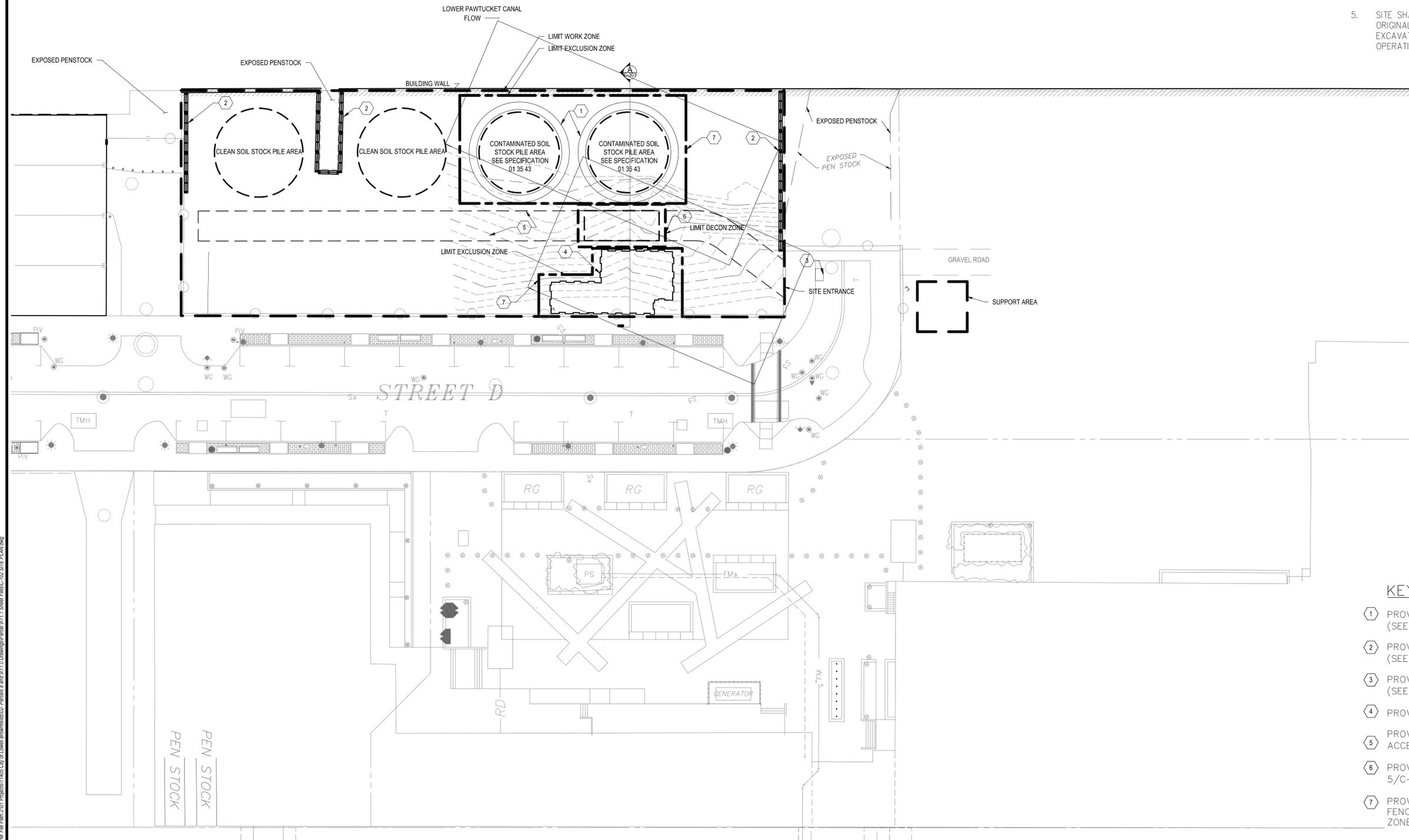
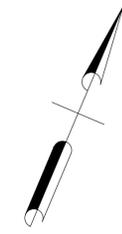
SHEET TITLE
EXISTING CONDITIONS PLAN

Plot Date: 12/22/14 4:53:58 PM File Path: J:\07 Projects\11405 City of Lowell Brownfields\02_Planets and 011\0 Drawings\Parcel 011.1_Show Plans\C-101_EC PLAN.dwg



NOTES:

1. SEE SHEET G-001 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.
2. CONTRACTOR IS RESPONSIBLE FOR DESIGN AND INSTALLATION OF TEMPORARY GRAVEL ROAD.
3. CONTRACTOR IS RESPONSIBLE FOR DESIGN AND INSTALLATION OF SHORING. PROVIDE MONITORING OF ADJACENT STRUCTURES DURING INSTALLATION REFER TO SPECIFICATION 31 41 16 SHEET PILING.
4. DO NOT ALLOW SOIL STOCKPILES AGAINST BUILDING WALL.
5. SITE SHALL BE BROUGHT BACK TO ORIGINAL CONDITIONS ONCE ALL EXCAVATION AND BACKFILLING OPERATIONS ARE COMPLETE.



PCB SOIL REMOVAL ACTION

PARCEL 239.1
JACKSON STREET
LOWELL, MA

City of
THE CITY OF LOWELL
DEPARTMENT OF PLANNING AND DEVELOPMENT

MARK	DATE	ISSUED FOR BID	DESCRIPTION
A	10/09/14		

PROJECT NO: 11405-02
MODEL FILE: C-102 SITE PLAN.dwg
DRAWN BY: JIR
CHK'D BY: RBB
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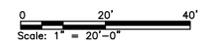
SHEET TITLE
SITE PLAN

C-102

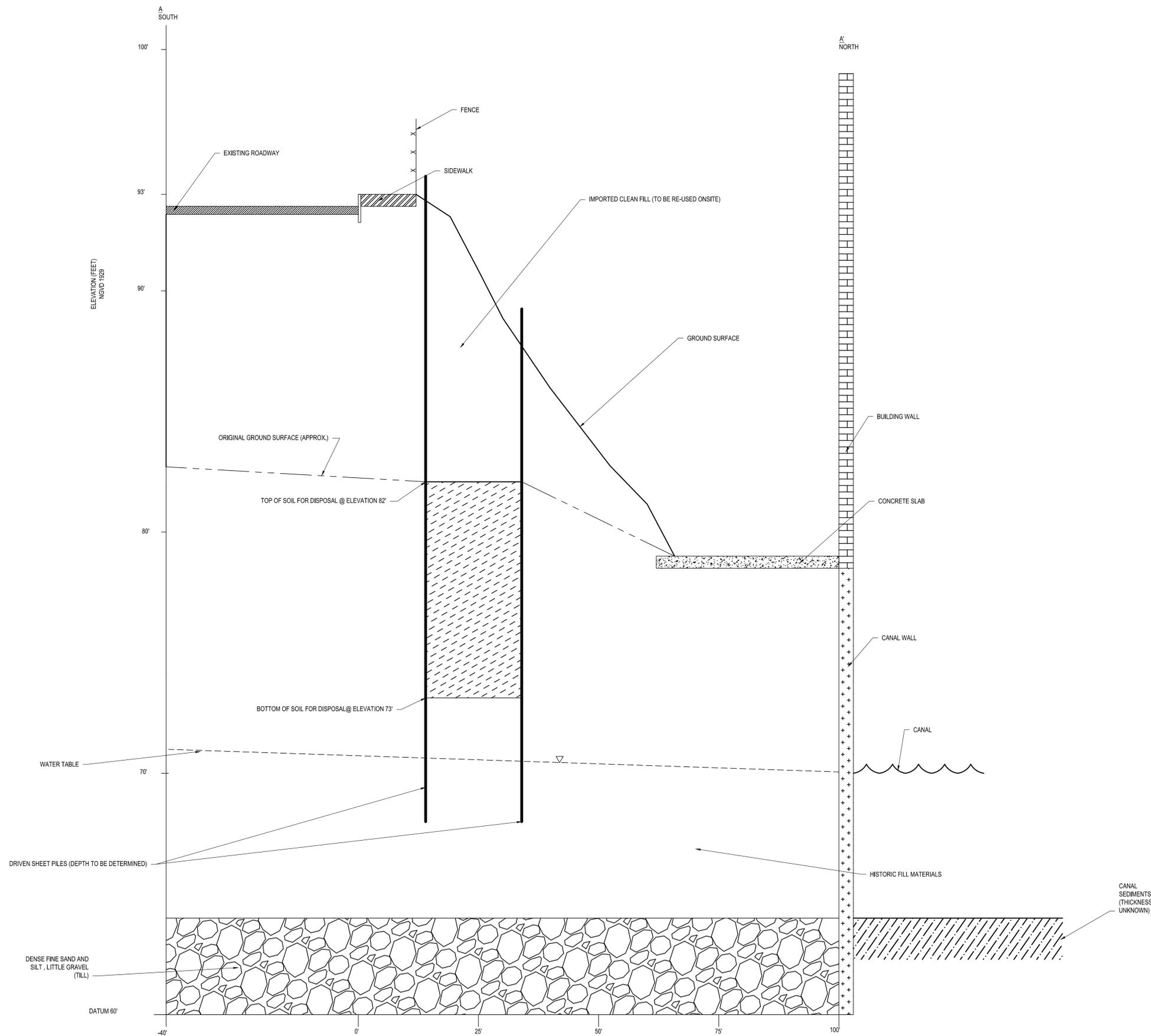
SHEET 3 OF 5

KEYED NOTES:

- 1 PROVIDE RUNOFF CONTAINMENT. (SEE DETAIL 3/C-501)
- 2 PROVIDE EROSION CONTROL. (SEE DETAIL 2/C-501)
- 3 PROVIDE INLET PROTECTION. (SEE DETAIL 4/C-501)
- 4 PROVIDE SHORING. (SEE NOTE 3)
- 5 PROVIDE TEMPORARY GRAVEL ACCESS ROAD (SEE NOTE 2)
- 6 PROVIDE DECON PAD (SEE DETAIL 5/C-501)
- 7 PROVIDE 5' HIGH ORANGE SAFETY FENCE TO DELINEATE EXCLUSION ZONES.



Plot Date: 1/29/2014 4:30:58 PM File Path: J:\01 Projects\11405\City of Lowell\Brownfields\02_Planets & 011\0 Drawings\Parcel 011.1_Sheet C-301_SECTION A.dwg



NOTES:

- SEE SHEET G-001 FOR LEGEND, ABBREVIATIONS, AND GENERAL NOTES.
- REFER TO SPECIFICATION 31 41 16 SHEET PILING FOR SHEET PILE DESIGN AND INSTALLATION.
- REFER TO SPECIFICATION 31 00 00 EARTHWORK FOR EXCAVATION PRACTICES.

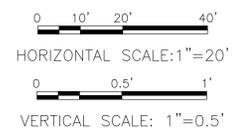
PCB SOIL REMOVAL ACTION
 PARCEL 239.1
 JACKSON STREET
 LOWELL, MA
 City
 THE CITY OF LOWELL
 DEPARTMENT OF PLANNING AND DEVELOPMENT

MARK	DATE	ISSUED FOR BID	DESCRIPTION
A	10/28/14		

PROJECT NO: 11405-02
 MODEL FILE: C-301_SECTION A.dwg
 DRAWN BY: JIR
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SHEET TITLE
SECTION A

C-301
 SHEET 4 OF 5



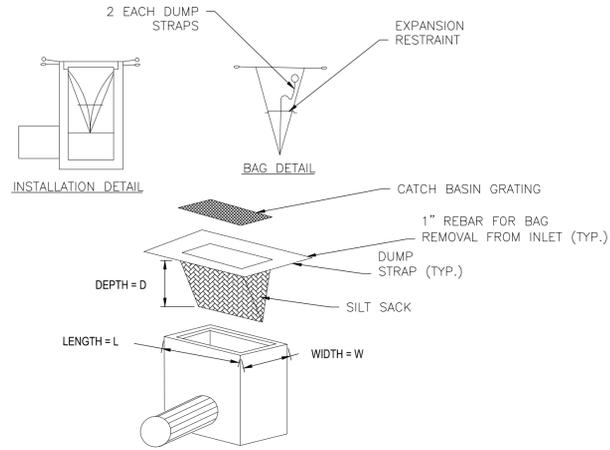
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A	10/09/14		

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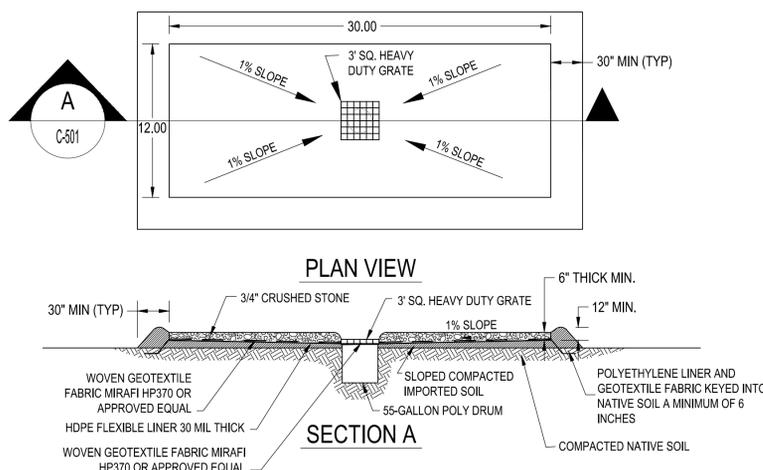
SHEET TITLE
DETAILS

EROSION AND SEDIMENT CONTROL NOTES:

- REFER TO SPECIFICATION 01 57 19 TEMPORARY EROSION AND SEDIMENT CONTROLS FOR MORE INFORMATION.
- IMMEDIATELY AFTER MOBILIZATION BUT PRIOR TO INITIATION ANY SOIL-DISTURBING ACTIVITIES, THE CONTRACTOR WILL INSTALL ALL SPECIFIED PERIMETER CONTROLS ON THE SITE. THESE CONTROLS HAVE BEEN DESIGNED TO TRAP ALL SEDIMENT PRODUCED DURING SOIL-DISTURBING ACTIVITIES AND TO PREVENT OFF-SITE DAMAGE. IT IS RECOGNIZED THAT SOME SITE PREPARATION MAY BE REQUIRED TO PROPERLY INSTALL THESE CONTROLS.
- THE RECOMMENDED SEQUENCE FOR THE INSTALLATION AND REMOVAL OF EROSION AND SEDIMENT CONTROL MEASURES IS AS FOLLOWS: PERIMETER CONTROL MEASURES (SILT BARRIERS AND FENCING) INSTALLED AT DESIGNATED AREAS; CLEANING OF STREETS DURING CONSTRUCTION; SITE GRADING (INCLUDING TEMPORARY SLOPE STABILIZATION) AS NEEDED; INSTALLATION OF UTILITIES; PAVING AS REQUIRED; FINAL GRADING; INSTALLATION OF SOO OR VEGETATIVE MATERIALS; REMOVAL OF TEMPORARY CONTROLS; AND SITE CLEANUP.
- DURING ALL SOIL-DISTURBING ACTIVITIES, THE CONTRACTOR WILL TAKE APPROPRIATE STEPS USING ACCEPTED CONSTRUCTION METHODS TO MINIMIZE EXPOSURE OF UNPROTECTED SOIL AND OTHER CONSTRUCTION MATERIALS TO RAINFALL. PARTICULAR CARE MUST BE EXERCISED WHEN DEALING WITH TOPSOIL STOCKPILES, FILL MATERIAL, OR SOIL ON SLOPES. THE CONTRACTOR SHALL MAINTAIN A DATE LOG OF ALL SOIL DISTURBANCE ACTIVITIES, MAJOR GRADING OPERATIONS, CONTROL MEASURE INSTALLATIONS.
- AS SITE CONDITIONS WARRANT, THE CONTRACTOR MAY ALSO CHOOSE TO MODIFY THE TYPE OR ARRANGEMENT OF SPECIFIED CONTROLS TO IMPROVE THEIR EFFECTIVENESS. AS WITH ANY OTHER PROJECT CHANGES, THE CONTRACTOR MUST PRESENT ALL PROPOSED MODIFICATIONS TO THE ENGINEER FOR APPROVAL PRIOR TO INSTALLATION.
- THE CONTRACTOR WILL INSPECT ALL EROSION AND SEDIMENT CONTROLS AT LEAST ONCE EVERY CALENDAR DAY AND AFTER ALL RAINFALL EVENTS TO ENSURE THAT EACH CONTROL REMAINS INTACT. ANY DAMAGE NOTED DURING SUCH INSPECTIONS SHALL BE REPAIRED WITHIN 4 HOURS TO RESTORE THE CONTROLS TO ORIGINAL SPECIFICATIONS. THE CONTRACTOR WILL BE RESPONSIBLE FOR MAINTENANCE OF ALL EROSION AND SEDIMENT CONTROLS AS SPECIFIED IN THE PLANS, INCLUDING PERIODIC RE-GRADING AND FINAL GRADING AFTER REMOVAL OF ALL SUCH CONTROLS.
- WHEN WATER IS USED FOR DUST CONTROL OR TO PROMOTE VEGETATION, THE CONTRACTOR WILL PREVENT THE ESCAPE OF THIS WATER AND ANY SEDIMENT IT MAY CARRY FROM THE CONSTRUCTION SITE.
- CARE MUST BE EXERCISED TO PREVENT EXCESSIVE OFF-SITE TRACKING OF MUD OR SEDIMENT BY CONSTRUCTION VEHICLES. PROPERLY GRAVELED TRANSITION AREAS SHOULD BE ESTABLISHED AT ALL TEMPORARY SITE EXITS TO ASSIST IN MUD REMOVAL FROM DEPARTING VEHICLES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANING THE STREET DAILY, WHEN MUD IS TRACKED ONTO THE STREET FROM THE CONSTRUCTION SITE. STREET WASHING SHALL BE ALLOWED ONLY AFTER SEDIMENT REMOVAL.
- DURING FINAL SITE RESTORATION, EACH TEMPORARY CONTROL SHALL BE COMPLETELY REMOVED AND THE AREA FINISHED TO THE APPROPRIATE POST-PROJECT CONDITION.
- CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH REQUIREMENTS OF ANY AND ALL PERMITS AND APPROVALS.
- VEHICLE MAINTENANCE OTHER THAN EMERGENCY REPAIR SHALL NOT BE PERFORMED ON THE PROJECT SITE. NEW OR USED HYDRAULIC FLUIDS, FUELS, AND ENGINE OILS SHALL NOT BE STORED AT THE PROJECT SITE.
- ANY POLLUTANTS DISCHARGED ON THE PROJECT SITE DURING CONSTRUCTION SHALL BE HANDLED AND DISPOSED IN A MANNER THAT DOES NOT CONTAMINATE STORMWATER RUNOFF.
- FUELING OF CONTRACTOR'S EQUIPMENT SHALL BE PERFORMED AWAY FROM STORM DRAIN OUTLETS. EXTREME CARE SHALL BE TAKEN TO PREVENT FUEL SPILLS. CONTRACTOR SHALL NOTIFY THE ENGINEER, LOCAL FIRE DEPARTMENT AND OTHER AUTHORITIES IN THE EVENT OF A SPILL. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR RESPONDING TO FUEL SPILLS, INCLUDING ALL COSTS OF REMOVING AND DISPOSING MATERIALS CONTAMINATED BY FUEL SPILLS.
- CONTRACTOR SHALL PROVIDE AND MAINTAIN ABSORBENT MATERIALS, SHOVELS, AND CONTAINERS FOR SPILL RESPONSE AND CLEANUP.
- CONTRACTOR SHALL PREVENT SURFACE WATER RUNOFF FROM TRANSPORTING SEDIMENT OR OTHER CONTAMINANTS OFF-SITE.
- CONTRACTOR SHALL REMOVE SEDIMENT DEPOSITS AND PLACE THEM IN DESIGNATED SPOIL AREAS. SEDIMENT SHALL NOT BE ALLOWED TO FLUSH OFF-SITE. IF SEDIMENT HAS BEEN IN CONTACT WITH CONTAMINATED MATERIALS, IT SHALL BE INCORPORATED INTO MATERIAL TO BE TRANSPORTED FOR TREATMENT OR DISPOSAL.
- EQUIPMENT AND VEHICLES SHALL BE PROHIBITED FROM MANEUVERING ON AREAS OUTSIDE OF DEDICATED RIGHTS-OF-WAY AND EASEMENTS FOR CONSTRUCTION. DAMAGE CAUSED BY CONSTRUCTION TRAFFIC TO EROSION AND SEDIMENT CONTROL SYSTEMS SHALL BE REPAIRED IMMEDIATELY.
- SILT FENCE MATERIALS SHALL MEET THE REQUIREMENTS OF ASTM D 6461 - 99. "STANDARD SPECIFICATION FOR SILT FENCE MATERIALS", ASTM INTERNATIONAL.
- SILT FENCE INSTALLATION SHALL MEET THE REQUIREMENTS OF ASTM D 6462 - 03. "STANDARD PRACTICE FOR SILT FENCE INSTALLATION", ASTM INTERNATIONAL.
- EROSION AND SEDIMENT CONTROLS SHALL BE UTILIZED IN COMPLIANCE WITH PROCEDURES RECOMMENDED IN "MASSACHUSETTS EROSION AND SEDIMENT CONTROL GUIDELINES"

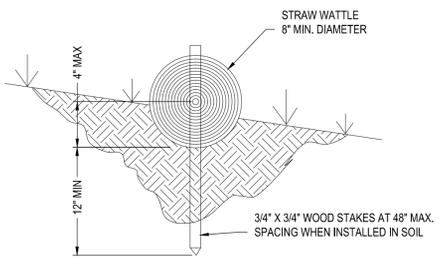
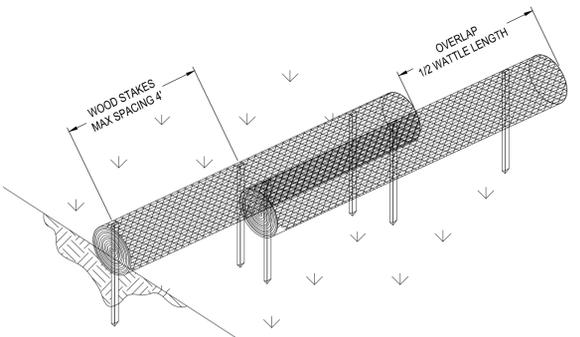


INLET PROTECTION
NOT TO SCALE



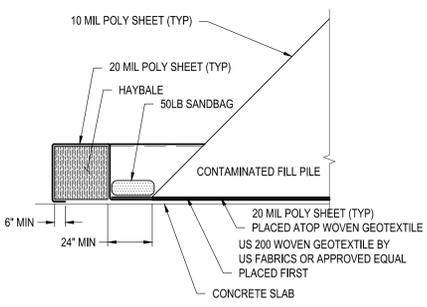
- NOTES:
- DECON PAD SHALL BE SIZED TO HANDLE EQUIPMENT PROPOSED FOR WORK.

DECON PAD
NOT TO SCALE



- NOTES FOR WATTLE INSTALLATION ON HARDENED SURFACES
- SUBSTITUTE 8" CMU BLOCK FOR WOOD STAKES AND INSTALL AT SAME SPACING ALONG DOWNSTREAM SIDE OF WATTLE.
 - BUNDLE WATTLES TOGETHER WITH TWINE EVERY 4'.

STRAW WATTLE - EROSION CONTROL
NOT TO SCALE



RUNOFF CONTAINMENT
NOT TO SCALE

Plot Date: 12/22/10 4:43:08 PM File Path: J:\07 Projects\11405\City of Lowell\Brownfields\02_Planets 8 and 9\11.0 Drawings\Parcel 011.1_Sheet\Plan-C-501-DETAILS.dwg