April 30, 2018

Mr. Chris Swain
Bureau of Remediation and Waste Management
Maine Department of Environmental Protection
17 State House Station
Augusta ME 04333

Subject: **Landfill 1 Corrective Measures Implementation Plan – Revision 2**
Orrington Remediation Site
Orrington, Maine

Dear Mr. Swain:

Please find enclosed the **Landfill 1 Corrective Measures Implementation Plan – Revision 2** for the Orrington Remediation Site. Revision 2 to this CMI Plan incorporates the responses to the Maine DEP's comments dated April 10, 2018 on the Landfill 1 Corrective Measures Implementation Plan – Revision 1. The Landfill 1 CMI Plan – Revision 2 includes updated text, tables and figures as well as all appendices. Correspondence with the Maine DEP concerning this remedial design is in Appendix O including the recent April 10, 2018 comment letter and Mallinckrodt's April 27, 2018 response to those comments.

The Maine DEP also requested information on the disposal facilities to be used for visible mercury. If recoverable mercury is encountered, it will be transported and disposed at WM Mercury Waste Inc. in Union Grove, WI (EPA ID WIR000000356). If visible mercury is observed that is entrained in the soil and cannot be separated, the soils with such visible mercury will be transported and disposed at Stablex in Blainville (Quebec), Canada (EPA ID NYD980756415). Waste generators have numerous obligations under both state and federal laws and regulations, and all waste shipments from the Orrington Remediation Site will meet these requirements.

Upon approval of those comment responses and the electronic copy of the CMIP, complete hard copies of the Landfill 1 CMI Plan – Revision 2, including all appendices, will be submitted to the Department.

We appreciate your review of this Landfill 1 CMI Plan – Revision 2 and the collaborative discussions that have resulted in this final plan. We look forward to receiving final approval of this final Landfill 1 CMI Plan as soon as possible so excavation and backfilling can be completed before next winter. If you have questions concerning this revised CMI Plan or the responses to comments submitted on April 27, please do not hesitate to contact me.

Sincerely,

Kathy Zeigler

Kathy Zeigler
Remediation Program Manager

cc: Dean Carter – CDM Smith
Pat Duft, Mallinckrodt US LLC
Chris Greene, Geosyntec
John Weston, CDM Smith

PROFESSIONAL ENGINEER CERTIFICATION

The design set forth in the Landfill 1 Corrective Measures Implementation Plan (CMI Plan) Revision 2 dated April 30, 2018 was prepared under the direction of a Professional Engineer licensed in the State of Maine (i.e., a Maine PE). Work Plans prepared by the Remediation Contractor and included as attachments to the CMI Plan have been reviewed under the direction of a Maine PE for compliance with the design requirements set forth in the CMI Plan.

April 30, 2018

Signature | Date | Stamp

CMI PLAN

Landfill 1
Corrective Measures Implementation (CMI) Plan

Revision 2

Orrington Remediation Site

Orrington, Maine

Prepared by:

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Mallinckrodt US LLC

April 2018

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Acronyms

Alpha	Alpha Analytical Laboratory
ASTM	American Society for Testing and Materials
BEP	Board of Environmental Protection
bgs	below ground surface
CDM	Camp Dresser & McKee
CDM Smith	CDM Smith, Inc.
CGP	Construction General Permit
CMI	Corrective Measures Implementation
COC	Contaminant of Concern
CQA	Construction Quality Assurance
DEP	Department of Environmental Protection
DMA	Direct Mercury Analyzer
Drawings	CMI Plan Drawings
ESC	Erosion and Stormwater Control
ft	feet
Geosyntec	Geosyntec Consultants, Inc.
GB	Geotechnical Boring
GPS	Global Positioning System
GWTP	Groundwater Treatment Plant
HASP	Health and Safety Plan
IES	Interim Extraction System
lb	Pound
LF	Linear Feet
LF1	Landfill 1
Mallinckrodt	Mallinckrodt US LLC
MDIFW	Maine Department of Inland Fisheries and Wildlife
mg/kg	milligrams per kilogram
MPS	Media Protection Standard
NLEB	Northern Long Eared Bat
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRPA	Natural Resources Protection Act
Order	Board of Environmental Protection Order

PAMP	Perimeter Air Monitoring Plan
PBR	Permit by Rule
PCB	polychlorinated biphenyl
PM_{10}	Particulate Matter
QA/QC	quality assurance/quality control
QAPP	Quality Assurance Project Plan
RAGs	Remediation Action Guidelines
SB	Soil Boring
Site	Orrington Remediation Site
SME	Sevee and Maher Engineers
SPT	standard penetration test
sq.	square
SVOC	semivolatile organic compound
TCLP	toxicity characteristic leaching procedure
TP	Test Pit
TSSA	Temporary Stockpile Area
ug/L	microgram per liter
USACE	United States Army Corps of Engineers
USCS	United Soil Classification System
USFWS	United States Fisheries and Wildlife Service
VOC	volatile organic compound
XRF	X-Ray Fluorescence

Section 1.
Introduction

1.1 Purpose

This Landfill 1 Area Corrective Measures Implementation (CMI) Plan – Revision 2 was prepared by Geosyntec Consultants, Inc. (Geosyntec) and CDM Smith Inc. (CDM Smith) on behalf of Mallinckrodt US LLC (Mallinckrodt). References to this CMI Plan within the document are intended to refer to the current revision (Revision 2). The purpose of this CMI Plan is to present the corrective measures to support soil remediation of the Landfill 1 Area at the Orrington Remediation Site (Site) located at 99 Industrial Way, Orrington, Maine. **Figure 1-1** is a Site Plan. The CMI Plan presents the results of the pre-design investigation, a narrative description of the remedial objectives and planned implementation, design drawings, and specifications for the remedial activity.

The Landfill 1 Area will be remediated in accordance with the Board of Environmental Protection (BEP) Order (the Order) effective April 3, 2014 which incorporates, with modifications, the Compliance Order issued by the Maine Department of Environmental Protection (DEP) dated November 24, 2008.

Subsequent sections describe the results of the Landfill 1 Area pre-design study, and objectives and components of the CMI. The 2010 modification to the 2008 Order states that "Mallinckrodt shall conduct column leaching tests such that the adsorption/desorption or other degradation processes of the residual soil contamination beneath the landfill can be quantified, and on this basis the Department shall determine the area and depth of soil excavation beneath [Landfill 1]." (Maine DEP, 2010). Mallinckrodt has completed the column leaching tests specified in the Order as part of the pre-design study, and the results are discussed in this CMI Plan.

Additional details describing the field sampling methods, analytical methods, health and safety procedures, and quality assurance/quality control (QA/QC) procedures have been provided in the Health and Safety Plan (HASP) (CDM Smith 2014a) and Quality Assurance Project Plan (QAPP) (CDM Smith, 2015a).

Waste generated during the remediation of the Landfill 1 Area will be managed in accordance with the letter from David Wright dated February 7, 2018 and the letter from Chris Swain dated March 6, 2018, both of which are included in Appendix P to this CMI Plan.

1.2 Report Organization

This Landfill 1 CMI Plan presents the geotechnical and analytical data collected to support the remedial design, followed by a description of the remedial design process and the proposed remediation activities. Analytical and geotechnical data were collected to support remedial design in the Landfill 1 Area in accordance with the Landfills Phase I Pre-Design Work Plan (CDM Smith, 2014b) and the Landfills Phase II Pre-Design Work Plan (CDM Smith, 2015b). A summary of the data collection activities and results of these supporting data sets are presented in Section 2.

The remedial design objectives, based on the Order, are described in Section 3. The components of the remedial design that will be implemented to meet the remedial design objectives as well as the material transportation and disposal logistics are included in Section 4. The permitting requirements are presented in Section 5, and the anticipated schedule of CMI activities is presented in Section 6.

The pre-design activities analytical results are presented in **Appendix A**, and the boring logs and test pit logs are provided in **Appendix B**. The laboratory reports from Alpha Analytical Laboratory (Alpha) and Geosyntec Consultants Field DMA-80 Laboratory are provided in **Appendix C**, and the Data Usability Assessment Reports are provided in **Appendix D**. The Geotechnical Laboratory Reports are in **Appendix E**. The results from the column test study are summarized in **Appendix F**. The CMI Plan Drawings (Drawings) are provided in **Appendix G,** Technical Specifications are provided in **Appendix H,** design calculations are provided in **Appendix I**, the Construction Quality Assurance (CQA) Plan is provided in **Appendix J**, the Landfill 1 Additional Investigation Plan is provided in **Appendix K,** the Soil and Concrete Use Plan is provided in **Appendix L** and the Interim Extraction System (IES) Design Plans are included in **Appendix M**. The Remediation Contractor Work Plans (e.g. Excavation and Restoration Plan, Excavation Support Plan, and Construction Water Management Plan) are provided in **Appendix N**. **Appendix O** provides responses to Maine DEP comments on the Draft Landfill 1 CMI Plan. **Appendix P** contains Maine DEP Correspondence regarding Landfill 1 waste characterization.

Section 2.
Summary of the Landfill 1 Area Pre-Design Results

The following section presents a summary of the results of the Phase I and Phase II pre-design activities completed at the Landfill 1 Area. Analytical and geotechnical pre-design activities were completed in accordance with the Revised Phase I Pre-Design Work Plan (Revised Phase I WP) (CDM Smith, 2014b), Revised Phase II Pre-Design Work Plan (Revised Phase II WP) (CDM Smith, 2015b), and the Revised Plant Area Pre-Design Work Plan (CDM Smith, 2015c). Letters of Conditional Approval for the Revised Phase I WP and Revised Phase II WP were received from Maine DEP on December 12, 2014 and June 16, 2015, respectively. Numerous e-mails approving step-out borings conducted during these pre-design investigations were sent to the Maine DEP for review and approval.

The Landfill 1 Area CMI includes excavation of fill from within Landfill 1 boundary as depicted on the Drawings in **Appendix G** and excavation of fill containing mercury concentrations greater than 2.2 mg/kg in the areas immediately upgradient and downgradient of the Landfill 1 boundary. The Pre-Design results for investigation activities conducted in the Landfill 1 Area are presented below.

2.1 Analytical Results

A total of 83 soil borings (SB) were advanced in the Landfill 1 Area during the Phase I and Phase II pre-design activities. Seven soil borings were advanced on December 15, 2014 and December 16, 2014, as part of Phase I pre-design activities. Seventy-six additional soil borings were advanced at Landfill 1 between June 17, 2015 and August 26, 2015 as part of the Phase II pre-design activities. The Revised Phase II WP proposed 48 soil borings (SB-LF1-08 through SB-LF1-55) with possible step-out soil borings where mercury concentrations in perimeter borings were above 2.2 milligrams per kilogram (mg/kg). Twenty-eight (28) step-out borings (SB-LF1-56 through SB-LF1-83) were performed with Maine DEP approval at the locations shown on **Figure 2-1.** The locations of sixteen (16) supplemental borings performed in May 2017, after the submittal of the draft CMI Plan, are also shown on **Figure 2-1**. The results from the supplemental borings are discussed in **Section 4.1**. The soil borings in the Landfill 1 area were advanced using a track mounted Geoprobe/7822DT, Geoprobe/6620DT, and a hand probe, due to space and access constraints.

On December 19, 2014, three test pits (TP) (TP-LF1-01, TP-LF1-02, and TP-LF2-03) were also completed in the Landfill 1 area using a John Deere 75D excavator. The locations of the Geoprobe soil borings, and test pits are shown on **Figures 2-1 and 2-9**, respectively.

Analytical samples were collected from soil samples obtained from these borings and test pits. **Appendix A** presents tabulated results of the analytical tests, **Appendix B** presents the boring and test pit logs from the investigations, and **Appendix C** presents the Alpha Laboratory Reports, Direct Mercury Analyzer (DMA) Laboratory Reports, and the Mercury Sequential Extraction Laboratory Reports. The sections below present a summary of the data collected and key findings to support the design activities.

2.1.1 Nature and Extent

The findings from the analysis of the nature and extent of contaminants of concern (COCs) exceeding soil Media Protection Standards (MPS) in the Landfill 1 area based on the pre-design investigation results are as follows:

- The majority of mercury from a volume perspective in the Landfill 1 area soils, based on the pre-design samples analyzed, is located in the fill material (Stratum 1).

- Higher concentrations of mercury were observed in fill material in the borings performed in Cells 1A and 1B as compared to the remaining borings.
- Non-mercury COCs with MPS were not detected above their respective MPS in the Landfill 1 area.
- Total volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) without MPS were not detected or were detected at levels less than Maine Remedial Action Guidelines (RAGs) for unrestricted use.
- Visible mercury was not observed in the borings or test pits performed in the Landfill 1 area.

Each boring was typically segregated into 1-ft intervals and mercury concentrations were measured from these intervals. Where there was not enough material for analysis in a 1-ft segment, soil from adjacent 1-ft segments (up to 4) was combined into a single sample. The sample intervals were first screened with an X-Ray Fluorescence Analyzer (XRF); if the XRF measurement was less than 15 mg/kg, the sample was analyzed using the on-site Maine-Certified DMA. Additionally, if the DMA measurement of mercury was less than 2.2 mg/kg, the sample was submitted for analysis at a Maine certified off-site laboratory (Alpha). The mercury concentrations measured using the XRF, DMA, and at the off-site Maine certified laboratory are provided in **Table A-1** of **Appendix A**. **Figure 2-2** presents the locations of borings where one or more samples exceeded the MPS for mercury and presents the depth below ground surface where soil exceeded the MPS. **Figure 2-3** also shows the location of each soil boring, and the depth below ground surface to the top of native soil at each location.

The majority of mercury from a volume perspective in the Landfill 1 area soils, based on the pre-design samples analyzed, is located in the fill material (Stratum 1). The depth of fill material in the Landfill 1 area ranges from 5 to 33 feet below ground surface, with the majority of the fill material located above the groundwater. Approximately 61 percent of the volume of soil with mercury concentrations greater than the MPS is in fill material, not in the native underlying soils in the Landfill 1 area.

Samples analyzed from soil borings installed during the pre-design activities vertically delineated the extent of mercury concentrations greater than the MPS in the Landfill 1 area. The lateral extent was delineated in the majority of locations in the Landfill 1 area with the exception of 3 locations. SB-LF1-82 in the northeast corner, SB-LF1-70 in the northwest corner, and SB-LF1-79 in the southwest corner had mercury concentrations greater than 2.2 mg/kg, but step-out borings were not performed due to the inability to safely access this area. Delineation will be completed during CMI excavation in these areas, and post-excavation confirmation samples will be collected and submitted to Maine DEP to confirm clean excavation boundaries.

A total of 43 samples were collected from 34 pre-design borings and sent to an off-site Maine certified laboratory for analysis of total VOCs and non-mercury COCs for which soil MPS are established. During Phase I pre-design activities, samples were collected at a frequency of approximately one sample every 4-ft vertically. During the Phase II pre-design activities, samples were collected from the interval below the deepest mercury MPS exceedance encountered in Phase I. Non-mercury COCs with MPS were not detected above their respective MPS in the Landfill 1 area. The results for non-mercury COCs (chloropicrin, polychlorinated biphenyls (PCBs), cadmium, ethylbenzene, and total xylenes) in the Landfill 1 area are presented in **Table A-2** of **Appendix A. Figures 2-4 through 2-8** present the sample locations and results if one or more samples from the boring were detected above the method detection limit. Other VOC and SVOC compounds without MPSs were either not detected or were present at concentrations less than the Maine RAGS for unrestricted use and therefore do not require additional delineation. The total VOC data is provided in **Table A-3** of **Appendix A**.

2.1.2 Preliminary Waste Characterization

To evaluate the potential waste characterization, samples were obtained from three test pits (TP-LF1-01, TP-LF1-02, and TP-LF1-03) and 17 borings (WC-LF1-01 through WC-LF1-17) (**Figures 2-9 and 2-10**). Test pit logs are presented in **Appendix B**.

A composite bulk sample was obtained from each test pit or boring to assess whether the material exhibits hazardous waste characteristics. The composite sample consisted of samples collected over the entire depth interval of the test pit or boring. The samples from each test pit or boring were placed in separate 5-gallon plastic buckets and sealed. The composite samples were analyzed to determine whether the material exhibited hazardous characteristics and to assist with identifying disposal facilities. The parameters analyzed included total metals, VOCs, toxicity characteristic leaching procedure (TCLP) metals, TCLP SVOCs, TCLP herbicides, ignitability, corrosivity, and reactivity. The analytical data are provided in **Table A-4** of **Appendix A**.

Cell 1A, Cell 1B and Lined Process Lagoon

According to historical documentation, approximately 1,000 tons of brine sludge was disposed of in Landfill 1 within Cells 1A and 1B from 1970 to 1972 (Acheron, 1988). As part of the closure process, the brine sludge was reportedly mixed with sand, after which the areas were covered with more sand and soil and later covered with a liner. Therefore. the current composition of the fill in Cell 1A and Cell 1B is residual brine sludge mixed with sand.

The Lined Process Lagoon was used as a surge capacity lagoon for the brine system and had a capacity of about 250,000 gallons. The lagoon was closed in July 1983 when it was drained, and the brine sludge and wastewater were removed (Acheron, Inc., 1988). Therefore, no waste remains in the Lined Process Lagoon; however, the residual fill in this area could have been mixed with the wastewater treatment sludge (K106 listed waste) or brine sludge (K071 listed waste) and the fill removed from this area will be managed as listed waste.

TP-LF1-01 and TP-LF1-03 were performed in Cells 1A and 1B respectively. The major findings from the waste characterization activities in the Cell 1A, 1B, and Lined Process Lagoon areas were as follows:

- There were no visual indications that brine sludge material is present in Cell 1A or Cell 1B, where borings and test pits were performed.
- The material tested does not exhibit the characteristics of a hazardous waste.
- Elemental mercury was not observed in the test pits or within the soil borings completed within Cell 1A, Cell 1B, or Lined Process Lagoon.

Landfill 1 Areas Outside Cells and Lined Process Lagoon

There are no historical records or documents indicating that brine sludges or wastewater treatment sludges were placed anywhere else in Landfill 1 or mixed with materials outside Cells 1A and 1B and the lined process lagoon. Records do indicate that construction debris and graphite anodes were disposed of on the hillside next to Cells 1A and 1B (CDM, 1998). The major findings from waste characterization activities in Landfill 1 Areas outside the Cells and the Lined Process Lagoon were as follows:

- There were no visual indications that brine sludge material is present in the Landfill 1 Areas outside the Cells.
- The material tested does not exhibit the characteristics of a hazardous waste.

- Elemental mercury was not observed in the test pits or within the soil borings completed in Landfill 1 Areas outside the Cells and Lined Process Lagoon.

Additional waste characterization sampling will be completed in the Landfill 1 Area outside the Cells 1A/1B and the Lined Process Lagoon at a rate of one sample for every 500 tons to be disposed. If any additional areas are identified to be hazardous waste, such soils will be excavated and managed separately and disposed as characteristic hazardous waste.

2.2 Geotechnical Investigation Results

Nine geotechnical borings (GB) were drilled in the Landfill 1 Area between June 25 and July 16, 2015. Geotechnical borings were advanced using a CME 850 drill rig with rotary wash and casing techniques. The geotechnical borings, shown on **Figure 2-1,** were advanced to evaluate the soil stratigraphy, soil strength parameters, and to obtain samples for geotechnical laboratory testing. Boring logs are provided in **Appendix B**.

The CME 850 drill rig was equipped with a 140 pound (lb.) automatic hammer to advance the split spoon sampler and perform Standard Penetration Tests (SPTs) in each boring. Split spoon sampling and SPTs were performed continuously to 10 ft into the till (Stratum 6) at GB-LF1-04, GB-LF1-07 and GB-LF1-10, and to 6 ft into till at GB-LF1-08 and GB-LF1-09, then at 5-ft vertical increments thereafter until a depth of at least 50 feet bgs was reached. GB-LF1-03 and GB-LF1-06 were sampled and tested continuously at 2-ft vertical increments until bedrock (Stratum 7) was encountered, then drilled to a depth of 10 ft into bedrock. GB-LF1-05 was sampled and tested continuously until refusal was encountered at 38 ft bgs. GB-LF1-02 was sampled and SPT-tested continuously until till was reached at 58 ft bgs and then was continuously split-spoon sampled 4 ft into the till. Cement-bentonite grout was used to backfill each borehole. One 10-ft bedrock core was taken at GB-LF1-04 to obtain bedrock type and quality information. A boring was not advanced at location GB-LF1-01 due to access difficulties and safety concerns.

Soil samples were collected during the SPT testing using standard split spoon sampling techniques. Individual samples were obtained for each split spoon. Soil was placed in 1-gal plastic zip-lock bags and labeled with sample identification information which included boring location, date, and depth interval. A tabulated summary of the samples proposed for laboratory testing was provided to Maine DEP on July 24, 2015 for approval. After Maine DEP provided comments on the samples and parameters to be analyzed, 11 samples from Landfill 1 were delivered to the CDM Smith GTS Laboratory, located in Somerville, Massachusetts, and tested in accordance with American Society for Testing and Materials (ASTM) D422 Standard Test Method for Particle Size Analysis of Soils (Grain Size Analysis), ASTM D4318 Standard Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils (Atterberg Limits)(as applicable), ASTM D2487 Standard Practice for Classification of Soils for Engineering Purposes (United Soil Classification System (USCS)), and ASTM D2216 Standard Test Method for Water Content. Five of the 11 samples were tested in accordance with ASTM D3080 Standard Test method for Direct Shear Test of Soils under Consolidated Drained Conditions.

2.2.1 Landfill 1 Stratigraphy

Based on data obtained from the geotechnical activities described above and historical information from previous Site investigations (CDM, 1998), the Landfill 1 stratigraphy can be described generally as a fill layer underlain by native soil layers of varying characteristics. Subsurface profiles of Landfill 1 are shown on **Drawings 6, 7, and 8** in the Landfill 1 CMI Plan Drawings (**Appendix G**).

Six of the seven subsurface strata identified in other areas of the Site were also identified in the Landfill 1 Area based on geotechnical laboratory soil test results, field SPT results, and visual observations made

during field activities. The subsurface strata are defined as follows for Landfill 1 (generally in order of appearance from top to bottom):

- Stratum 1 (Fill) – Fill overlays the naturally occurring materials and ranges from very loose to very dense (SPT Navg = 17) silty sand and silty or clayey sand to poorly graded sand with little to trace medium to fine gravel and little to trace organics to very soft to very hard silt. Stratum 1 is 5 to 33 ft thick in the eastern and central parts of Landfill 1 and tapers to a thinner layer, approximately 5 ft thick, on the western part of the landfill as the ground surface drops in elevation.

- Stratum 2 (Peat) – Not encountered in the Landfill 1 area.

- Stratum 3 (Clay and Silt) – The Clay and Silt layer ranges from silt or silt and clay with some to trace gravel or sand to sand or gravel with high silt or clay content, the latter occurring in pockets within Stratum 3, or as Stratum 3 transitions to another stratum type. Stratum 3 was observed in pockets on the western part of the Landfill 1 area.

- Stratum 4 (Sand) – The Sand layer ranges from loose to very dense (SPT Navg = 27) silty sand to poorly graded "clean" sand or well graded sand, with some to trace gravel, clay, and silt present. Stratum 4 was observed under Stratum 1 throughout the Landfill 1 area, thicker at the northwest corner (toe) of Landfill 1, and tapered out at the southeast corner of Landfill 1 adjacent to the North Drainage Ditch area.

- Stratum 5 (Gravel) – The Gravel layer ranges from medium to very dense (SPT Navg = 43) coarse to fine rounded and angular gravel, occasionally found with some sand and silt. The gravel layer is primarily on the western side of the Landfill 1 Area beneath Stratum 1 and above Stratum 6. Gravel on the southwestern side of Landfill 1 is brown and generally free from significant quantities of sand and fines, consistent with gravel layers observed in the Landfill 2 geotechnical borings. The gravel layer generally mixes with more sand and fines near the center of the Landfill 1 area where the gravel layer tapers out below Stratum 4.

- Stratum 6 (Till) – Till consists of a very stiff to hard (SPT Navg = 48) silt or medium to very dense clayey or silty sand with little to trace sand, gravel, and cobbles. Stratum 6 was observed below Stratum 5 and Stratum 4 throughout the Landfill 1 area, except near the east side of Landfill 1 where the till underlays Stratum 1 at GB-LF1-10.

- Stratum 7 (Bedrock) - Bedrock was observed as moderately hard, fresh, blue grey, fine grained phyllite, with vertical fractures. Stratum 7 was observed along the north side of the Landfill 1 area at 8 ft bgs at GB-LF1-03, at 67 ft bgs at GB-LF1-04, and at 10.5 ft bgs at GB-LF1-06. Two five-foot rock cores were taken at GB-LF1-04; from 69 ft bgs to 74 ft bgs and 74 ft bgs to 79 ft bgs. Bedrock was also identified near the toe of Landfill 1 in the historical monitoring well installation log, MW-401-B1, at 34 ft bgs.

2.2.2 Soil and Rock Classifications and Laboratory Index Test Results

A summary of soil samples obtained from the field, laboratory soil index test results and corresponding USCS Classifications are provided in **Table 2-1** and **2-2**. Laboratory reports presenting the test results are provided in **Appendix E**. A total of 11 samples were tested and classified in accordance with the ASTM test methods described above.

A rock core sample was obtained from GB-LF1-04 between 69 ft bgs and 79 ft bgs to verify competent bedrock elevations. The rock core samples were obtained upon refusal, as determined by SPT blow counts at 69 ft bgs. Three-inch (3-in) diameter sampling rods and a core barrel were used to core the bedrock sample in two 5 ft runs. The recovery length and sampling time were noted upon completion

of each 5 ft run. The bedrock core was stored in a plywood sample container and marked with the date, location, sample ID, and other pertinent project information and then classified on site. Information regarding the classification of the GB-LF1-04 core sample is provided on the GB-LF1-04 boring log in **Appendix B**. The bedrock core description is provided above as the description for Stratum 7. The rock quality designation was 32 percent for the core sample obtained between 69 ft bgs and 74 ft bgs, and 30 percent for the sample obtained between 74 ft bgs and 79 ft bgs.

Table 2-1: Laboratory Grain Size Analysis

TEST STANDARD			GRAIN SIZE (ASTM D422)							
SAMPLE No.	Depth Interval (ft)	Stratum	PASSING 3-in. (%)	PASSING 3/4-in. (%)	PASSING No. 4 (%)	PASSING No. 10 (%)	PASSING No. 20 (%)	PASSING No. 40 (%)	PASSING NO.100 (%)	PASSING NO.200 (%)
GB-LF1-02	14-24.9	4	100	100	99.6	99.3	98.8	94.7	54.4	27.8
GB-LF1-04	24-27.8	4	100	100	88.8	80.8	71.4	63.9	51.1	44.1
GB-LF1-04	38-41.33	5	100	91.3	79.2	73.1	62.3	46.8	27.2	20
GB-LF1-04	44-47.2	6	100	100	79.4	70.6	62.6	56.2	46.8	41
GB-LF1-05	24-28.8	5	100	93.1	57.2	44.8	37.4	31.5	20.9	15.8
GB-LF1-07	10-14	1	100	100	94.2	90	85.1	78.2	61.1	50.1
GB-LF1-07	30-35.9	6	100	100	88.1	80.3	73.5	68.1	58.6	52.7
GB-LF1-08	26-29.1	6	100	100	77.6	67.7	59.3	52	41.1	35
GB-LF1-09	12-15.2	1	100	90.4	68.9	56.8	46	37.5	26.2	21.7
GB-LF1-10	6-8	1	100	82.3	69.9	63.4	58.1	53.5	45.8	41.3
GB-LF1-10	14-15.25	6	100	92.4	77.3	69.8	64.8	60.6	53.7	48.7

Table 2-2: Laboratory Soil Index and Classification Test Results

TEST STANDARD			MOISTURE (ASTM D2216)	ATTERBERG LIMITS (ASTM D4318)			SOIL CLASSIF'N (ASTM D2487)
SAMPLE No.	Depth Interval (ft)	Stratum	(%)	LL	PL	PI	USCS
GB-LF1-02	14-24.9	4	16	NV	NP	NP	SM
GB-LF1-04	24-27.8	4	13.1	23	13	10	SC
GB-LF1-04	38-41.33	5	14.2	NV	NP	NP	SM
GB-LF1-04	44-47.2	6	11.4	20	14	6	SC-SM
GB-LF1-05	24-28.8	5	6.7	NV	NP	NP	GM
GB-LF1-07	10-14	1	19.2	19	13	6	CL-ML
GB-LF1-07	30-35.9	6	10.7	21	13	8	CL
GB-LF1-08	26-29.1	6	7.9	16	12	4	SC-SM
GB-LF1-09	12-15.2	1	8	16	14	2	SM
GB-LF1-10	6-8	1	10.8	21	14	7	GC-GM
GB-LF1-10	14-15.25	6	9.6	22	14	8	SC

Notes:
1. Stratum designations include:
   Stratum 1 = Fill
   Stratum 2 = Peat/organics

Stratum 3 = Clay and Silt
Stratum 4 = Sand
Stratum 5 = Gravel
Stratum 6 = Till
Stratum 7 = Bedrock

2. Abbreviations: ASTM= American Society for Testing and Materials; NV = No value; NP = not plastic.
3. USCS Symbols, based on ASTM D2487 method of classification for soils for engineering purposes: silty sand (SM); clayey sand (SC); well graded silty sand (SW-SM); poorly graded silty sand (SP-SM); clayey and silty sand (SC-SM); clayey silty sandy gravel (GC-GM); clay (CL); well graded silty gravel (GW-GM); silty gravel (GM); silty clay (CL-ML).
4. Samples listed correspond to those samples identified for laboratory testing as summarized in an email to Maine DEP on July 18, 2015. No changes were made to the proposed testing program submitted on that date.
5. Samples were a composite of the of the corresponding strata

2.2.3 Groundwater

Two water-bearing units underlie the Landfill 1 area; an overburden unit containing sand and gravel outwash deposits that overlay glacial till and an underlying bedrock unit. Based on data from groundwater elevation monitoring conducted by Sevee and Maher Engineers, Inc. (SME) from 2012 through 2016, the direction of groundwater flow is from northeast to southwest in both hydrologic units and generally follows the topography of the area towards the Penobscot River.

The Landfill 1 area contains a network of monitoring wells, piezometers, and extraction wells. The wells at the upgradient end of Landfill 1 are P-7 and MW-502-01. Mid-gradient monitoring wells include MW-501-01 and P-10. Downgradient wells include monitoring well cluster B-326, monitoring well cluster MW-401, MW-512-01, MW-513-01, and MW-402-01. In 2014, SME installed 14 piezometers to confirm groundwater flow direction and better understand contaminant distribution. Based on the measurements obtained in 2014 and 2016 (included in **Appendix E**), the following observations were made:

- Groundwater in the Landfill 1 area ranges from about 5 to 33 feet below the ground surface;
- The native/fill material interface is generally above the measured groundwater surface except for about 10 percent of the Landfill 1 area where fill extends up to 6.5 feet into the groundwater;
- Based on the borings, a highly permeable gravel zone is present along the northern limit of Landfill 1 that appears to drain the upgradient areas and it is anticipated that it may contain pockets of perched water;
- Highly permeable ice-contact gravels are present along the western edge of the Landfill 1 area that extends to the west beneath the Penobscot River. This layer terminates at the bedrock ridge to the north of Landfill 1, and the southern extent has not been determined (SME, 2015); and
- The 2012 groundwater elevations are appropriate to use for design as they are representative of a wet year on the Site (i.e., represent high groundwater elevations under existing conditions) prior to the IES operation. These are conditions that maybe encountered during excavation activities.

Groundwater level observations from 2012 are shown in **Table 2-3**.

Table 2-3: Groundwater Observations

Zone	Well No.	Average 2012 Groundwater Elevation[1] (ft)	Groundwater Fluctuation (ft)[2]
Upgradient	P-7	50.7	2.01
	MW-502-01	52.7	1.20
Mid-Gradient	MW-501-01	30.0	1.56
	P-10	24.0	2.01
Downgradient	B-326-03	0.85	2.03
	MW-401-01	1.14	1.23
	MW-512-01	0.74	1.95
	MW-513-01	1.78	2.48
	MW-402-01	1.66	1.17

Notes:
1. Based on drawing titled Interpretive Groundwater Table Surface (December 2012) by SME.
2. Based on recorded groundwater levels measurement contained in Appendix E.

The Remediation Contractor shall confirm elevations prior to commencing work in the various Landfill 1 work areas.

An IES has been operated near the downgradient edge of Landfill 1 since 2014 with MW-601 in operation since 2005. The IES consists of six extraction wells (EW-1, EW-2, EW-3, EW-4, EW-5, and MW-601). The primary purpose of the IES is to intercept and capture groundwater for treatment before discharge to the Penobscot River, which has the effect of lowering groundwater elevations in the immediate area of the wells. Based on quarterly monitoring data collected during operation of the IES, SME has concluded that "the IES is successfully capturing mercury seepage emanating from the area around the Lined Process Lagoon before it discharges to the river" (SME, 2015).

2.3 Sequential Extraction Analysis and Column Leaching Test Results

2.3.1 Sequential Extraction Analysis

As part of the Revised Phase II WP, three samples of fill material (Stratum 1) collected from SB-LF1-18, SB-LF1-22 and SM-LF1-30 had mercury sequential extraction analysis performed. Two of these borings (SB-LF1-18 and SM-LF1-30) were located within the limits of Cell 1A and Cell 1B, while the third boring (SB-LF1-22) is outside the cell boundaries. An additional three samples were collected from native material for the column leaching tests and mercury sequential extraction analysis from beneath Cell 1B (SB-LF1-25 from Stratum 4) and downgradient of the Lined Process Lagoon Boundaries (SB-LF1-39, from Stratum 5 and Stratum 6). The majority of mercury in the samples from outside Cell 1A and 1B (samples from SB-LF1-22 in Stratum 1 and SB-LF1-39 in Stratum 5 and 6) was in the F-4 and F-5

fractions with smaller percentages in the F1 and F2 fractions. These results indicate that the majority of the mercury in the samples collected from outside the limits of Cells 1A and 1B is strongly bound to the soil matrix and unlikely to be released to groundwater.

The mercury sequential extraction results for the samples collected within Cell 1A and 1B and beneath Cell 1B from SB-LF1-18, SB-LF1-30, and SB-LF1-25, respectively, indicate that a higher percentage of the mercury in these samples was in the F-1 and F-2 fractions with smaller percentages of mercury in the F4 and F5 fractions compared to the borings outside the Cell areas.

Eleven (11) additional samples were collected for mercury sequential extraction analysis as part of the supplemental investigation conducted in May 2017. The results from the supplemental investigation are described in **Section 4.1**.

2.3.2 Column Leaching Study

A column leaching study was conducted to evaluate the potential for mercury concentrations in native soils above the MPS to leach to groundwater if they remain in place after the fill material exceeding the MPS are removed. Based on the analytical data and geochemical equilibrium analysis results described in the study, column tests were conducted using native soil samples from SB-LF1-25 located beneath Cell 1B (Stratum 4) and from SB-LF1-39 located downgradient of the Lined Process Lagoon (Stratum 5). These strata and locations were selected for sampling because the Environmental Visualization Software (EVS) model showed that the primary strata with mercury concentrations above the MPS below the groundwater table were Stratum 4 (sand) and Stratum 5 (gravel). The soil sample locations were further selected from each of these strata by analyzing the EVS model to determine where the best combination of sufficient depth of the stratum and mercury concentrations exceeding the MPS were present.

The results of the mercury selective sequential extraction analysis and column leaching tests demonstrate that the native soils with mercury concentrations greater than 2.2 mg/kg generally have a low potential to leach mercury into the groundwater long-term. The column test from beneath Cell 1B also indicate a substantial drop in mercury leaching to the groundwater after several volumes of clean pore water have passed through the soils. These pore water volumes represent approximately 2.5 to 10 weeks for the ten pore water volumes evaluated as part of the study to pass through the Landfill1 area. which means that after remediation is complete a substantial drop in the potential for the remaining mercury to leach to the groundwater would be expected. Additional detail on the column leaching tests results was provided in a letter sent to Maine DEP on October 12, 2016 and is included in **Appendix F**.

The conclusions from the sequential extraction analysis and column leaching study are discussed in **Section 4.1**.

2.3.3 Conclusions

The results from the selective sequential extraction analyses and column tests indicate that mercury from both fill and native materials in Landfill 1 outside of Cells 1A and 1B does not have the long-term potential to leach mercury to the groundwater. Furthermore, while the soils present in the native soil beneath Cell 1B contains more leachable fractions of mercury, the column leaching tests indicate a substantial drop in mercury leaching to the groundwater after several pore volumes of water, representing a relatively short period of time post-remediation, have passed through the soils.

Groundwater data from the Landfill 1 area suggests there may be a potential source of mercury present in the area upgradient of MW-501-O1 near the former Lined Process Lagoon. In most locations where groundwater is monitored the mercury concentrations are declining steadily over time, however the

concentrations in MW-501-O1 have remained generally consistent. The activities presented in this CMI Plan will address this area through further delineation and source removal as contaminated soils are removed as described herein.

Section 3.
Design Objectives

3.1 Corrective Measures Implementation Plan Objectives

The primary objective of the remedy for the Landfill 1 area is to address mercury concentrations that exceed the soil MPS (presented in Section 3.2) and to remove the fill from within the Landfill 1 boundary. The design is intended to remove all non-native (fill) soils from within the Landfill 1 boundary and remove additional fill with mercury concentrations that exceed the MPS from areas upgradient and downgradient of the Landfill 1 boundary, and leave native soils where mercury is present above the MPS in place. Excavated material above the MPS will be disposed off-site in a licensed disposal facility, The native soils with mercury concentrations greater than the MPS being left in place have undergone additional sequential extraction analysis as described in **Section 4.1**. Data show that the mercury left in place in native soils has limited potential to leach to groundwater, however even if some limited leaching to groundwater occurs, these low levels of mercury in the groundwater will be captured and treated by the groundwater extraction system. The Order specifically allows for soils beneath Landfill 1 to be left in place. Section 10(C)(1)(f) of the August 2010 Findings of Fact and Order on Appeal issued by the BEP (Maine DEP, 2010) states:

"The Board further finds that if soils with contaminants above media protection standards remain on-site, the area of contaminated soils must be graded appropriately and covered to prevent infiltration and further leaching of contaminants to groundwater, which may include installation of a synthetic cap over remaining contaminated soils. The Department shall determine the appropriate cover for any such areas based on the concentration of contaminants in remaining soils above the MPS."

Therefore, in certain areas where removal of Landfill 1 area soils containing mercury concentrations greater than the MPS is impracticable and unnecessary to achieve risk reduction, the Order allows such soils to remain in place if containment of the mercury contaminated soils meet certain criteria. In Landfill 1, Mallinckrodt has provided technical data to support leaving some soils exceeding the mercury MPS in place in accordance with the Order.

Additional objectives of the Landfill 1 CMI are to:

- Remove the Industrial Sewer within the Landfill 1 area excavation limits;
- Maintain groundwater capture during Landfill 1 CMI activities;
- Establish final grades to control stormwater, minimize infiltration, and re-vegetate the Landfill 1 area to minimize the potential for future erosion; and
- Manage air quality conditions and be protective of on-site workers and the surrounding community.

3.2 Contaminants of Concern and Media Protection Standards

COCs at the Site for which soil MPS have been established are summarized in **Table 3-1**, as presented in Attachment 2 of the Order. Mercury is the primary COC as identified in previous investigations in the Landfill 1 Area.

Table 3-1: Soil Media Protection Standards – Numeric

	Soil
	(mg/kg)
Mercury	2.2
Chloropicrin	0.125
PCBs	1.0
Cadmium	8
Ethylbenzene	13
Xylene	190

NOTES:
Media Protection Standards as presented in the Order (Attachment 2).
mg/kg = milligrams per kilogram
PCBs = polychlorinated biphenyls

In addition to numerical MPSs, the Order includes a narrative MPS for soils which reads in part:

"All soils onsite … that may potentially contain mercury greater than 2.2 ppm must be vegetated, paved, or otherwise stabilized to prevent erosion during any construction or remediation.

Sections 10(C)(1 and 2) of the August 2010 Findings of Fact and Order on Appeal issued by the BEP (Maine DEP, 2010) states *contemplate certain areas where stabilization methods should be employed if it is impracticable to remove certain soils*[1].

[1] Sections 10(C)(1 and 2) specify activities to be completed by Mallinckrodt to evaluate the soils beneath Landfills 1 and 2, including tests to determine "the ability of the contaminants of concern to desorb from the soils" (10(C)(1)(f)) and "an assessment of the potential for contaminants of concern adsorbed to soils beneath the landfill to desorb at concentrations that would cause the groundwater to exceed the Media Protection Standards" (10(C)(2)(i)).

Section 4.
Corrective Measures Implementation Components

The Landfill 1 CMI will include the following components presented in the general order of execution.

- Pre-excavation borings and sampling (completed in May 2017);
- Pre-Construction Survey;
- Implementation of the perimeter air monitoring program;
- Site preparation including establishment of access roads, staging areas, erosion and sediment controls, etc.;
- Removal of the Industrial Sewer and Storm Drains in excavation areas;
- Maintaining groundwater control;
- Excavation and removal of fill material containing mercury concentrations exceeding the MPS from the Landfill 1 area;
- Excavation of fill material containing mercury concentrations less than the MPS within the Landfill 1 boundary;
- Transportation and off-site disposal of excavated material exceeding the MPS;
- Post-excavation confirmation sampling;
- Completion of an as-built survey to confirm excavation extents are achieved;
- Materials management including soil stockpiling and direct loading of gondolas;
- Installation of a non-woven geotextile along the Landfill 1 area excavation areas along the interface with the Northern Drainage Ditch excavations to be completed as part of the Plant Area CMI Plan;
- Backfilling the excavation and grading of the Landfill 1 area to proposed final grades; and
- Surface stabilization, re-vegetation, and restoration of the Landfill 1 area.

Drawing 2 in **Appendix G** presents a detailed sequence of the remediation activities. Although listed as discrete tasks, portions of construction may be performed simultaneously. The remainder of Section 4 describes components of the CMI including pre-construction activities, site staging and layout, erosion and sediment control, excavation of soil containing mercury concentrations greater than the MPS, post-excavation confirmation sampling, excavation of fill containing mercury concentrations less than the MPS within the Landfill 1 boundary, final grading plan, and re-vegetation. Some of the components of the CMI, including the Perimeter Air Monitoring Plan, Temporary Soil Stockpile Area, staging areas, and portions of the access roads in the Plant Area and Northern Drainage Ditch, will have already been implemented prior to the start of the Landfill 1 CMI.

4.1 Pre-Excavation Borings and Sampling

Supplemental soil borings were performed in Landfill 1 in May 2017. These activities included collecting additional samples to improve delineation of mercury in fill and native soil near the Lined Process Lagoon upgradient of MW-501-O1 and collecting samples from throughout Landfill 1 to perform sequential extraction testing and evaluate the potential for mercury remaining in native soil to leach into the groundwater. The supplemental borings were completed in accordance with the Landfill 1 Supplemental Boring Work Plan provided in **Appendix K**, with the following modifications:

- SB-LF1-20D was collected near the location of pre-design boring SB-LF1-20 to investigate high mercury concentrations identified in a gravel layer during the 2015 pre-design activities;
- SB-LF1-96, SB-LF1-97, and SB-LF1-99 were added as step out borings to further delineate mercury near SB-LF1-20D;
- SB-LF1-89 was not completed due to limited drill rig access;
- SB-LF1-98 was added to the scope because the mercury concentrations in SB-LF1-94 were less than the MPS; and
- SB-LF1-90, SB-LF1-94, and SB-LF1-98 were not selected for mercury sequential extraction because mercury concentrations in native soils were less than the MPS.

The locations of the supplemental borings completed in May 2017 are shown on **Drawing 9** in **Appendix G**, and the results are summarized below.

4.1.1 Borings near the Lined Process Lagoon

Five borings were advanced adjacent to (SB-LF1-84 and SB-LF1-95) and immediately downgradient of (SB-LF1-86, SB-LF1-87, and SB-LF1-88) the Lined Process Lagoon. Samples were collected from these borings for mercury analysis using the same procedure that was used for the pre-design borings (described in Section 2). The analytical results for these samples are provided in **Appendix A**, and the boring logs are provided in **Appendix B**. The mercury concentrations in these borings were similar to the results from nearby pre-design borings and indicate that fill and native soil in this area contain mercury concentrations greater than the MPS.

4.1.2 Mercury Sequential Extraction Sampling

Samples for mercury sequential extraction analysis were collected from the native soils in 11 borings completed in May 2017 to further evaluate the potential for mercury to leach from soils left in place after excavation. The borings included four borings downgradient of the Lined Process Lagoon (SB-LF1-84, SB-LF1-85, SB-LF1-86, and SB-LF1-87), one boring (SB-LF1-88) within Cells 1A and 1B, and five borings outside of the Cells and Lined Process Lagoon (SB-LF1-20D, SB-LF1-91, SB-LF1-92, SB-LF1-93, and SB-LF1-99). A total of 16 samples were collected from the 11 locations and sent to an off-site laboratory for mercury sequential extraction analysis. The samples were collected from multiple strata: five (5) samples were collected from Stratum 6 (till), five (5) samples were collected from Stratum 5 (gravel), three (3) samples were collected from Stratum 4 (sand), and three (3) samples were collected from Stratum 3 (silt). The analytical results from the sequential extraction analysis are provided in **Appendix A**. The findings from the mercury extraction analysis are as follows:

- The percentage of mercury bound in the more soluble F1 and F2 fractions in the samples from the Cells is generally higher than in the samples collected from the other areas of Landfill 1;

- Between 55% and 88% of the mercury in the samples taken downgradient of the Lined Process Lagoon is bound in the less soluble F4 and F5 fractions;

- With the exception of SB-LF1-20 and SB-LF1-91, the majority of the mercury in borings outside the Cells and Lined Process Lagoon is bound in the less soluble F4 and F5 fractions; and

- About 60% to 70% of the mercury in two of the four samples collected from SB-LF1-20 and SB-LF1-91, the two borings immediately downgradient of Cell 1A, is bound in the more soluble F1 and F2 fractions. About 30% to 40% of the mercury in those two samples and the majority of the mercury in the other two samples from these locations is bound in the less soluble fractions.

The extraction well with the highest concentration of mercury in the groundwater extraction system – extraction well EW-1 – is located immediately downgradient of SB-LF1-20 and SB-LF1-91 and effectively captures mercury in groundwater from these areas. The new extraction well system, described in the Final Groundwater Extraction System Design prepared by SME (October 16, 2017) and approved by the Maine DEP on January 9, 2018, will continue to effectively capture mercury that leaches from the soils left in place.

4.1.3 Conclusions

The results from the selective sequential extraction analyses and column tests indicate that mercury from both fill and native materials in Landfill 1 outside of Cells 1A and 1B does not have the long-term potential to leach mercury to the groundwater. Furthermore, while the soils present in the native soil beneath Cell 1B contain more leachable fractions of mercury, the column leaching tests indicate a substantial drop in mercury concentrations in groundwater after several pore volumes of water have passed through the soils.

Groundwater data from the Landfill 1 area suggests there may be a potential source of mercury present in the area upgradient of MW-501-O1 near the former Lined Process Lagoon. In most locations where groundwater is monitored the mercury concentrations are declining steadily over time, however the concentrations in MW-501-O1 have remained generally consistent. As described in **Section 4.1**, five additional borings were completed in and around the Lined Process Lagoon to improve delineation of mercury in fill and native soils in this area. Samples from four of the borings were also be submitted for sequential extraction analysis, and the results indicated that the majority of mercury in native soil in this area is in the less soluble F4 and F5 fractions. The activities presented in this CMI Plan will address this potential source area by removing contaminated fill in this area.

4.2 Pre-Construction Survey

The Remediation Contractor will perform a pre-construction survey of the limits of work of the Landfill 1 area. The results of the pre-construction survey will be used to update the historical topographic information from this area and to confirm quantities as necessary before and during the CMI construction. The pre-construction survey will also include utilities, Industrial Sewer Pipe, Storm Drains, and other pipe locations and inverts. The survey will be performed by a surveyor licensed in the State of Maine. The results of the pre-construction survey will be compared to the existing survey information. Modifications to the final grades or excavation limits will be made if necessary and submitted to the Maine DEP.

4.3 Perimeter Air Monitoring Stations

The perimeter air monitoring system was implemented for the Landfill Ridge Area CMI (CDM Smith, 2015d) and will continue for the Landfill 1 CMI. The system was set up in accordance with the Perimeter Air Monitoring Plan (PAMP) (CDM Smith, 2015e). The objectives of the perimeter air monitoring system are to protect both on-site workers and the surrounding community by monitoring air quality

conditions during the CMI activities and to provide real time data so corrective actions can be taken promptly and/or work can be stopped if action criteria are exceeded.

The perimeter air monitoring system will measure mercury vapors, particulate matter less than 10 microns in diameter (PM_{10}), and VOCs using both fixed (i.e., permanent) and mobile stations. The locations of the permanent Perimeter Air Monitoring Stations (PAMS) are shown on **Drawing 3.** Additionally, Temporary (i.e., mobile) Air Monitoring Stations (TAMS) will be established as needed. Measurements will be taken in real time to allow for modifications of work activities or mitigation measures to be implemented in the event that the air quality conditions are impacted by the CMI activities. Additional details on implementation of the air monitoring program, including MPS, response levels, corrective actions, and reporting, are provided in the PAMP (CDM Smith 2015e).

4.4 Site Staging and Layout

Site staging and layout is shown on **Drawing 10**. This drawing presents features that will be implemented prior to removal of soils in the Landfill 1 area including temporary erosion and sediment controls discussed in **Section 4.5**. Features such as temporary access roads and decontamination pads are presented in the Remediation Contractor Excavation and Restoration Work Plan in **Appendix N**. The Site staging and layout will be phased with the excavations and will be coordinated with other CMI Plan work at the Site.

4.4.1 Site Logistics

Primary site access will be through the main gate at the end of Industrial Way (see **Drawing 3**). Access to the Site will be restricted; personnel and visitors will sign in at the security trailer or at the construction trailer during the morning health and safety meeting. Regular site workers will sign in during the daily safety meeting and the sign-in record will be provided to the security personnel to ensure an accurate record of personnel on-site is available. Visitors will be required to check out at the security trailer when leaving the Site.

Typical work hours for the Site will be Monday through Friday 7:00 AM to 5:00 PM. The hours may be adjusted as needed to accommodate construction schedules and inclement weather.

The remediation areas will be divided into three work zones: (i) support zones, (ii) contamination reduction zones, (iii) and exclusion zones. The support zone will be delineated using temporary construction fencing and will include the office trailer complex and supporting facilities. Signage will be used to identify work zones. The locations of the work zones are included in the Remediation Contractor's Excavation and Restoration Work Plan in **Appendix N**.

The contamination reduction zone will be at the access point from the support zone into the exclusion zone. The contamination reduction zone for the Landfill 1 Area will include the decontamination pad(s) for cleaning vehicle tires (**Drawing 10**) and personnel decontamination facilities established by the Remediation Contractor.

4.4.2 Site Trailers/Offices

Trailers for the Owner, Remediation Project Manager, Transportation and Disposal Contractor, Maine DEP, an on-site laboratory, and restroom facilities have been installed by the Remediation Project Manager. The Remediation Contractor will be responsible for providing their own trailers to be installed in the Contractor Office Trailer Complex shown on **Drawing 3**.

4.4.3 Clearing and Grubbing

The Remediation Contractor will be responsible for clearing and grubbing areas within the limit of work as required for access to the Site and execution of work. Clearing and grubbing will consist of removing trees and associated stumps, undergrowth, roots, deadwood and surficial debris. Cleared vegetation will be shredded or chipped prior to stockpiling and potential future use onsite. Root material and associated soil removed from clean areas outside the work area will be segregated and stockpiled for reuse on Site. Root material and soil removed during grubbing from within the excavation areas will be considered waste material and transported to a Temporary Soil Stockpile Area (TSSA) for off-site disposal. Clearing activities will be performed in a manner so as to minimize the extent of area cleared.

4.4.4 Access Roads

Access roads from previous CMI work will be maintained for use as part of the Landfill 1 Area CMI. An additional access road to the temporary staging area south of Landfill 1 has been constructed as shown on **Drawing 10.** The Remediation Contractor will notify the Remediation Project Manager prior to constructing additional access roads, and access roads will be constructed as shown on the drawings and described in the Specifications (**Appendix H**). The access roads will be maintained clean (e.g. outside of the exclusion zones) during the Landfill 1 Area CMI. Vehicles leaving the exclusion zones will be cleaned at the decontamination pad(s) shown on **Drawing 10** prior to traversing the access roads. The roads will be inspected daily by the Remediation Project Manager and documented in daily reports.

4.4.5 Staging Area

The staging area shown on **Drawing 10** will provide an area for material staging during the Landfill 1 construction. The staging area has been constructed as shown on the drawings and described in the specifications. It will not serve as a material storage or stockpile area for material that requires off-site disposal.

4.4.6 Decontamination Pad

Vehicles exiting from the exclusion zones will pass through a decontamination pad to remove soil that may exceed the MPS parameters. The Landfill 1 Area decontamination pads as shown on **Drawing 10** have been constructed. The decontamination pad(s) will include a geomembrane liner to collect water used in the decontamination process (**Drawing 24**). Calculations demonstrating the minimum puncture resistance of the geomembrane are presented in **Appendix I-1**. Water collected in the decontamination pad(s) will be considered contact water and will be sent to the on-site groundwater treatment plant (GWTP). The Remediation Contractor will determine the actual location of the decontamination pad(s) based on the proposed construction sequence and access location, along with the method of conveyance of contact water to the GWTP. Both are included in the Remediation Contractor's Construction Water Management Plan in **Appendix N**.

4.4.7 Rail Loading and Temporary Soil Stockpile Areas

Vehicles transporting soil for off-site disposal will pass through a decontamination pad before driving on existing access roads to the rail loading area or Temporary Soil Stockpile Areas (TSSAs; shown on **Drawing 3**). The rail loading area and TSSA No. 1 and No. 2 have been constructed as part of previous CMIs. Railroad improvements and a new TSSA (TSSA No. 3) were constructed during the summer of 2017. The TSSA(s) that will be used for stockpiling Landfill 1 soil will be selected based on available capacity at the time of implementation. Soils from Landfill 1 will not be comingled with soils from other areas. Soils from different waste categories will be stockpiled separately and will be separated by physical barriers (e.g., concrete blocks or jersey barriers) similar to those used to segregate listed and special waste during the Landfill 2 CMI. Listed waste and characteristic waste soil will be placed near

the downgradient corners of the TSSA(s) to minimize the potential for contact water from the listed or characteristic hazardous waste piles to cross-contaminate the non-hazardous waste piles.

The TSSAs are graded to drain towards a sump. Water collected in the sumps will be considered contact water and treated at the on-site GWTP.

Upon completion of the Landfill 1 CMI, some of the site staging and layout components may remain in place for use during the final phases of remediation at the Site.

4.5 Temporary Erosion and Sediment Control

Erosion and sediment controls including silt fence, super silt fence and fiber rolls will be necessary near the bottom of the slope in the Landfill 1 Area. A turbidity curtain will also be installed in the Penobscot River adjacent to Landfill 1. The turbidity curtain will be similar to that used during the Southerly Stream and Northern Drainage Ditch excavations. The locations of the erosion and sediment controls specific to the Landfill 1 CMI are shown on **Drawing 10.** Additional erosion and sediment controls will be installed as necessary and in accordance with the requirements of the specifications and as outlined in the Landfill 1 Erosion and Sediment Control Calculation Package contained in **Appendix I-4**. Erosion and sediment control measures will be installed in accordance with the Maine Erosion & Sediment Control Practices Field Guide for Contractors (Maine DEP, 2014) and Maine Stormwater Best Practices Manual (Maine DEP, 2015). Additional erosion and sediment controls may be installed as needed throughout the excavation and restoration based on the Remediation Contractor's proposed Excavation and Restoration Work Plan (**Appendix N**).

Throughout construction the Remediation Contractor will be required to provide sufficient temporary storage for contact water resulting from a 10-year 24-hour storm from within the excavation area. The reason for the temporary storage is that during precipitation events, the on-site GWTP may have limited capacity since it may be receiving peak flows. Calculations demonstrating the required storage volume are presented in **Appendix I-2**. The Remediation Contractor will be responsible for ensuring water sent to the on-site GWTP meets the influent criteria established by the on-site GWTP operator. Additional details are provided in the Remediation Contractor's Construction Water Management Plan in **Appendix N**.

4.6 Industrial Sewer and Storm Drain Removal in Landfill 1 Area

The majority of the Industrial Sewer and storm drains, collectively referred to as underground pipes herein, used in historical plant operations are being addressed as part of future work during the Plant Area CMI. The Industrial Sewer pipes that are within the limits of the Landfill 1 excavation will be removed during the Landfill 1 CMI. In locations where underground pipes are outside the boundary of the Landfill 1 excavation area, they will be addressed during the Plant Area CMI discussions. Plugs will be installed in sections of pipes that remain in place after adjacent sections are removed in the Landfill 1 excavation.

Drawing 11 displays an overlay of the underground pipes on the Landfill 1 excavation grades. The expected underground pipe invert elevations are provided on **Drawing 5,** however, the underground pipe elevations encountered in the field may vary**.**

In areas where the crown of the underground pipe is above the excavation bottom elevation, the following procedure shall be used:

- Notify the Maine DEP's onsite representative of the intent to remove an underground pipe;

- Perform the excavation to the sidewall and bottom limits provided in **Drawing 11**;
- When an underground pipe is encountered, remove the piping;
- Observe bedding materials for the presence of visible mercury. If visible mercury is identified, the bedding material will be stockpiled separately for disposal at an appropriate off-site facility;
- Observe removed underground pipe for visible mercury. If visible mercury is identified on or in the pipe, it will be collected and the pipe will then be stockpiled separately for disposal at an appropriate off-site facility;
- Stockpile the pipe without visible mercury separately from soils in the designated TSSA(s) for shipment off-site for disposal;
- Install plugs (e.g., concrete or grout fill or a rubber or PVC cap) into the ends of sections of pipe that extend beyond the excavation limits, and
- Survey the bottom and sidewalls of the excavation and plug locations.

Specific means and methods to be used for the pipe removal are presented in the Remediation Contractor's Excavation and Restoration Work Plan in **Appendix N**.

4.7 Groundwater Monitoring Well Protection

A total of 20 groundwater monitoring wells in the Landfill 1 Area will be protected during CMI activities or removed prior to excavation and replaced after excavation to allow for post-excavation monitoring of groundwater quality and elevation. The locations of the monitoring wells in Landfill 1 that will be maintained or replaced are shown on **Drawing 5**. Other wells located in the Landfill 1 Area will be abandoned in accordance with the Maine DEP Guidance for Well and Boring Abandonment (Maine DEP, 2009) prior to excavation and removed during the Landfill 1 CMI activities**.**

Two of the extraction wells from the interim groundwater extraction system (EW-3 and EW-5) will be maintained as monitoring wells for long-term monitoring. The remaining interim extraction wells will be removed during the excavation. The interim extraction system will be maintained as long as possible during the excavation to maintain groundwater control as described in Section 4.8 below.

4.8 Maintaining Groundwater Control

The existing IES will be reconfigured to allow for excavation of the Landfill 1 Area while maintaining groundwater capture. Groundwater modeling calculations conducted by SME indicate that groundwater capture can be maintained temporarily during excavation using only extraction well EW-3, which is outside the Landfill 1 excavation area. An additional extraction well (EW-5) was installed by SME in November 2017 at the location shown on **Drawing 4** to supplement EW-3. Existing extraction wells EW-3 and EW-5 will be protected during the Landfill 1 soil remediation then retained for the purpose of water level elevation monitoring of the final extraction system. The other currently-existing extraction wells will be operated as long as practical during the Landfill 1 remediation, however these will not be protected during soil excavation and will be decommissioned at the appropriate time during the remediation activities

Potential down time to the IES (e.g., to relocate electrical supply and force mains) during the Landfill 1 CMI will be minimized and will not exceed 30 consecutive days. Modeling performed by SME shows that if the IES system is restarted after a 30 day shut down there will be no loss of groundwater capture

in this area. Mallinckrodt's intent is to maintain pumping from extraction wells to the extent practical however a situation could occur in which a temporary shutdown is required. If this is necessary Maine DEP and/or the on-site inspector will be notified. If a temporary shutdown is necessary, it would be expected to occur for less than this maximum timeframe and Maine DEP would be kept informed.

After completion of restoration, additional groundwater extraction wells will be installed as described in the Final Groundwater Extraction System Design (to be submitted separately from this Landfill 1 CMI Plan) approved by the Maine DEP. The layout and details of the existing IES are included in **Appendix M**. The final grades shown on the Final Grading Plan (**Drawing 21**) will allow an access roadway to be constructed to provide access to the final extraction wells. Details on final access roads for the groundwater extraction system and monitoring wells are not part of the scope of the Landfill 1 Area remediation. Details on final roads and access points will be provided to Maine DEP separately in the future. Access to the pumphouse and extraction wells will be maintained during the Landfill 1 remedial action. As the Construction Project Manager, CDM will be responsible for maintaining this access.

4.9 Excavation Plan

The approximate limits of materials that require excavation and off-site disposal are shown on **Drawing 11.** The vertical limit of excavation is defined by contours developed for the bottom of the fill material with mercury concentrations greater than the MPS. The bottom of excavation surface was developed based on the results from pre-design borings (as described in Section 4.10.2). The horizontal limit of excavation extends to the locations of sidewall samples or to areas being excavated as part of other CMI Plans.

The excavation plan shown on **Drawing 11** incorporates information collected from the supplemental borings completed in May 2017 (described in **Section 4.1**). **Drawing 11** also shows five areas where additional excavation will be performed based on discussions between Mallinckrodt and the Maine DEP. These deep excavations are in 20 ft by 20 ft areas centered around borings SB-LF1-10, SB-LF1-14, SB-LF1-16, SB-LF1-27, and SB-LF1-29. The excavation depths will be extended by 4 feet near SB-LF1-10 and SB-LF1-27, by 2 feet near SB-LF1-14 and SB-LF1-29 and by 1 foot near SB-LF1-16.

Additional excavation beyond the limits shown on **Drawing 11** may be required to maintain safe excavation conditions (e.g. excavation slopes) and to establish final grades. The excavation may also be extended if the confirmation sampling locations exhibit concentrations in fill material greater than the MPS or if field observations indicate that the fill/native soil interface has not been reached at the prescribed elevation. Excavated materials that exceed MPS criteria will be transported to one of the TSSAs. Once the excavation limits shown on **Drawing 11** have been achieved, and confirmation samples have confirmed that fill containing mercury concentrations greater than the MPS has been removed from Landfill 1, the remaining fill material within Landfill 1 boundary will be excavated to achieve the excavation limits shown on **Drawing 16.** Excavated material that does not exceed the MPS will be managed in accordance with the Soil and Concrete Use Plan presented in **Appendix L**. This material may include boulders encountered within the excavation limits and additional soil removed to meet final grades. Boulders will be cleaned of soil prior to placement back within the excavation limits.

4.9.1 Excavation Basis

Excavation in the Landfill 1 area will remove fill material with mercury concentrations greater than the MPS and additional soils around SB-LF1-10, SB-LF1-14, SB-LF1-16, SB-LF1-27, and SB-LF1-29 as required by the Maine DEP and shown on **Drawing 11**. The remaining fill material within the Landfill 1 boundary will be removed as shown on **Drawing 16**. This material will be managed in accordance with the Soil and Concrete Use Plan presented in **Appendix L**. Native soils with mercury concentrations greater than the MPS will be left in place based on soil testing that shows that the mercury in these

native soils is comprised of less soluble fractions and is less likely to leach mercury long-term into the groundwater above the MPS. If low concentrations of mercury leach into the groundwater from these native soils, the mercury in the groundwater will be captured by the extraction well system. In addition, the technical issues of excavating soils below the water table and in deep excavations that require extensive sheeting and shoring are significant and would create construction and safety issues. As discussed in Section 2, the majority of mercury in the Landfill 1 Area soils is located in the fill material and will be removed. This includes fill that exceeds the MPS in and beneath Cells 1A, Cell 1B, and the Lined Process Lagoon. Therefore, the removal of the fill material with mercury above the MPS is an environmentally protective remedy. Additional lines of evidence to support this approach and which describe why this is appropriate and permissible under the Order include the following:

- Specific language in the Order, which allows soils with concentrations greater than the MPS in Landfill 1 to remain in place under certain conditions;
- The technical challenges of excavating highly permeable (Stratum 4 and Stratum 5) native soils below the water table;
- The results from the sequential extraction analysis indicating that the majority of mercury in native soil below the groundwater table outside of the Cell 1A, Cell 1B, and Lined Process Lagoon areas is in a less soluble form (i.e., F-4 and F-5 fractions) and is therefore less likely to leach to groundwater;
- The results from column test studies indicating that the amount of mercury that could leach from native soils beneath Cell 1A, Cell 1B, and the Lined Process Lagoon significantly decreases as additional pore volumes of groundwater pass through the material therefore mercury concentrations in groundwater are expected to decrease over time;
- A groundwater extraction system will remain in place after excavation to continue capturing mercury-impacted groundwater;
- The only identified brine disposal areas within Landfill 1 are Cells 1A and 1B and the Lined Process Lagoon, and fill materials that exceed the MPS in these areas are being removed. No brine sludges were disposed in other areas of the Landfill 1 Area; therefore, all brine sludge waste will be removed as described in more detail in 4.9.4; and
- The bottom and sides of each excavation area and excavated materials will be visually inspected for visible mercury. If observed, visible mercury and material containing visible mercury will be handled as described in 4.9.3.

4.9.2 Excavation

The limits of the material to be removed have been defined based on the data collected from soil borings during the pre-design activities discussed in Section 2 and supplemental borings discussed in Section 4.1. At each pre-design boring, the elevation of the bottom of fill exceeding the MPS was identified as either the elevation of the top of the first depth interval in fill containing mercury concentrations less than 2.2 mg/kg or the elevation of the fill/native soil interface. The surface representing the bottom of fill exceeding the MPS was then defined by interpolating between the known elevations at the pre-design points. The interpolation was carried out using a triangulated irregular network (TIN) implemented in AutoCAD Civil 3D® software. The contours for the surface representing the bottom of fill exceeding the MPS are presented on **Drawing 11.** A similar process was used to generate a surface representing the fill/native soil interface; the contours for the fill/native soil interface within the Landfill 1 boundary are presented on **Drawing 16**.

The Remediation Contractor will remove materials within the limits of excavation. Excavated materials exceeding the MPS will be transported to one of the TSSAs for rail car loading and off-site disposal at facility licensed to receive the waste. Additional excavation may be required based on the results of post-excavation bottom and sidewall confirmation sampling and field observations as described in Section 4.11. Excavated materials containing mercury concentrations less than the MPS will be handled in accordance with the Soil and Concrete Use Plan in **Appendix L**.

Additional notes regarding the excavation are provided below:

- There is an existing 30-mil thick hypalon geomembrane covering portions of Landfill 1 as shown on **Drawing 4**. The Remediation Contractor will remove this geomembrane as the excavation proceeds and transport the geomembrane material to one of the TSSAs for off-site disposal.
- Excavations will be completed in the dry. See Section 4.9.5.
- Care will be taken such that materials requiring off-site disposal will not be mixed with materials that contain mercury concentrations less than the MPS (see Soil and Concrete Use Plan in **Appendix L**).
- Excavation phasing will be determined by the Remediation Contractor to optimize slope stability and contact water management.
- Water from excavations will be treated as contact water until at least two feet of clean backfill has been placed.
- Stormwater controls will be phased with the timing of the excavations to minimize contact water generation, erosion, and sedimentation. As the excavation in each phase is complete, exposed soil in the area will be temporarily stabilized until the final grading, drainage features and stabilization can be completed.
- The excavation will generally progress from areas where the existing ground surface is at higher elevations to lower elevations to minimize contact water generation and to prevent the spread of contamination to areas that have already been excavated. Runoff from the excavation shall be mitigated using temporary erosion sediment controls such as diversion berms or low-spots in the excavation to contain stormwater or groundwater.
- The bottom and sides of each excavation area and excavated materials will be visually inspected for visible mercury. If observed, visible mercury and material containing visible mercury will be handled as described below in Section 4.9.3.
- To the extent practical, over-excavation will be minimized.
- Excavation sequencing and phasing are included in the Remediation Contractor's Excavation Plan (**Appendix N**).
- The Remediation Contractor shall place 8 oz nonwoven geotextile along the sidewalls between Landfill 1 excavation areas and excavation areas to be addressed during the Plant Area CMI.

4.9.3 Excavation in Areas Potentially Containing Visible Mercury

Excavated materials as well as the bottoms and side walls of the excavation will be visually inspected for visible mercury in each excavation area. If visible mercury is observed a 20-foot by 20-foot area, one foot deep, will be excavated around the observed visible mercury. After this area is excavated the

sidewalls and bottom will be re-inspected for visible mercury. This additional excavation is consistent with the protocol to remove additional soils if a post-excavation confirmation sample exceeds the MPS. Soils containing visible mercury from any area will be stockpiled separately for disposal at an appropriate off-site facility.

Inspections in areas where visible mercury is identified during excavation will be conducted by CQA personnel. Inspections will be conducted after every two feet of excavation. Soil from these areas will be stockpiled in the visible mercury stockpile area. In addition, the bottom of excavation will be inspected by CQA personnel by walking a 10-foot grid throughout the excavation. Sidewalls will be inspected by walking the perimeter of the excavation.

As described in Section 4.6, removed Industrial Sewer and storm drain pipes will be inspected for visible mercury. If visible mercury is identified, it will be washed from the pipes, collected, and placed in a drum labeled as containing visible mercury for off-site disposal at an appropriate facility. The soil beneath the pipes will also be inspected; if visible mercury is identified, the soils will be removed and stockpiled separately for off-site disposal. Pipe or backfill materials containing visible mercury will be transported separately and sent to a disposal facility permitted to accept materials with visible mercury.

4.9.4 Excavation in Areas Containing Listed Waste

Brine sludge was disposed of in Cell 1A, Cell 1B, and the Lined Process Lagoon, and is a characterized as a listed waste. The limits of Cell 1A, Cell 1B, and the Lined Process Lagoon are shown on **Drawing 11.** The limits are based on the locations and dimensions described in the *Hydrogeologic Study Plan for LCP Chemicals and Plastics, Inc., Orrington, Maine* prepared by Acheron, Inc. (Acheron) and submitted to the United States Environmental Protection Agency (USEPA) and the Maine DEP in August of 1988 (Acheron, 1988). The Acheron report identifies the dimensions of Cells 1A and 1B as 30 ft by 100 ft and 20 ft by 100 ft, respectively, and the Lined Process Lagoon is described as 45 ft by 65 ft. The historical boundaries of these features shown on **Drawing 11** are consistent with these dimensions and are in the locations indicated on the site map contained in the Acheron report and in historical survey information. The listed waste boundary includes the historical limits of Cells 1A and 1B plus a 10-foot buffer on the downgradient and cross-gradient sides of the cells and a 2-ft buffer on the upgradient sides of the cells. The area between the historical boundaries of Cell 1A and 1B will also be handled as listed waste as shown on **Drawing 11**. The area inside the historical limits of the Lined Process Lagoon plus a 1-ft buffer around the Lined Process Lagoon will also be handled as listed waste.

During removal, material inside the listed waste boundaries will be handled and stockpiled separately from material outside the listed waste boundaries. The listed waste boundaries are defined by the control points shown on **Drawing 11** and will be established in the field by the Remediation Contractor during the pre-construction survey. The Remediation Contractor will stake the listed waste boundaries in the field to provide visual demarcation, and the coordinates of the boundaries will be input into the excavator's Global Positioning System (GPS) during removal activities. When the excavation reaches the listed waste boundary a post-excavation survey will be conducted by a Maine-licensed surveyor hired by the Remediation Contractor and submitted to the Remediation Project Manager and the CQA Engineer for review. Soil and material from either side of a listed waste boundary will be handled and stockpiled separately, and equipment will be decontaminated when transitioning from handling non-listed (i.e., special) waste to handling listed waste and vice versa. Material with different waste classifications will be placed in separate TSSA areas, to the degree possible. If materials with different waste classifications are placed in the same TSSA area, Mallinckrodt will notify Maine DEP and discuss appropriate measures (e.g., physical barriers) for segregating the materials. Physical barriers may include concrete barriers and the areas where listed waste is stockpiled will be sloped so that storm water that runs off these soils does not flow into non-listed waste areas.

Material from outside the limits of Cell 1A, Cell 1B, and the Lined Process Lagoon did not contain listed waste and analytical data supports that the soils/debris in Landfill 1 are not hazardous based on TCLP testing. Specifically, the Maine DEP requested that the soil in the vicinity of SB-LF1-32 be segregated and tested for hazardous waste characteristics. The soil in this area has been sampled and shown to be characteristically non-hazardous. These soils will be classified for disposal based on the results of additional waste characterization to be performed in accordance with the disposal facility requirements prior to excavation.

4.9.5 Excavation Dewatering

Water encountered within the excavations will be considered contact water and will require treatment at the on-site GWTP. Based on groundwater level measurements observed from monitoring wells and piezometers located in the Landfill 1 Area, the static groundwater elevation may be above the bottom of excavation in some areas. Incremental excavation and backfilling will be conducted to reduce the volume of contact water that may occur at any given time. These details are presented in the Remediation Contractor's Excavation and Restoration Plan in **Appendix N**.

Groundwater levels in the excavation areas will be maintained at least one foot below the bottom of the excavation. Sumps and/or well points will be used to remove contact water from the excavation areas. Contact water generated from precipitation events and groundwater inflows will be transferred to the GWTP either in tanker trucks or via pipe. Calculations for the necessary storage capacity to manage the anticipated quantity of contact water are presented in **Appendix I-2**. The means and methods that the Remediation Contractor will use to dewater the excavations (e.g. sumps, well points) and transport the contact water to the on-site GWTP are presented in the Remediation Contractor's Construction Water Management Plan in **Appendix N**.

4.9.6 Excavation Support/Stability

Stability of the excavation sidewalls will be maintained by sloping, benching and/or shoring (e.g. sheet piles, soldier pile and lagging, trench boxes, etc.) in compliance with applicable safety regulations and the Site HASP (CDM Smith, 2014a).

The Remediation Contractor's Excavation and Restoration Plan in **Appendix N** describes the proposed sloping and shoring approach.

4.9.7 Excavation As-Built Survey and Backfill

The excavation limits for fill exceeding the MPS will be verified by confirmation samples (as described in **Section 4.10**) and by a post-excavation survey to be conducted by a surveyor licensed in the State of Maine. The excavation limits shown on **Drawing 16** for remaining fill below the MPS within the Landfill 1 boundary (as) will be verified by a post-excavation survey. The surveyor will, at a minimum, survey the set of control points established on a 25-foot square grid and the limits of the 20-foot by 20-foot boxes centered around borings SB-LF1-10, SB-LF1-14, SB-LF1-16, SB-LF1-27, and SB-LF1-29 as shown on **Drawings 13 and 18**. The results from the post-excavation survey will be compared to the design elevations tabulated on **Drawings 14 and 19** to confirm that the excavation has reached the design bottom of excavation surfaces. Additionally, the surfaces created from the post-excavation as-built drawings will be compared to the design bottom of -excavation surfaces to check that design elevations were achieved between the survey control points. The survey results will be reviewed along with the results from confirmation samples before a backfill notification is issued for a given section of excavation.

For areas outside the Landfill 1 boundary, backfilling will be incrementally performed once excavation has been completed in designated areas to the elevations shown on **Drawing 11** and post-excavation

sampling has been completed. For areas inside the Landfill 1 boundary, additional excavation will be performed to remove fill containing mercury concentrations less than 2.2 mg/kg, and backfilling will be incrementally performed once excavation has been completed in designated areas to the elevations shown on **Drawing 1**6 and verified by the surveyor. Backfill notifications will identify survey control points that define the limits of the area that will be backfilled. Excavations will be backfilled in accordance with the Specifications (**Appendix H**) and Soil and Concrete Use Plan (**Appendix L**). The excavation and backfilling sequencing are presented in the Remediation Contractor's Excavation and Restoration Work Plan in **Appendix N**.

4.9.8 Reuse Soil Removal and Stockpiling

In areas where the excavation ends in soil with mercury concentrations less than 2.2 mg/kg and the bottom of excavation elevation is higher than the final grade elevation, additional soil will be removed and stockpiled for reuse. The locations of areas where material is proposed for reuse are shown on **Drawing 20**. After the post-excavation survey and confirmation sampling have confirmed that the target excavation elevations have been achieved, the Remediation Contractor will excavate the soil in these areas to achieve an elevation two feet below the final grade elevation shown on **Drawing 21**. The soil that is removed from these areas will be stockpiled on site, and composite samples will be collected in accordance with the Soil and Concrete Use plan in **Appendix L**. If the results from composite samples confirm that the mercury concentrations are less than the MPS, the stockpiles will be approved for reuse as backfill.

4.9.9 Transportation and Disposal

Based on the preliminary waste characterization results discussed in Section 2.1.2 and historical documentation of brine sludge disposal in Cell 1A, Cell 1B, and the Lined Process Lagoon, it is anticipated that waste from Landfill 1 will fall into one of three categories for disposal: (1) non-hazardous waste, (2) characteristic hazardous waste, (3) listed waste. While not expected, waste containing visible mercury may also be generated if visible mercury is encountered during excavation. Materials containing microbeads of visible mercury will be transported, stockpiled, and handled separately and sent to a disposal facility permitted to accept this material. A full waste characterization sampling event will be completed at a rate required by the disposal facility. The waste profile(s) will be developed for the material and sent to the appropriate disposal facility for acceptance.

It is anticipated that the majority of the material from the Landfill 1 Area will be transported off-site via gondola rail car. In general, soils will be placed in the TSSAs and then loaded into the rail cars. Direct loading into the rail cars may also be performed.

4.10 Confirmation Sampling

The Confirmation Sampling Plan for the Landfill 1 area is shown on **Drawing 15.** Mallinckrodt and the Maine DEP have agreed on the confirmation sampling frequency and locations shown on the **Drawing 15** and described below. Since these Drawings have been finalized and approved by the Maine DEP, they were not revised to remove the areas that will now be addressed in the Plant Area CMI Plan but instead these areas were shaded. The portions of the Confirmation Sampling Plan described below that refer to the Landfill 1 area will be implemented as part of this CMI Plan, and those that refer to the areas outside the Landfill 1 area will be implemented as part of the Plant Area CMI Plan.

A combination of pre- and post-excavation sidewall and bottom samples and survey will be used to confirm that the horizontal extent of excavation is sufficient to remove fill from the Landfill 1 area. Where excavations within the Landfill 1 area end in fill material with mercury concentrations less than the MPS criterion, a combination of survey and bottom confirmation samples will be used to confirm

that the remaining fill material is below the MPS criterion. Then, the remaining fill with mercury concentrations less than the MPS criterion will be removed from the Landfill 1 area. In areas where native soil is being left in place surveys will be used to confirm the design excavation limits are removed, and record samples will be collected to document the concentration of mercury in soils left in place. Confirmation sampling will be performed in accordance with the August 8, 2016, *Confirmation Sampling and Split Sampling Protocol.*

4.10.1 Sidewall Confirmation Samples

Pre-excavation sidewall samples were collected during the pre-design activities and used to develop the excavation plan. These samples, in which each sample interval in the boring has mercury concentrations less than the MPS, define the lateral extent of mercury exceedances at the perimeter of the excavation. Since the mercury concentration in each interval in these pre-excavation borings is less than the MPS, each sample collected from these pre-excavation sidewall borings is considered a separate sidewall sample. Additional sidewall samples will be collected to address limited data gaps and achieve the minimum sidewall sampling density of 1 sample per 50 linear feet of excavation boundary, except where the Landfill 1 boundary is adjacent to other remedial areas. The locations of the sidewall samples are provided on **Drawing 15**.

The excavation plan for Landfill 1 on **Drawing 11** indicates that the completed excavation for the Landfill 1 area and the adjacent portions of the Northern Drainage Ditch and the Plant Area will have a perimeter of approximately 1,950 LF. Of this 1,950 LF, approximately 450 LF is adjacent to areas being excavated under other CMI plans (e.g., Plant Area or Northern Drainage Ditch), and these sections of the excavation boundary do not have sidewall samples because clean boundaries have either already been established (see the Northern Drainage Ditch Closure Report) or will be verified during the future excavation during the Plant Area CMI. The Remediation Contractor shall place 8 oz nonwoven geotextile along the sidewalls adjacent to areas being excavated under the Plant Area CMI Plan to distinguish these sidewalls where additional excavation will take place.

The sidewall sampling frequency shown on **Drawing 15** is 1 sample per 36 LF. Fifteen additional sidewall samples will be collected during excavation to achieve this frequency.

4.10.2 Bottom Confirmation Samples

A pre-excavation bottom sample is defined as the first sample interval in a boring with a mercury concentration less than 2.2 mg/kg that vertically delineates the extent of mercury above the MPS. A post-excavation bottom sample is a grab sample collected from the bottom of the open excavation. Post-excavation bottom samples will be collected in excavation areas in which the initial[2] excavation ends in fill material with mercury concentrations less than the MPS. Bottom samples in these locations will confirm that mercury concentrations are below 2.2 mg/kg in the remaining fill. The remaining fill will then be removed from the Landfill 1 area and managed in accordance with the Soil and Concrete Use Plan.

[2] The excavation plan for the Landfill 1 Area includes an initial excavation to remove fill containing mercury concentrations greater than the 2.2 mg/kg (shown on Drawings 11 through 14) and a subsequent excavation to remove remaining fill containing mercury concentrations less than 2.2 mg/kg (shown on Drawings 16 through 19). The references to excavations ending in fill refer to the initial excavation of soils with mercury greater than 2.2 mg/kg. Fill containing mercury concentrations greater than 2.2 mg/kg will be disposed off-site. Fill containing mercury concentrations less than 2.2 mg/kg will be managed in accordance with the Soil and Concrete Use Plan.

During the Landfill Ridge CMI, the Scrap Metal Yard CMI, and the Northern Drainage Ditch CMI Plans, bottom confirmation sampling on a 50-foot grid spacing (i.e., 1 sample per 2,500 square feet (sq ft) was shown to be effective in the Landfill Ridge Area, post-excavation bottom samples were below the MPS as expected based on the pre-excavation sampling data. Although eight post-excavation bottom samples had concentrations greater than 2.2 mg/kg, five of the eight were taken prior to completion of excavation in the area and collected from areas that included debris (woody roots, tree debris, organic material, etc.). In the Scrap Metal Yard, 45 of the original 51 bottom confirmation sample locations had mercury results less than 2.2 mg/kg. Five of the samples with concentrations greater than 2.2 mg/kg were sampled in the top 2 inches of the organic layer. These results indicate the pre-excavation data combined with post-excavation sampling at 1 per 2500 sq ft provides accurate data confirming that excavation bottoms are below the MPS, with 95 percent and 98 percent of confirmation bottom samples being below the MPS in the Landfill Ridge and Scrap Metal Yard, respectively.

Mallinckrodt and the Maine DEP have agreed to an increased frequency of bottom confirmation samples in the Landfill 1 area and adjacent portions of the Northern Drainage Ditch and Plant Area as follows:

- In the area within 400 sq ft of TP-PA-02, where visible mercury has been observed, bottom confirmation samples will be collected at a frequency of 1 sample per 100 sq ft;
- In listed and hazardous waste areas, samples will be collected at a frequency of 1 sample per 500 sq ft; and
- In other areas of Landfill 1 where the initial excavation ends in fill containing mercury concentrations less than 2.2 mg/kg, samples will be collected at a frequency of 1 sample per 750 sq ft.

No pre-design bottom confirmation samples were collected from the area within 400 sq ft of TP-PA-02, so four post-excavation bottom confirmation samples will be collected from this area to achieve a frequency of 1 sample per 100 sq ft. A total of 16 pre-design bottom confirmation samples were collected from the listed waste areas, and the total area of listed waste is 10,500 sq ft. An additional five (5) post-excavation bottom confirmation samples will be added to the listed waste areas to achieve a sampling frequency of 1 sample per 500 sq ft. A total of 40 pre-design bottom confirmation samples were collected from other areas of Landfill 1 and the adjacent portions of the Northern Drainage Ditch and Plant Area where the initial excavation ends in fill with mercury concentrations less than 2.2 mg/kg. The area associated with these samples is 120,000 sq ft. A total of 117 post-excavation bottom confirmation samples were added to these areas to achieve a sampling frequency of 1 sample per 750 sq ft. A total of 129 post-excavation bottom confirmation samples will be collected at the locations shown on **Drawing 15** in **Appendix G**.

4.10.3 Record Samples

The purpose of confirmation samples is to verify that the soils in the bottom of the excavation are below the MPS. Such confirmation samples are therefore not applicable in areas where native material above the MPS will remain in place. Over 300 samples were collected during the pre-design activities from the native soil that will remain in place to document the mercury concentrations in these soils. These samples will be referred to as record samples. In addition to these pre-design record samples, Maine DEP requested an additional 14 post-excavation record samples be collected. Nine locations (RS-LF1-01 through RS-LF1-09) are shown on **Drawing 15,** and five will be discretionary samples with locations selected by the Maine DEP's on-site representative.

A survey will also be conducted in these areas to confirm that the appropriate bottom elevation specified on **Drawing 14** has been reached, and a visual inspection will be performed to check that observable fill material (e.g. debris, etc.) is not remaining in the bottom of the excavation. If observable

fill material is seen during the inspection, further excavation will be performed. A visual inspection will also be conducted to look for the presence of visible mercury as described in Section 4.10.3. If visible mercury is identified, materials containing the visible mercury will be excavated and stockpiled for disposal at the appropriate off-site facility. The pre-design borings and post-excavation bottom record samples, as well as a comparison of the as-built survey to the excavation surface, will serve as final documentation of the remaining mercury concentrations and bottom of excavation elevation.

4.10.4 Confirmation Sampling Frequency

As described in Sections 4.10.1 and 4.10.2, upon completion of the confirmation sampling program the minimum sample frequencies agreed upon with the Maine DEP will be achieved.

Post-excavation confirmation samples will be analyzed for mercury. Based on the pre-excavation confirmation samples showing concentrations of non-mercury COCs less than detection limits or less than the respective MPS, post-excavation sampling for the non-mercury COCs is not required. Chloropicrin detected above the MPS in the Chloropicrin Spill Area will be handled as part of the Plant Area CMI Plan (CDM Smith, 2017).

The actual number of confirmation samples and timeframe of collection are summarized in **Table 4-1**.

Table 4-1: Summary of Landfill 1 Confirmation Samples

Sampling Time Frame	Bottom Samples			Side Wall Samples
	Visible Mercury Area	Listed Waste Areas	Excavations Ending in Fill Less than the MPS	
Pre-Excavation (complete)	0	13	43	342
Post-Excavation	4	8	117	15
Area/Perimeter	400 ft^2	10,500 ft^2	120,000 ft^2	1,500 LF(1)
Total Confirmation Samples	4	21	160	357
Frequency	1 sample/ 100 ft^2	1 sample/500 ft^2	1 sample/750 ft^2	1 sample/ 4 linear feet

1. The perimeter length excludes perimeter adjacent to areas excavated under other CMI Plans.
2. The total listed waste area is 13,000 ft^2; however, 2,500 ft^2 has excavation ending at the fill/native interface where record samples are being collected instead of bottom confirmation samples.
3. The 120,000 ft^2 of area with excavations ending in fill less than the MPS is equal to the total excavation area (150,000 ft^2) minus the sum of the listed waste areas (10,500 ft^2) and the areas where excavations end at the fill/native interface (20,000 ft^2).

After completing removal activities in excavation areas that end in fill material with mercury concentrations less than 2.2 mg/kg, post-excavation bottom confirmation samples will be collected as shown on **Drawing 15**. Upon receipt of total mercury results below the MPS, a backfill notification will be sent to the Maine DEP and the area will be backfilled in accordance with the August 8, 2016, *Confirmation Sampling and Split Sampling Protocol*. If the confirmation sample indicates soil concentrations are above the MPS, a 20-foot by 20-foot area, one foot deep, will be excavated around the sample and the area will be resampled until the mercury concentration in the confirmation sample is below the MPS or the fill/native interface is reached. Excavation areas where confirmation samples are not applicable will be considered complete once the fill material is removed from the excavation boundaries provided in the excavation survey control plan and tables (**Drawings 13 and 14)** and the

survey verifies the excavation bottom (elevation) has been achieved as designed. Post-excavation bottom record samples will also be collected in these areas at the 14 locations shown on **Drawing 15**.

4.10.5 Pre-Excavation Confirmation Samples

The locations and types of the pre-excavation confirmation samples are provided in **Table 4-2**. The coordinates of these pre-excavation confirmation samples are provided on **Drawing 12**.

Table 4-2: Landfill 1 Pre-Excavation Confirmation Samples

Sample Location	Type of Core	Number of Samples	Depth Interval of Sample(s) (ft bgs)	Elevation Interval of Sample (ft)
SB-LF1-01	Bottom	1	16 - 17	19.4 - 18.4
SB-LF1-03	Bottom	1	23 - 24	26.8 - 25.8
SB-LF1-04	Bottom	1	30 - 31	21.4 - 20.4
SB-LF1-05	Bottom	1	7 - 10	51.7 - 48.7
SB-LF1-07	Bottom	1	5 - 6	57.5 - 56.5
SB-LF1-18	Bottom	1	20 - 21	30.1 - 29.1
SB-LF1-20	Bottom	1	50 - 50.5	-1.5 - -2
SB-LF1-21	Bottom	1	49 - 50	-4.8 - -5.8
SB-LF1-23	Bottom	1	12 - 13	19.1 - 18.1
SB-LF1-26	Bottom	1	21 - 22	32 - 31
SB-LF1-31	Bottom	1	37 - 38	19.5 - 18.5
SB-LF1-35	Bottom	1	5 - 6	55.2 - 54.2
SB-LF1-36	Bottom	1	17 - 19	43.5 - 41.5
SB-LF1-37	Bottom	1	28 - 29	33.2 - 32.2
SB-LF1-41	Bottom	1	26 - 27	18.2 - 17.2
SB-LF1-42	Bottom	1	7 - 8	56.4 - 55.4
SB-LF1-43	Bottom	1	21 - 22	41.5 - 40.5
SB-LF1-45	Bottom	1	25 - 26	36.1 - 35.1
SB-LF1-46	Bottom	1	22 - 23	36.1 - 35.1
SB-LF1-49	Bottom	1	25 - 26	36 - 35
SB-LF1-55	Bottom	1	2 - 3	62.7 - 61.7
SB-LF1-60	Bottom	1	14 - 15	49.1 - 48.1
SB-LF1-62	Bottom	1	13 - 14	48.4 - 47.4
SB-LF1-64	Bottom	1	2 - 4	42 - 40
SB-LF1-79	Bottom	1	2 - 3	17.5 - 16.5
SB-ND-02	Bottom	1	1 - 2	56.1 - 55.1
SB-ND-06	Bottom	1	25 - 26	10.4 - 9.4
SB-ND-07	Bottom	1	11 - 12	18.1 - 17.1
SB-ND-14	Bottom	1	24 - 25	1.9 - 0.9
SB-ND-21	Bottom	1	24 - 25	9.1 - 8.1
SB-PA-05	Bottom	1	0.5 - 2	65.9 - 64.4

Sample Location	Type of Core	Number of Samples	Depth Interval of Sample(s) (ft bgs)	Elevation Interval of Sample (ft)
SB-PA-143	Bottom	1	0.5 - 2	65.6 - 64.1
SB-PA-156	Bottom	1	29 - 30	17.2 - 16.2
SB-LF1-02	Sidewall	21	0 - 19	33.9 - 14.9
SB-LF1-09	Sidewall	5	0 - 6	22.8 - 16.8
SB-LF1-56	Sidewall	21	0 - 20	64.9 - 44.9
SB-LF1-58	Sidewall	8	0 - 10	31.7 - 21.7
SB-LF1-59	Sidewall	12	0 - 10	33.1 - 23.1
SB-LF1-65	Sidewall	16	0 - 20	26.9 - 6.9
SB-LF1-66	Sidewall	8	0 - 10	27.5 - 17.5
SB-LF1-69	Sidewall	2	0 - 2	53.6 - 51.6
SB-LF1-71	Sidewall	2	0 - 4	45.5 - 41.5
SB-LF1-72	Sidewall	8	0 - 10	73.5 - 63.5
SB-LF1-74	Sidewall	1	0 - 2	70.7 - 68.7
SB-LF1-75	Sidewall	2	0 - 2.5	62.9 - 60.4
SB-LF1-76	Sidewall	3	0 - 3	34.7 - 31.7
SB-LF1-78	Sidewall	8	0 - 12	18.5 - 6.5
SB-LF1-80	Sidewall	11	0 - 10	32.3 - 22.3
SB-LF1-83	Sidewall	3	0 - 4	79 - 75
SB-ND-04	Sidewall	24	0 - 28	53.6 - 25.6
SB-ND-09	Sidewall	10	0 - 10	22.3 - 12.3
SB-ND-15	Sidewall	21	0 - 20	33.3 - 13.3
SB-ND-16	Sidewall	22	0 - 20	29.8 - 9.8
SB-ND-17	Sidewall	15	0 - 14	25.8 - 11.8
SB-PA-01	Sidewall	35	0 - 32	58.2 - 26.2
SB-PA-03	Sidewall	25	0 - 25	66.3 - 41.3
SB-PA-111	Sidewall	15	0.5 - 15	66.2 - 51.7
SB-PA-133	Sidewall	12	0 - 20	66 - 46
SB-PA-178	Sidewall	3	0 - 3	77.1 - 74.1
SB-PA-84	Sidewall	29	0 - 31	68.2 - 37.2

4.10.6 Post-Excavation Confirmation Samples

The elevations and types of the post-excavation confirmation samples are provided in **Table 4-3**. The coordinates of these post-excavation confirmation samples are provided on **Drawing 15**.

Table 4-3: Landfill 1 Post-Excavation Confirmation Samples

Sampling Locations	Type of Confirmation Sample	Elevation of Sample (ft)
BS-LF1-01	Bottom	53.2
BS-LF1-02	Bottom	47.6

Sampling Locations	Type of Confirmation Sample	Elevation of Sample (ft)
BS-LF1-03	Bottom	40.4
BS-LF1-04	Bottom	28.7
BS-LF1-05	Bottom	63.3
BS-LF1-06	Bottom	60.6
BS-LF1-07	Bottom	55.9
BS-LF1-08	Bottom	52.2
BS-LF1-09	Bottom	55.3
BS-LF1-10	Bottom	61.8
BS-LF1-11	Bottom	57.7
BS-LF1-12	Bottom	53.2
BS-LF1-13	Bottom	41.6
BS-LF1-14	Bottom	21.0
BS-LF1-15	Bottom	41.3
BS-LF1-16	Bottom	37.7
BS-LF1-17	Bottom	21.6
BS-LF1-18	Bottom	22.0
BS-LF1-19	Bottom	21.5
BS-LE1-20	Bottom	39.5
BS-LF1-21	Bottom	63.4
BS-LF1-22	Bottom	31.2
BS-LF1-23	Bottom	29.5
BS-LF1-24	Bottom	24.0
BS-LF1-25	Bottom	65.4
BS-LF1-26	Bottom	61.1
BS-LF1-27	Bottom	35.8
BS-LF1-28	Bottom	37.3
BS-LF1-29	Bottom	24.1
BS-LF1-30	Bottom	49.1
BS-LF1-31	Bottom	50.9
BS-LF1-32	Bottom	44.0
BS-LF1-33	Bottom	27.0
BS-LF1-34	Bottom	30.3
BS-LF1-35	Bottom	46.3
BS-LF1-36	Bottom	48.2
BS-LF1-37	Bottom	47.3
BS-LF1-38	Bottom	52.7
BS-LF1-39	Bottom	35.3
BS-LF1-40	Bottom	61.4
BS-LF1-41	Bottom	62.9
BS-LF1-42	Bottom	45.1

Sampling Locations	Type of Confirmation Sample	Elevation of Sample (ft)
BS-LF1-43	Bottom	34.7
BS-LF1-44	Bottom	50.9
BS-LF1-45	Bottom	33.0
BS-LF1-46	Bottom	23.6
BS-LF1-47	Bottom	23.1
BS-LF1-48	Bottom	44.2
BS-LF1-49	Bottom	24.1
BS-LF1-50	Bottom	48.4
BS-LF1-51	Bottom	22.2
BS-LF1-52	Bottom	29.9
BS-LF1-53	Bottom	59.7
BS-LF1-54	Bottom	59.1
BS-LF1-55	Bottom	58.3
BS-LF1-56	Bottom	51.8
BS-LF1-57	Bottom	61.3
BS-LF1-58	Bottom	29.5
BS-LF1-59	Bottom	39.6
BS-LF1-60	Bottom	33.3
BS-LF1-61	Bottom	63.8
BS-LF1-62	Bottom	24.6
BS-LF1-63	Bottom	25.7
BS-LF1-64	Bottom	47.0
BS-LF1-65	Bottom	50.8
BS-LF1-66	Bottom	52.7
BS-LF1-67	Bottom	62.9
BS-LF1-68	Bottom	18.4
BS-LF1-69	Bottom	65.1
BS-LF1-70	Bottom	58.2
BS-LF1-71	Bottom	52.0
BS-LF1-72	Bottom	28.5
BS-LF1-73	Bottom	31.4
BS-LF1-74	Bottom	37.3
BS-LF1-75	Bottom	24.8
BS-LF1-76	Bottom	50.0
BS-LF1-77	Bottom	64.7
BS-LF1-78	Bottom	38.1
BS-LF1-79	Bottom	40.1
BS-LF1-80	Bottom	21.2
BS-LF1-81	Bottom	39.6
BS-LF1-82	Bottom	44.3

Sampling Locations	Type of Confirmation Sample	Elevation of Sample (ft)
BS-LF1-83	Bottom	47.8
BS-LF1-84	Bottom	48.6
BS-LF1-85	Bottom	43.2
BS-LF1-86	Bottom	44.2
BS-LF1-87	Bottom	29.7
BS-LF1-88	Bottom	63.8
BS-LF1-89	Bottom	64.4
BS-LF1-90	Bottom	64.3
BS-LF1-91	Bottom	65.0
BS-LF1-92	Bottom	44.0
BS-LF1-93	Bottom	22.1
BS-LF1-94	Bottom	29.9
BS-LF1-95	Bottom	55.0
BS-LF1-96	Bottom	57.0
BS-LF1-97	Bottom	58.4
BS-LF1-98	Bottom	59.6
BS-LF1-99	Bottom	47.6
BS-LF1-100	Bottom	51.4
BS-LF1-101	Bottom	23.7
BS-LF1-102	Bottom	29.2
BS-LF1-103	Bottom	22.6
BS-LF1-104	Bottom	39.6
BS-LF1-105	Bottom	36.5
BS-LF1-106	Bottom	32.0
BS-LF1-107	Bottom	38.7
BS-LF1-108	Bottom	20.0
BS-LF1-109	Bottom	27.1
BS-LF1-110	Bottom	27.4
BS-LF1-111	Bottom	21.1
BS-LF1-112	Bottom	25.4
BS-LF1-113	Bottom	29.0
BS-LF1-114	Bottom	43.1
BS-LF1-115	Bottom	26.7
BS-LF1-116	Bottom	23.6
BS-LF1-117	Bottom	21.5
BS-LF1-118	Bottom	23.4
BS-LF1-119	Bottom	20.8
BS-LF1-120	Bottom	35.5
BS-LF1-121	Bottom	38.7
BS-LF1-122	Bottom	21.1

Sampling Locations	Type of Confirmation Sample	Elevation of Sample (ft)
BS-LF1-123	Bottom	37.7
BS-LF1-124	Bottom	20.3
BS-LF1-125	Bottom	25.5
BS-LF1-126	Bottom	19.0
BS-LF1-127	Bottom	23.4
BS-LF1-128	Bottom	58.4
BS-LF1-129	Bottom	56.1
SW-LF2-01	Sidewall	62.9 - 62.4
SW-LF2-02	Sidewall	71.9 - 71.4
SW-LF2-03	Sidewall	56.9 - 56.4
SW-LF2-04	Sidewall	28 - 27.5
SW-LF2-05	Sidewall	15.1 - 14.6
SW-LF2-06	Sidewall	44.7 - 44.2
SW-LF2-07	Sidewall	84.9 - 84.4
SW-LF1-08	Sidewall	81.3 - 80.8
SW-LF1-09	Sidewall	25.4 - 24.9
SW-LF1-10	Sidewall	30.2 - 29.7
SW-LF1-11	Sidewall	66 - 65.5
SW-LF1-12	Sidewall	66 - 65.5
SW-LF1-13	Sidewall	44.3 - 43.8
SW-LF1-14	Sidewall	27.3 - 26.8
SW-LF1-15	Sidewall	24.8 - 24.3

Note: Sidewall confirmation samples will be taken from the top 6 inches of soil at each location.

4.11 Final Grading and Restoration

Design objectives for the Landfill 1 Area final grading and restoration include the following:

- Maintaining at least two feet of clean fill above the bottom of excavation;
- Achieving a ground surface with a maximum slope of 4H:1V to the extent practicable;
- Stabilizing the area against erosion;
- Prevent ponding of surface water;
- Maintaining the groundwater elevation below ground surface;
- Maintaining long-term slope stability along the Penobscot River; and
- Maintaining access to the Southern Cove.

As shown on **Drawing 21** and as mentioned above, the proposed final grade slopes will range from 7% to 50% (2H:1V), with the steepest slope occurring adjacent to the Penobscot River, in order to maintain

2 feet above the bottom of excavation and groundwater. The clean cover soil will serve as a separation and contact cover in accordance with the Order to prevent exposure to remaining soil potentially containing mercury concentrations greater than the MPS. Alternative cover options, including impermeable or synthetic caps were also considered. The "separation and contact" approach was selected because it addresses the direct contact exposure pathway, which is the primary exposure pathway of concern for future receptors in Landfill 1. Possible leaching of mercury to groundwater due to infiltration will be addressed through the continued operation of the groundwater extraction system.

The final grades will be achieved by backfilling the excavation with On-Site Reused Material and/or common fill from off-site. Six inches of topsoil will be placed over the area and seeded. The seed mix is designed for erosion control and vegetation restoration. The Northern Drainage Ditch channel will be re-established at the location shown on **Drawing 23** during the Plant Area CMI. The channel cross section and design details are presented on **Drawing 23**. Swales will be installed at two locations along the slope of Landfill 1 to direct runoff toward the newly constructed Northern Drainage Ditch channel and a swale will be constructed at the Landfill 1/Plant area boundary to convey runoff from the Plant Area to the Northern Drainage Ditch.

The final grade elevations shown on **Drawing 21** are a minimum of two feet higher than the groundwater elevations measured by SME in 2012. The 2012 groundwater elevations have been used as a benchmark for establishing final grades because they are generally higher than the groundwater elevations measured from 2012 through 2015 and represent a conservative estimate of groundwater conditions. Maintaining the final grade elevations above this conservative benchmark is expected to minimize the potential for groundwater seepage at the ground surface under final conditions.

The calculations presented in **Appendix I-3** were used to evaluate the stability of the final grade slope for the Cross-Section A-A' profile shown on **Drawing 22**. The results from this analysis indicate that the calculated factors of safety against slope failure exceed the minimum required factors of safety for these areas.

As shown on **Drawing 23**, a portion of the final slopes along the Penobscot will be stabilized with riprap slope protection. Temporary erosion and sediment controls used during remediation include silt fence, fiber rolls, turbidity curtain, temporary diversion berms, check dams, slope drains, and temporary stabilization measures.

4.12 Stormwater Management

In general, stormwater runoff from the post-remediation Landfill 1 Area will be captured in a series of swales and conveyed through trench drains into the new location of the Northern Drainage Ditch. The Northern Drainage Ditch ultimately drains to the Penobscot River. Calculations provided in **Appendix I-4** indicate that the post-remediation condition peak flow rates will be less than the pre-remediation peak flow rates under the evaluated design storms. The post-remediation proposed finish grade slopes range from 7% to 50%, and will be temporarily stabilized with erosion control blanket while permanent vegetation is established. Additional stabilization procedures are discussed in Section 4.11.

Section 5.
Permitting

The Landfill 1 remediation requires the following permits:

- Shoreland Protection Ordinance (ZBA); per the Shoreland Protection Act, a Land Use Application must be submitted to the Orrington Code Enforcement Officer (CEO) for work within 250 feet of the Penobscot River. Landfill 1 is within this 250-ft zone. The Application consists of a one-page notification form and a cover letter, in addition to project figures and plans. A Shoreland Protection Ordinance permit for the entire Site was approved by the Orrington CEO on April 8, 2016. This permit is valid for the remainder of the Site work within the 250-ft zone including Landfill 1.

- Natural Resources Protection Act (NRPA) Permit; per NRPA there is a 75-ft setback measured horizontally of the normal high water line of a great pond, river, stream or brook or the upland edge of a coastal wetland or freshwater wetland (Protected Natural Resources). NRPA also applies to projects located within essential habitats of a threatened or endangered species. The overall remediation project qualifies for a Permit by Rule (PBR) Category #13 – Habitat Creation or Enhancement and Water Quality Improvement Activities. A PBR Application was previously filed for the Landfill Ridge CMI and presumptive approval was received 14 calendar days thereafter (i.e., no comments received). The Maine DEP (Jim Beyer) indicated that the Landfill Ridge PBR application applies to the entire project and the permit is valid for two years. Since the Landfill Ridge PBR (amended by Maine DEP to cover entire Site) expired in June 2017 and the Penobscot River is located within 75-ft of the limit of the Landfill 1 work, a new permit application was submitted in June 2017 and was granted presumptive approval before the expiration of the previous permit. The new permit application is valid until June 2019. The application consists of a one-page NRPA notification form, a cover letter and additional project information, figures, project plans, and documentation of correspondence with United States Fisheries and Wildlife Service (USFWS) and Maine Department of Inland Fisheries and Wildlife (MDIFW), as applicable. Presumptive approval is granted if no response is issued within 14 days of submittal and the permit is valid for two years. Following completion of each phase, photographs of the affected area should be submitted to Maine DEP.

- United States Fisheries and Wildlife Service (USFWS) and/or Maine Department of Inland Fisheries and Wildlife (MDIFW) Consultation. Consultation with USFWS was conducted to establish if there are any new species of concern in the project area. Initial consultation with USFWS and MDIFW was conducted in the spring of 2015, and after a period of 2 years follow-up consultation was conducted in March 2017. Consultation indicates that the project area supports no known species of concern.

- Maine Construction General Permit (CGP); Maine DEP has been delegated authority by the USEPA under the National Pollutant Discharge Elimination System (NPDES) permit program to issue stormwater permits for construction activities (which include excavation, dredging, and filling). This permit is required for construction activities that result in greater than one acre of land disturbance. Each separate work area requires a CGP (i.e., CGPs exist for each previous work area greater than one acre of disturbance, e.g., Landfill Ridge, Landfills 3, 4 & 5, and Landfill 2/Scrap Metal Yard/Southerly Stream). To address this requirement for Landfill 1, a Notice of Intent (NOI) was submitted in July 2017, consisting of a one-page notification form, a cover letter, an Erosion and Sedimentation Control Plan, and project figures and plans. Additionally, if work is to occur within an essential habitat of threatened or endangered species,

documentation of approval from MDIFW must also be submitted; since there are no such habitats, approval from MDIFW was not necessary. A Notice of Termination must be submitted at the completion of construction activities. Presumptive approval is granted if no response is issued within two weeks of submittal. The expiration of the permit is variable and it can be reissued.

- Maine State General Permit; per the Maine General Permit and overseen by the United States Army Corps of Engineers (USACE), either a USACE Category 1 Self-Verification Notification Form or a USACE Category 2 Pre-Construction Notification must be filed for special activities including removal of hazardous or toxic materials within Inland and Navigable Waters of the United States. The category determination is dependent on the square footage of direct Inland and Navigable Waters impact. The Landfill 1 work will impact the Northern Drainage Ditch (NDD), however the Jurisdiction Determination issued by USACE on July 31, 2015 (File Number: NAE-1999-2231-M3) determined the NDD was a non-jurisdictional Waters of the United States and therefore no General Permit with USACE is required to conduct the Landfill 1 work.

Section 6.
Schedule

The schedule for the Landfill 1 Area CMI Plan is included as **Table 6-1.**

Table 6-1: Proposed Schedule for Landfill 1 CMI Plan.

Task	Anticipated Start Date	Anticipated End Date
Prepare and Submit DRAFT Landfill 1 CMI Plan to Maine DEP	Dec 16, 2016	April 25, 2017
Initial Maine DEP CMI Plan Meeting	May 10, 2017	May 10, 2017
Pre-Excavation Borings and Sampling	May 22, 2017	May 26, 2017
Maine DEP Review	April 26, 2017	August 24, 2017
Procurement of Remedial Contractor	April 28, 2017	June 23, 2017
Submission of Remedial Contractor Work Plans	June 23, 2017	August 8, 2017
Maine DEP Review of Contractor Work Plans	August 8, 2017	September 29, 2017
Revise CMI Plan	May 31, 2017	October 13, 2017
Maine DEP Reviews	October 13, 2017	April 10, 2018
Respond to Maine DEP comments and Finalize CMI Plan Rev 2	April 10, 2018	April 27, 2018
Submission of Final CMI Plan and Remedial Contractor Work Plans	April 30, 2018	April 30, 2018
Maine DEP Final Review and Approval	May 1, 2018	May 10, 2018
Mobilize for Construction Activities	May 22, 2018	May 22, 2018

Section 7.
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SME, 2015. 3rd Quarter Interim Extraction System Operation Report. Orrington Remediation Site, Orrington, Maine. Sevee and Maher Engineers, Inc. November 11.

Figures

LEGEND

- PROPERTY LINE
- EXISTING GROUND ELEVATION (FT)
- FENCE LINE
- ROADWAY
- RAILROAD
- SOUTHERLY STREAM CULVERT
- SOUTHERLY STREAM / NORTHERN DITCH

0 150' 300'
SCALE IN FEET

NOTES:
1. THE SITE IS LOCATED AT 99 INDUSTRIAL WAY, ORRINGTON MAINE 04474.
2. EXISTING TOPOGRAPHY AND SITE FEATURES ARE BASED ON A SURVEY CONDUCTED BY THE JAMES W. SEWALL COMPANY IN 2003 AND PROVIDED IN CDMSMITH DRAWING "3841OC_MASTER-SURVEY.DWG" AND ARE UPDATED BY CES, INC. OF BANGOR MAIN. THE HORIZONTAL DATUM IS NAD83 (NORTH AMERICAN DATUM 1983) MAINE STATE PLANE (EAST ZONE) AND THE VERTICAL DATUM IS NAVD 88 (NORTH AMERICAN VERTICAL DATUM 1988).
3. STRUCTURES HAVE BEEN DEMOLISHED AND ONLY FOUNDATIONS REMAIN, WITH THE EXCEPTION OF IDENTIFIED WHICH REMAIN.

SITE PLAN

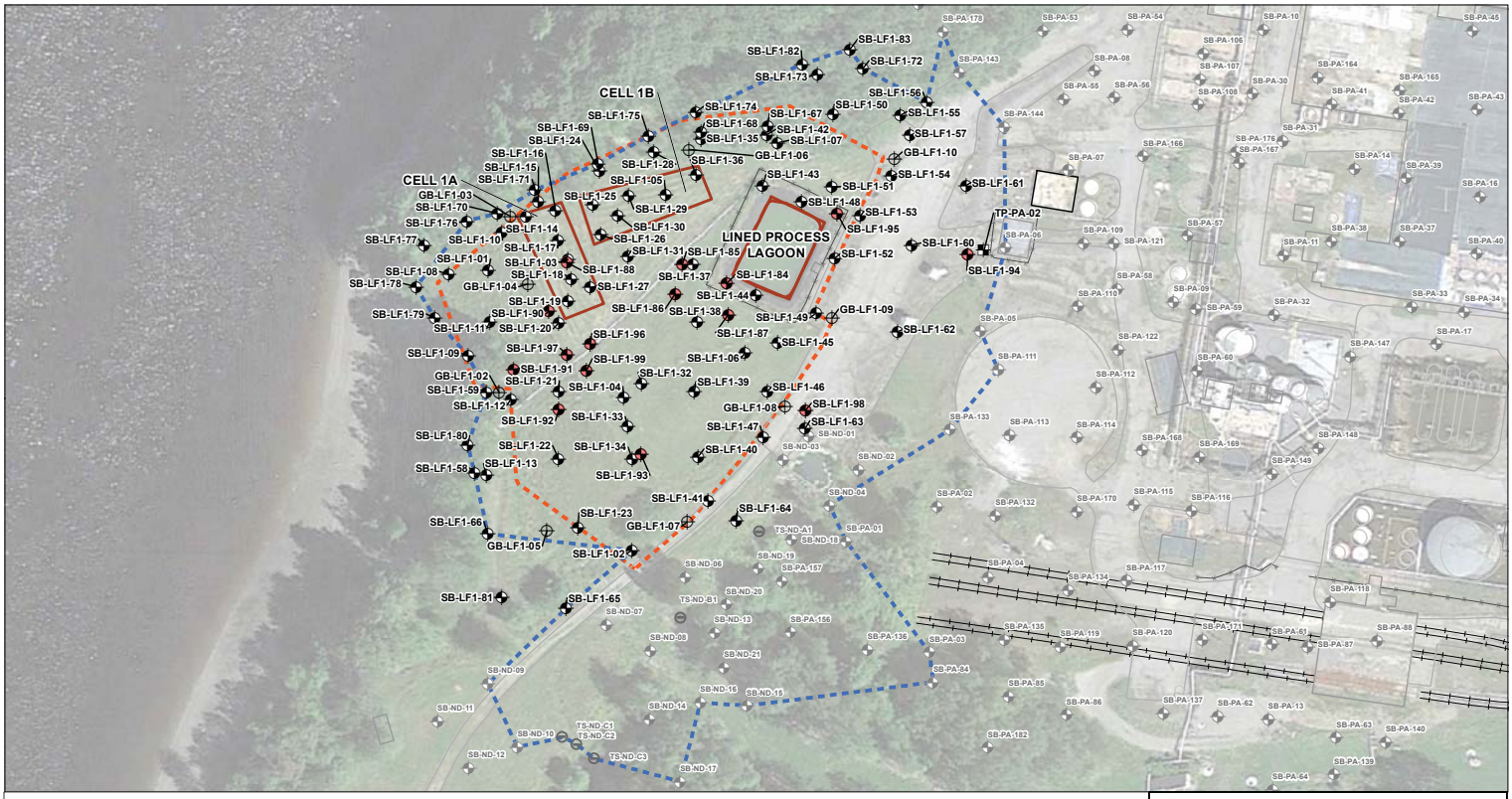
ORRINGTON REMEDIATION SITE
ORRINGTON, MAINE

CDM Smith | Geosyntec consultants

Acton, MA | APRIL 2018

Figure: 1-1

T:\PROJECTS_CADD\ORRINGTON\ORRINGTON ME REMEDIATION II\DES\GN\LANDFILL 1\FIGURES\BR0292-LF1_CMI-F01-1



LEGEND

- PRE-DESIGN BORING COMPLETED 2014-2015
- SUPPLEMENTAL BORING COMPLETED MAY/JUNE 2017
- PRE-DESIGN TEST PIT
- PRE-DESIGN GEOTECHNICAL BORING
- PRE-DESIGN TRANSECT LOCATION
- LANDFILL 1 EXCAVATION BOUNDARY
- HISTORICAL LANDFILL 1 BOUNDARY (FROM CMS REPORT, CDM 2003)
- RAILROAD TRACKS
- HISTORICAL CELL BOUNDARY
- EXISTING FENCE

N

0 75'

SCALE IN FEET

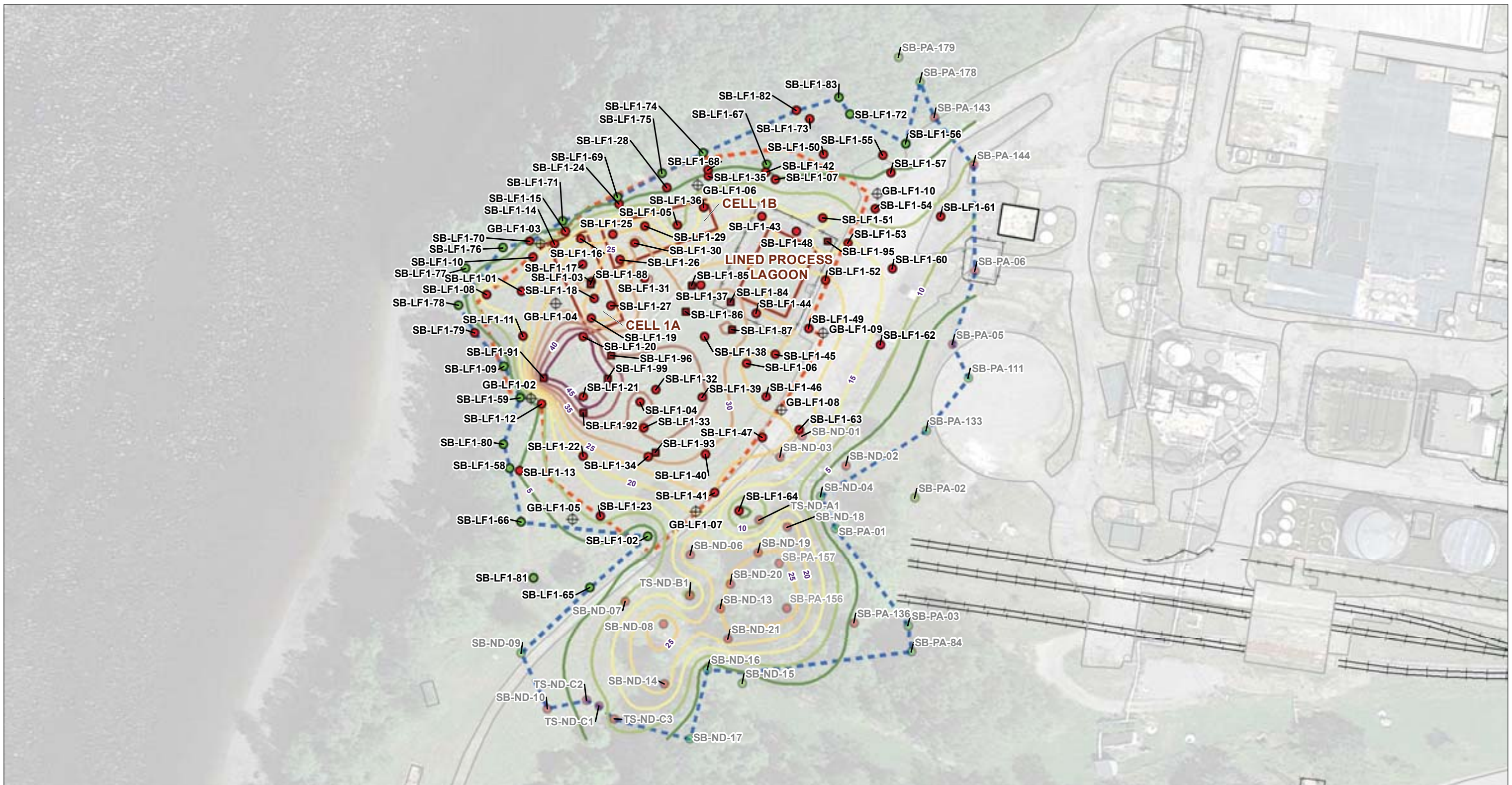
LANDFILL 1 PRE-DESIGN ACTIVITIES LOCATIONS

ORRINGTON REMEDIATION SITE
ORRINGTON, MAINE

Geosyntec consultants

Acton, MA | APRIL 2018

Figure: 2-1



LEGEND

- MERCURY CONCENTRATION LESS THAN 2.2 MG/KG IN EACH DEPTH INTERVAL SAMPLED IN PRE-DESIGN BORING COMPLETED IN 2014-2015
- MERCURY CONCENTRATION GREATER THAN 2.2 MG/KG IN AT LEAST ONE SAMPLE IN PRE-DESIGN BORING COMPLETED IN 2014-2015
- MERCURY CONCENTRATION GREATER THAN 2.2 MG/KG IN AT LEAST ONE SAMPLE IN BORING COMPLETED IN MAY/JUNE 2017
- PRE-DESIGN GEOTECHNICAL BORING
- LANDFILL 1 EXCAVATION BOUNDARY
- HISTORICAL LANDFILL 1 BOUNDARY (FROM CMS REPORT, CDM 2003)
- RAILROAD TRACKS
- HISTORICAL CELL BOUNDARY
- EXISTING FENCE

DEPTH OF DEEPEST SAMPLE WITH MERCURY GREATER THAN 2.2 MG/KG (FT BGS)

5, 10, 15, 20, 25, 30, 35, 40, 45

N

0 80'

SCALE IN FEET

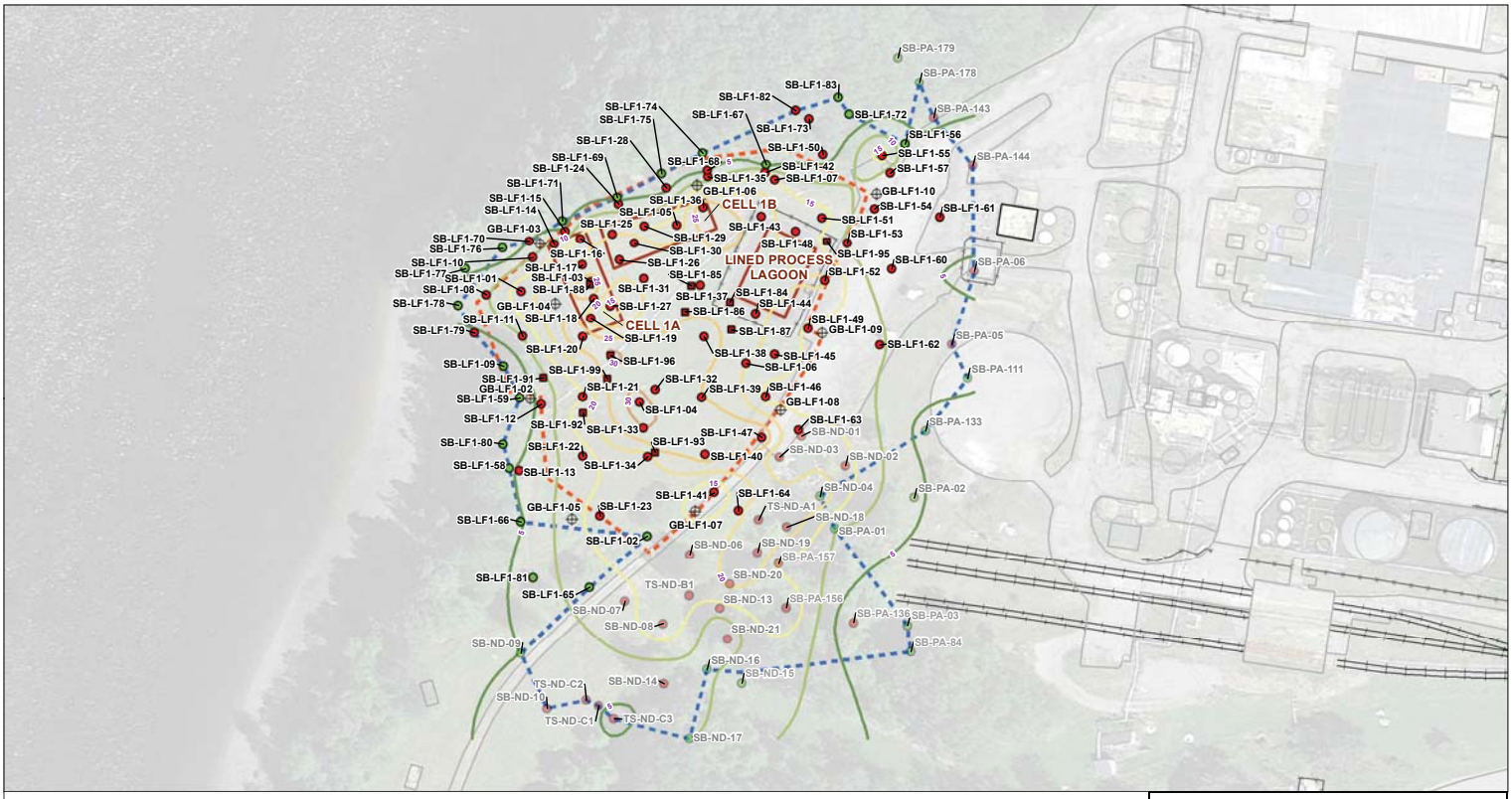
NOTE: CONTOURS ARE BASED ON THE MAXIMUM SAMPLE DEPTH WITH A MERCURY CONCENTRATION GREATER THAN THE MEDIA PROTECTION STANDARD (MPS) OF 2.2 MG/KG FOR EACH PRE-DESIGN BORING.

LANDFILL 1 PRE-DESIGN
MERCURY DELINEATION DEPTH
ORRINGTON REMEDIATION SITE
ORRINGTON, MAINE

Geosyntec consultants

Figure: 2-2

Acton, MA | APRIL 2018



LEGEND

- MERCURY CONCENTRATION LESS THAN 2.2 MG/KG IN EACH DEPTH INTERVAL SAMPLED IN PRE-DESIGN BORING COMPLETED IN 2014-2015
- MERCURY CONCENTRATION GREATER THAN 2.2 MG/KG IN AT LEAST ONE SAMPLE IN PRE-DESIGN BORING COMPLETED IN 2014-2015
- MERCURY CONCENTRATION GREATER THAN 2.2 MG/KG IN AT LEAST ONE SAMPLE IN BORING COMPLETED IN MAY/JUNE 2017

- PRE-DESIGN GEOTECHNICAL BORING
- LANDFILL 1 EXCAVATION BOUNDARY
- HISTORICAL LANDFILL 1 BOUNDARY (FROM CMS REPORT, CDM 2003)
- RAILROAD TRACKS
- HISTORICAL CELL BOUNDARY
- EXISTING FENCE

DEPTH TO TOP OF NATIVE SOILS (FT)

5 20
10 25
15 30

N

0 80'

SCALE IN FEET

LANDFILL 1 PRE-DESIGN
DEPTH TO TOP OF NATIVE SOILS
ORRINGTON REMEDIATION SITE
ORRINGTON, MAINE

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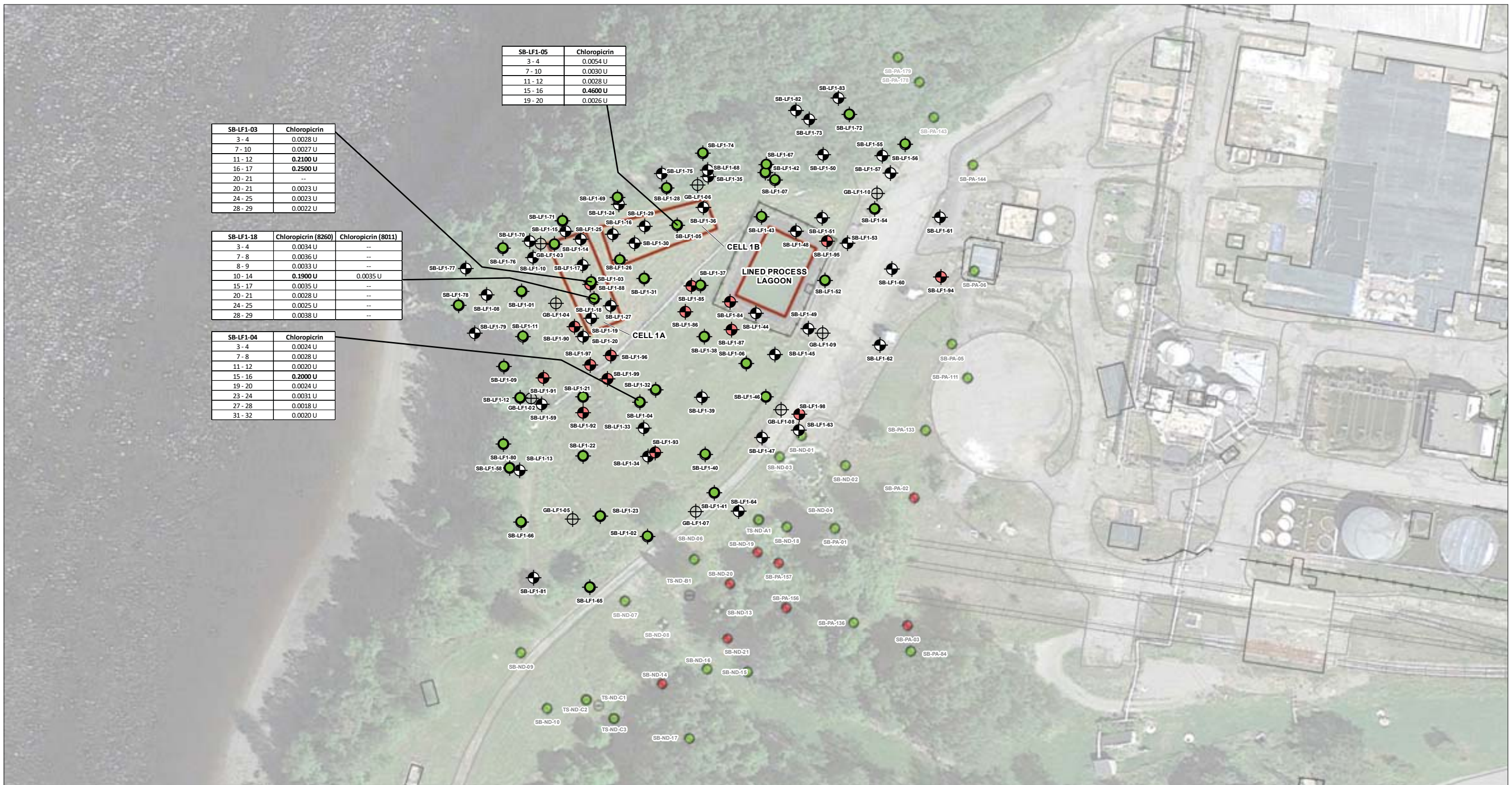
Figure: 2-3



SB-LF1-05	Chloropicrin
3 - 4	0.0054 U
7 - 10	0.0030 U
11 - 12	0.0028 U
15 - 16	**0.4600 U**
19 - 20	0.0026 U

SB-LF1-03	Chloropicrin
3 - 4	0.0028 U
7 - 10	0.0027 U
11 - 12	**0.2100 U**
16 - 17	**0.2500 U**
20 - 21	--
20 - 21	0.0023 U
24 - 25	0.0023 U
28 - 29	0.0022 U

SB-LF1-18	Chloropicrin (8260)	Chloropicrin (8011)
3 - 4	0.0034 U	--
7 - 8	0.0036 U	--
8 - 9	0.0033 U	--
10 - 14	**0.1900 U**	0.0035 U
15 - 17	0.0035 U	--
20 - 21	0.0028 U	--
24 - 25	0.0025 U	--
28 - 29	0.0038 U	--

SB-LF1-04	Chloropicrin
3 - 4	0.0024 U
7 - 8	0.0028 U
11 - 12	0.0020 U
15 - 16	**0.2000 U**
19 - 20	0.0024 U
23 - 24	0.0031 U
27 - 28	0.0018 U
31 - 32	0.0020 U

LEGEND

- DOES NOT EXCEED CHLOROPICRIN MPS OF 0.125 MG/KG
- EXCEEDS CHLOROPICRIN MPS OF 0.125 MG/KG
- SUPPLEMENTAL BORING COMPLETED MAY/JUNE 2017
- PRE-DESIGN BORING COMPLETED 2014-2015
- PRE-DESIGN GEOTECHNICAL BORING
- PRE-DESIGN TRANSECT LOCATION

NOTES:
1. RESULTS ARE PRESENTED FOR LOCATIONS WHERE CHLOROPICRIN WAS DETECTED ABOVE THE METHOD DETECTION LIMIT IN AT LEAST ONE SAMPLE. RESULTS ARE NOT SHOWN FOR LOCATION FOR WHICH ALL RESULTS WERE BELOW LABORATORY REPORTING LIMITS.
2. "J" INDICATES THAT THE CONCENTRATION WAS ESTIMATED.
3. "J+" INDICATES THAT THE CONCENTRATION WAS ESTIMATED; BIASED HIGH.
4. "J-" INDICATES THAT THE CONCENTRATION WAS ESTIMATED; BIASED LOW.
5. "U" INDICATES THAT THE CONCENTRATION WAS LESS THAN THE METHOD DETECTION LIMIT.
6. BOLD NUMBERS INDICATE THAT THE CONCENTRATION WAS ABOVE THE MPS.

LOCATION NAME	PARAMETER	
DEPTH BGS (FEET)	CHLOROPICRIN (8260C) MG/KG	CHLOROPICRIN (8011) MG/KG

N

0 80'

SCALE IN FEET

LANDFILL 1 PRE-DESIGN
CHLOROPICRIN RESULTS

ORRINGTON REMEDIATION SITE
ORRINGTON, MAINE

Geosyntec consultants

Figure: 2-4

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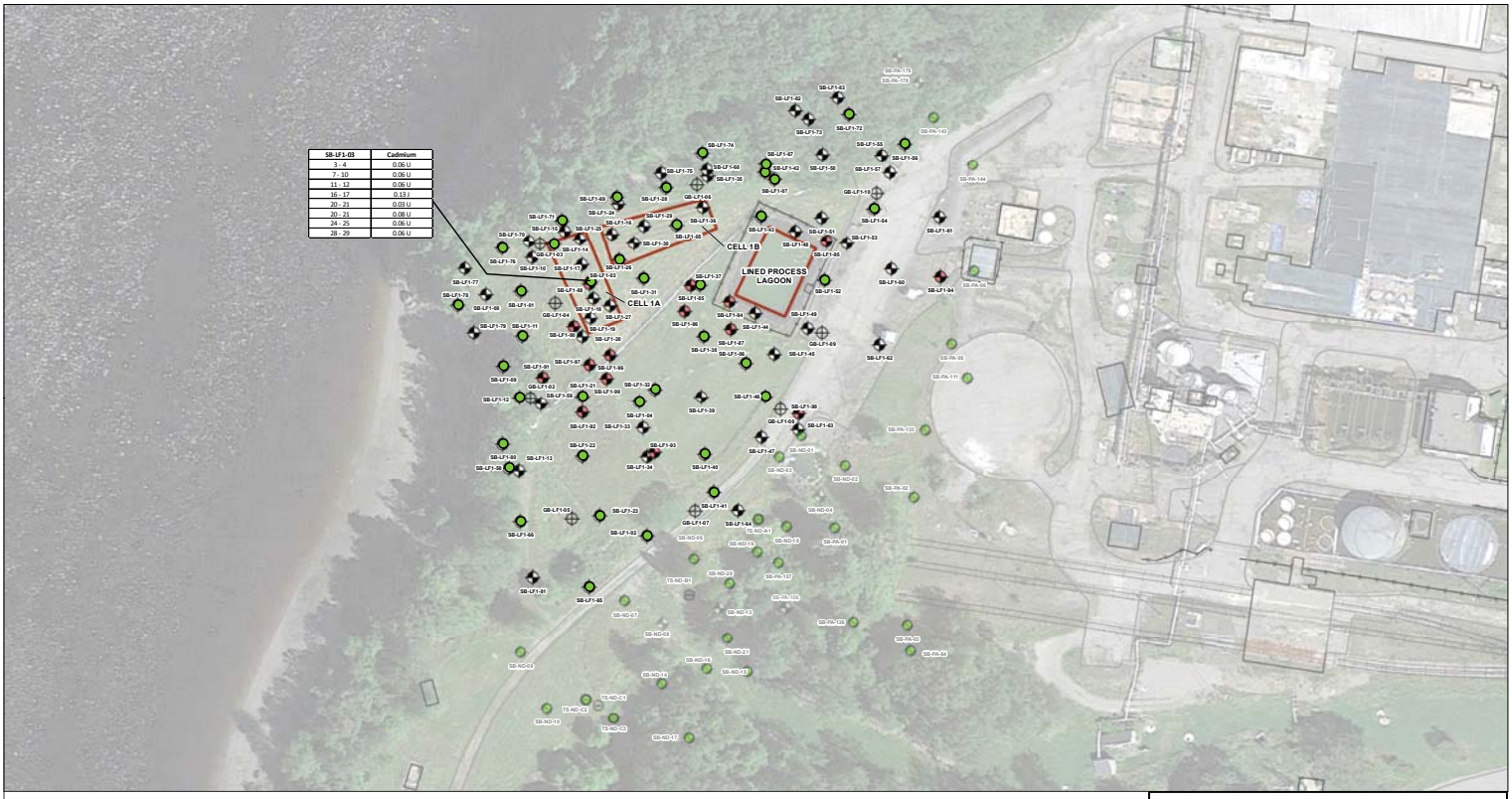

LEGEND

- DOES NOT EXCEED CADMIUM MPS OF 8 MG/KG
- SUPPLEMENTAL BORING COMPLETED MAY/JUNE 2017
- PRE-DESIGN BORING COMPLETED 2014-2015
- PRE-DESIGN GEOTECHNICAL BORING
- PRE-DESIGN TRANSECT LOCATION

NOTES:
1. RESULTS ARE PRESENTED FOR LOCATIONS WHERE CADMIUM WAS DETECTED ABOVE THE METHOD DETECTION LIMIT IN AT LEAST ONE SAMPLE. RESULTS ARE NOT SHOWN FOR LOCATION FOR WHICH ALL RESULTS WERE BELOW LABORATORY REPORTING LIMITS.
2. "J" INDICATES THAT THE CONCENTRATION WAS ESTIMATED.
3. "U" INDICATES THAT THE CONCENTRATION WAS LESS THAN THE METHOD DETECTION LIMIT.

LOCATION NAME	PARAMETER
DEPTH BGS (FEET)	CADMIUM CONCENTRATION (MG/KG)

N

0 80'

SCALE IN FEET

LANDFILL 1 PRE-DESIGN
CADMIUM RESULTS
ORRINGTON REMEDIATION SITE
ORRINGTON, MAINE

Geosyntec consultants

Figure: 2-5

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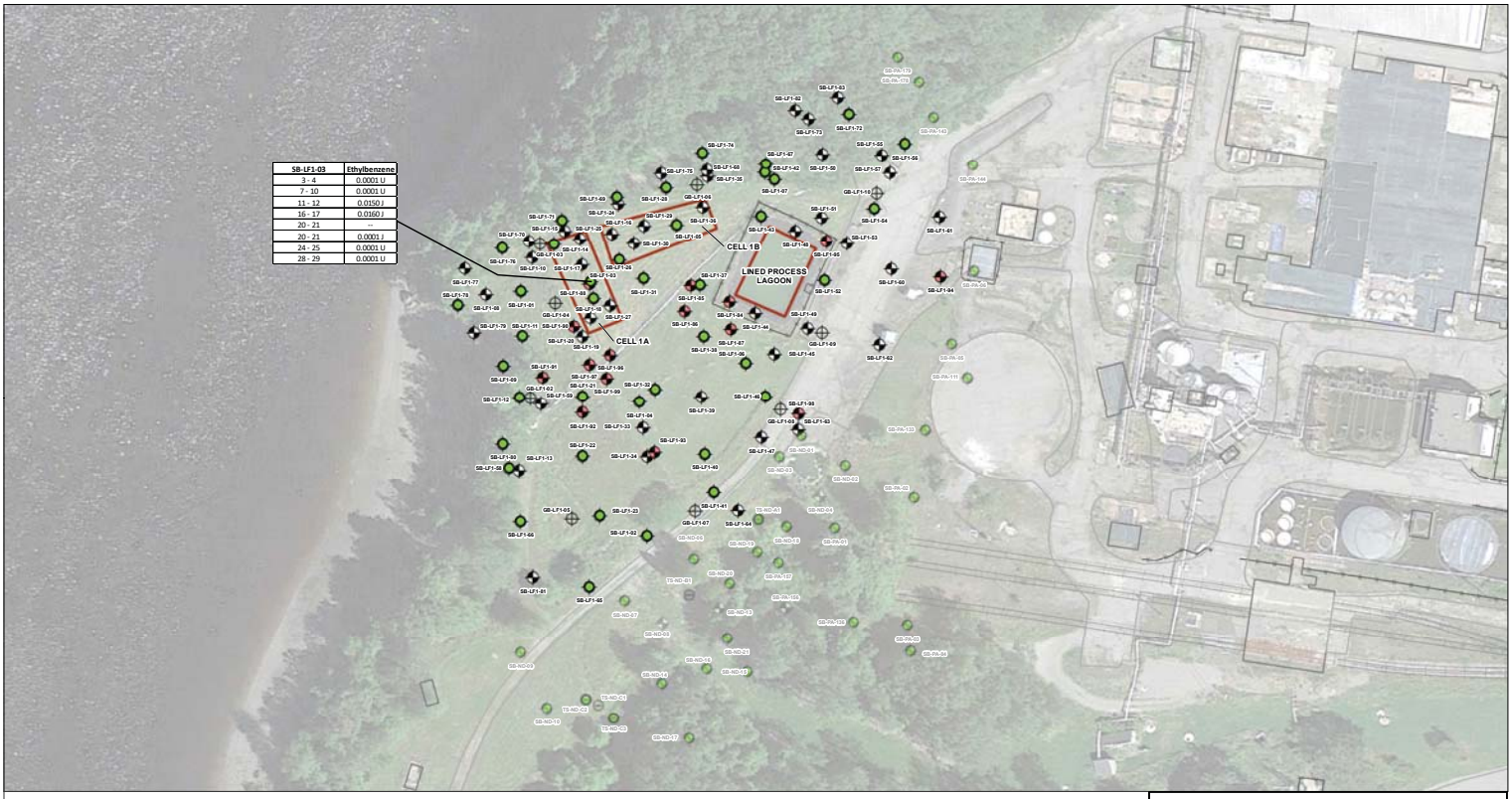


LEGEND

- DOES NOT EXCEED ETHYLBENZENE MPS OF 13 MG/KG
- SUPPLEMENTAL BORING COMPLETED MAY/JUNE 2017
- PRE-DESIGN BORING COMPLETED 2014-2015
- PRE-DESIGN GEOTECHNICAL BORING
- PRE-DESIGN TRANSECT LOCATION

NOTES:
1. RESULTS ARE PRESENTED FOR LOCATIONS WHERE ETHYLBENZENE WAS DETECTED ABOVE THE METHOD DETECTION LIMIT IN AT LEAST ONE SAMPLE. RESULTS ARE NOT SHOWN FOR LOCATION FOR WHICH ALL RESULTS WERE BELOW LABORATORY REPORTING LIMITS.
2. "J" INDICATES THAT THE CONCENTRATION WAS ESTIMATED.
3. "U" INDICATES THAT THE CONCENTRATION WAS LESS THAN THE METHOD DETECTION LIMIT.

LOCATION NAME	PARAMETER
DEPTH BGS (FEET)	ETHYLBENZENE CONCENTRATION (MG/KG)

N

0 80'

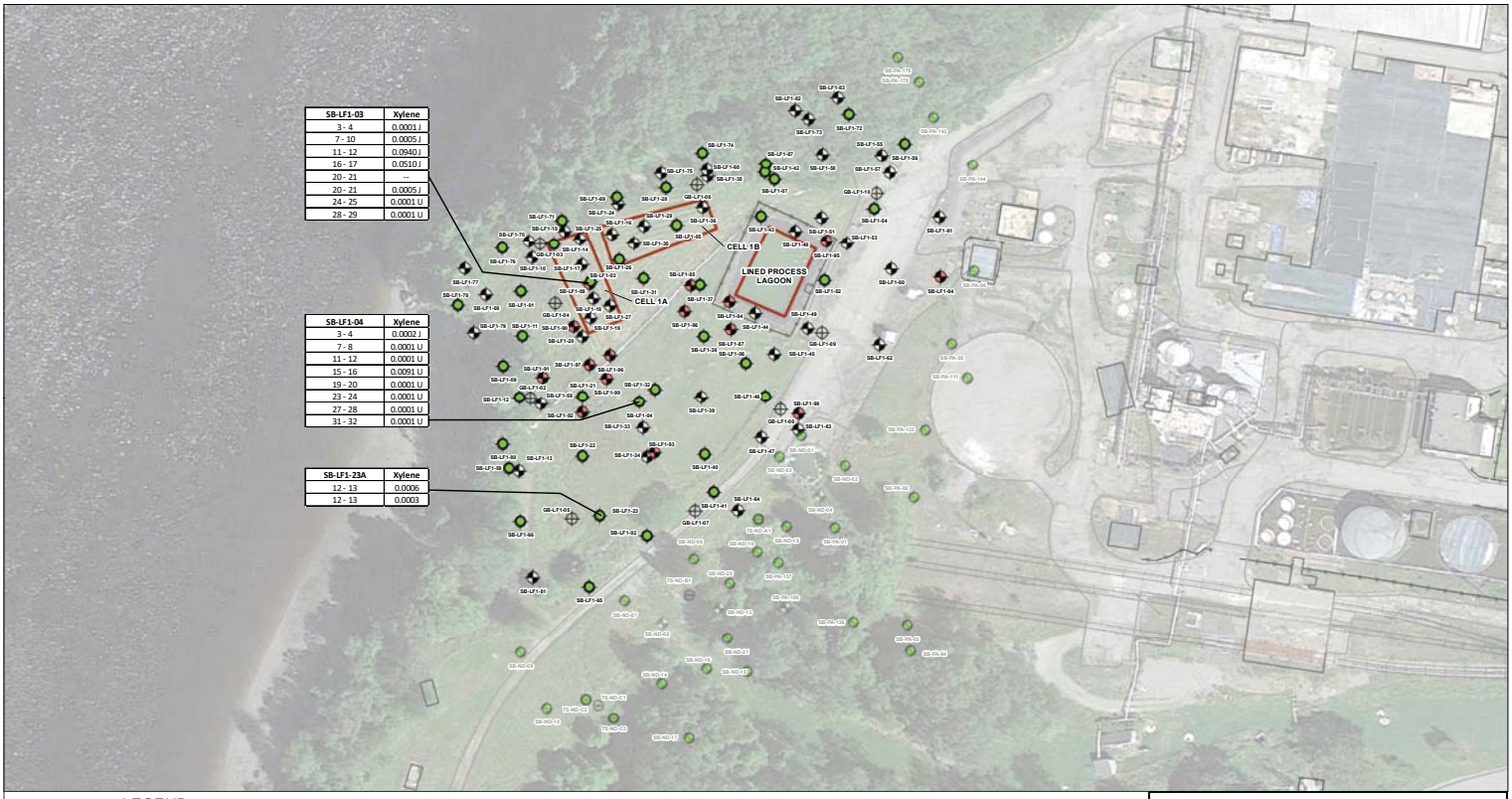
SCALE IN FEET

LANDFILL 1 PRE-DESIGN
ETHYLBENZENE RESULTS
ORRINGTON REMEDIATION SITE
ORRINGTON, MAINE

Geosyntec consultants

Acton, MA | APRIL 2018

Figure: 2-6



SB-LF1-03	Xylene
3 - 4	0.0001 J
7 - 10	0.0005 J
11 - 12	0.0940 J
16 - 17	0.0510 J
20 - 21	--
20 - 21	0.0005 J
24 - 25	0.0001 U
28 - 29	0.0001 U

SB-LF1-04	Xylene
3 - 4	0.0002 J
7 - 8	0.0001 U
11 - 12	0.0001 U
15 - 16	0.0091 U
19 - 20	0.0001 U
23 - 24	0.0001 U
27 - 28	0.0001 U
31 - 32	0.0001 U

SB-LF1-23A	Xylene
12 - 13	0.0006
12 - 13	0.0003

LEGEND

- DOES NOT EXCEED XYLENE MPS OF 190 MG/KG
- SUPPLEMENTAL BORING COMPLETED MAY/JUNE 2017
- PRE-DESIGN BORING COMPLETED 2014-2015
- PRE-DESIGN GEOTECHNICAL BORING
- PRE-DESIGN TRANSECT LOCATION

NOTES:
1. RESULTS ARE PRESENTED FOR LOCATIONS WHERE XYLENE WAS DETECTED ABOVE THE METHOD DETECTION LIMIT IN AT LEAST ONE SAMPLE. RESULTS ARE NOT SHOWN FOR LOCATION FOR WHICH ALL RESULTS WERE BELOW LABORATORY REPORTING LIMITS.
2. "J" INDICATES THAT THE CONCENTRATION WAS ESTIMATED.
3. "U" INDICATES THAT THE CONCENTRATION WAS LESS THAN THE METHOD DETECTION LIMIT.

LOCATION NAME	PARAMETER
DEPTH BGS (FEET)	XYLENE CONCENTRATION (MG/KG)

N

0 80'

SCALE IN FEET

LANDFILL 1 PRE-DESIGN
XYLENE RESULTS
ORRINGTON REMEDIATION SITE
ORRINGTON, MAINE

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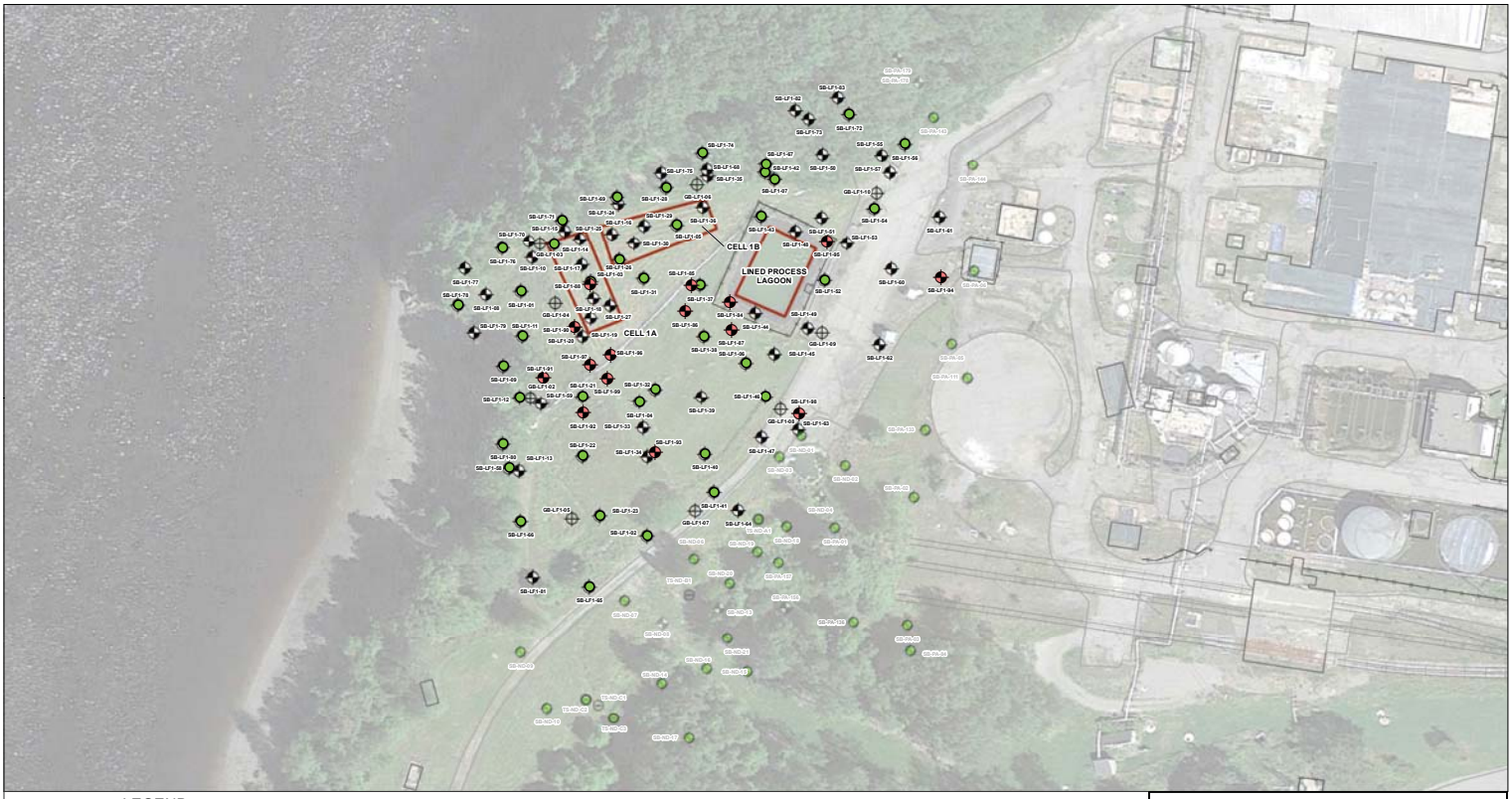
Figure: 2-7



LEGEND

- DOES NOT EXCEED PCB MPS OF 1 MG/KG
- SUPPLEMENTAL BORING COMPLETED MAY/JUNE 2017
- PRE-DESIGN BORING COMPLETED 2014-2015
- PRE-DESIGN GEOTECHNICAL BORING
- PRE-DESIGN TRANSECT LOCATION

NOTES:
1. NO SAMPLES ANALYZED FOR PCBS IN THE LANDFILL 1 AREA WERE DETECTED ABOVE LABORATORY LIMITS.

N

0 80'

SCALE IN FEET

LANDFILL 1 PRE-DESIGN
PCB RESULTS
ORRINGTON REMEDIATION SITE
ORRINGTON, MAINE

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Figure: 2-8

LEGEND

- PRE-DESIGN TEST PIT
- SOIL BORINGS FOR WASTE CHARACTERIZATION
- CHARACTERISTIC NON-HAZARDOUS
- CHARACTERISTIC HAZARDOUS
- LANDFILL 1 EXCAVATION BOUNDARY
- HISTORICAL CELL BOUNDARY

N

0 80'

SCALE IN FEET

LANDFILL 1 PRE-DESIGN WASTE CHARACTERIZATION RESULTS

ORRINGTON REMEDIATION SITE
ORRINGTON, MAINE

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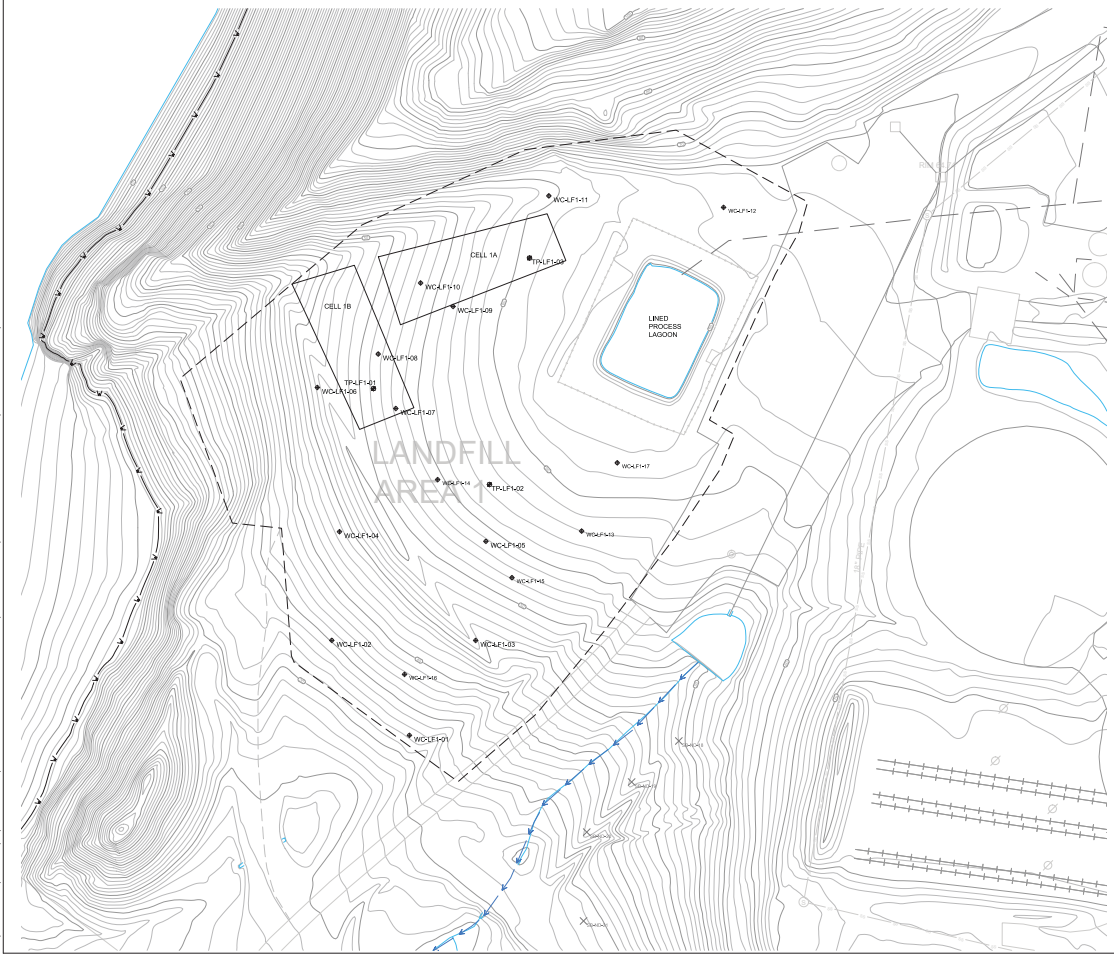
Figure: 2-9

T:\PROJECTS_CADD\O\ORRINGTON\ORRINGTON ME REMEDIATION II\CONTAINED-IN\BR0292-LF1_CI-F01-02 (WASTE CHARECTZ)



LEGEND

- TP-LF1-01 LANDFILL 1 PRE-DESIGN TEST PIT LOCATION
- WC-LF1-01 LANDFILL 1 WASTE CHARACTERIZATION LOCATION
- APPROXIMATE LIMIT OF LANDFILL 1 (BASED ON CMS REPORT)

Northing (USSurveyFoot)	Easting (USSurveyFoot)	Elevation (USSurveyFoot)	Description
391430.86	899036.08	31.65	WC-LF1-01
391480.32	898995.69	34.77	WC-LF1-02
391480.27	899070.57	45.31	WC-LF1-03
391536.90	898999.66	42.98	WC-LF1-04
391531.90	899075.91	53.54	WC-LF1-05
391612.01	898988.12	46.90	WC-LF1-06
391601.07	899029.00	52.66	WC-LF1-07
391629.44	899019.85	51.01	WC-LF1-08
391654.21	899058.82	56.09	WC-LF1-09
391666.42	899041.94	53.10	WC-LF1-10
391711.81	899108.72	59.43	WC-LF1-11
391705.81	899199.70	63.23	WC-LF1-12
391537.21	899125.78	58.01	WC-LF1-13
391564.01	899050.81	54.51	WC-LF1-14
391512.94	899089.49	52.11	WC-LF1-15
391462.59	899033.54	37.70	WC-LF1-16
391572.79	899144.33	61.49	WC-LF1-17
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

NOTE:

1. THE LOCATIONS OF BORINGS WC-LF1-1 THROUGH WC-LF1-11 ARE BASED ON A SURVEY CONDUCTED BY CES, INC. ON 30 APRIL 2016.
2. THE LOCATIONS OF TEST PITS TP-LF1-01 THROUGH TP-LF1-03 WERE SURVEYED DURING THE PRE-DESIGN INVESTIGATION.
3. THE LOCATIONS OF BORINGS WC-LF1-12 THROUGH WC-LF1-17 ARE APPROXIMATE, AND A FINAL SURVEY WILL BE PERFORMED TO VERIFY THESE LOCATIONS.

N

0 25' 50'
SCALE IN FEET

LANDFILL 1
WASTE CHARACTERIZATION LOCATIONS
ORRINGTON REMEDIATION SITE
ORRINGTON, MAINE

CDM Smith | Geosyntec consultants

Acton, MA | APRIL 2018

Figure: 2-10

LANDFILL 1 CORRECTIVE MEASURES IMPLEMENTATION PLAN
ORRINGTON REMEDIATION SITE
ORRINGTON, MAINE

OCTOBER 2017

SOURCE: BY BING MAPS.

VICINITY MAP
NOT TO SCALE

LIST OF DRAWINGS

DRAWING NUMBER	DRAWING TITLE	REVISION NO.
1	COVER SHEET	2
2	GENERAL NOTES AND LEGEND	2
3	SITE PLAN	2
4	EXISTING CONDITIONS	2
5	SUBSURFACE UTILITIES	2
6	SUBSURFACE PROFILES - SHEET 1	2
7	SUBSURFACE PROFILES - SHEET 2	2
8	SUBSURFACE PROFILES - SHEET 3	2
9	2017 SUPPLEMENTAL BORING LOCATIONS	2
10	EROSION CONTROL AND SITE LAYOUT PLAN	2
11	EXCAVATION PLAN (SOILS ≥2.2 MG/ KG)	2
12	EXCAVATION TABLES (SOILS ≥2.2 MG/ KG)	2
13	EXCAVATION SURVEY CONTROL PLAN (SOILS ≥2.2 MG/ KG)	2
14	EXCAVATION SURVEY CONTROL TABLES (SOILS ≥2.2 MG/ KG)	2
15	CONFIRMATION SAMPLING PLAN	2
16	EXCAVATION PLAN (FILL <2.2 MG/KG WITHIN THE LANDFILL 1 BOUNDARY)	2
17	EXCAVATION TABLES (FILL <2.2 MG/KG WITHIN THE LANDFILL 1 BOUNDARY)	2
18	EXCAVATION SURVEY CONTROL PLAN (FILL <2.2 MG/KG WITHIN THE LANDFILL 1 BOUNDARY)	2
19	EXCAVATION SURVEY CONTROL TABLES (FILL <2.2 MG/KG WITHIN THE LANDFILL 1 BOUNDARY)	2
20	RE-USE SOIL REMOVAL PLAN	2
21	FINAL GRADING PLAN	2
22	FINAL GRADING PROFILES	2
23	SITE RESTORATION AND STABILIZATION PLAN	2
24	SEDIMENTATION AND EROSION CONTROL DETAILS	2
25	TEMPORARY STORMWATER CONTROL DETAILS	2
26	RESTORATION, STABILIZATION, AND VEGETATIVE DETAILS	2
27	STORMWATER MANAGEMENT DETAILS	2
28	MISCELLANEOUS DETAILS	2
29	INTERIM EXTRACTION SYSTEM (IES) DETAILS	2

SOURCE: Aerial photo provided by CDMSmith in image file named "aerial poster"

LOCATION MAP
NOT TO SCALE

PREPARED FOR:

MALLINCKRODT US LLC

MODIFICATIONS TO DRAWINGS ARE INDICATED BY A 2

REV	DATE	DESCRIPTION	DRN	APP
2	04/30/18	ADDRESS MAINE DEP COMMENTS DATED 04/10/2018	SLB	CMG
1	03/07/18	UPDATES TO LISTED WASTE BOUNDARY AND EXCAVATION LIMITS	SLB	CMG

CDM Smith

Geosyntec consultants

TITLE: COVER SHEET

PROJECT: LANDFILL 1 CORRECTIVE MEASURES IMPLEMENTATION PLAN
ORRINGTON REMEDIATION SITE

SITE: ORRINGTON, MAINE

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

SIGNATURE

MARCH 7, 2018
DATE

STATE OF MAINE
SCOTT M. LUETTICH
No. 7452
LICENSED
PROFESSIONAL ENGINEER

DESIGN BY:	JHG/LJP	DATE:	OCTOBER 2017
DRAWN BY:	JHT/RMK	PROJECT NO.:	BR0292
CHECKED BY:	MEP/DTD	FILE:	
REVIEWED BY:	CMG	DRAWING NO.:	1 OF 29
APPROVED BY:	SML		

ISSUED FOR CONSTRUCTION - REV2

(1in) (2in) (3in) (4in)
SCALE IS BASED ON 22" X 34" NON-REDUCED SHEET SIZE (BORDER = 21" X 32")

GENERAL NOTES

1. THE SITE IS LOCATED AT 99 INDUSTRIAL WAY, ORRINGTON MAINE 04474.
2. EXISTING TOPOGRAPHY AND SITE FEATURES ARE BASED ON A SURVEY CONDUCTED BY THE JAMES W. SEWALL COMPANY IN 2003 AND PROVIDED IN CDM SMITH DRAWING "38410C_MASTER-SURVEY.DWG". THE HORIZONTAL DATUM IS NAD83 (NORTH AMERICAN DATUM 1983) MAINE STATE PLANE (EAST ZONE) AND THE VERTICAL DATUM IS NAVD 88 (NORTH AMERICAN VERTICAL DATUM 1988).
3. EXISTING TOPOGRAPHY IN THE AREAS SOUTH OF THE LANDFILL 1 CMI ACTIVITIES IS BASED ON THE NORTHERN DRAINAGE DITCH CMI PLAN PROPOSED CONDITIONS.
4. PRE-DESIGN INVESTIGATION LOCATIONS WERE OBTAINED BY CES, INC OF BANGOR, MAINE BETWEEN JULY 2015 AND NOVEMBER 2016. SUPPLEMENTAL BORING LOCATIONS WERE OBTAINED BY CES IN MAY 2017.
5. WETLAND DELINEATION AND CLASSIFICATION WERE OBTAINED FROM CDM SMITH DRAWING "38410_WETLAND_CLASSIFICATIONS.DWG" PROVIDED ON 2015.03.17. FLAGGED WETLAND LOCATIONS WERE OBTAINED BY CES, INC OF BANGOR MAINE BETWEEN THE DATES OF NOVEMBER 12, 2014 AND JANUARY 21, 2015.
6. NORMAL SITE HOURS ARE FROM 07:00 AM TO 05:00 PM MONDAY THROUGH FRIDAY. APPROVAL FROM THE REMEDIATION PROJECT MANAGER IS REQUIRED FOR CONSTRUCTION BEYOND THE NORMAL OPERATING HOURS.
7. EXISTING UTILITIES SHOWN ON THE DRAWINGS ARE APPROXIMATE.
8. THE REMEDIATION CONTRACTOR SHALL PERFORM WORK WITHIN THE DESIGNATED LIMITS OF WORK SHOWN ON THE DRAWINGS, UNLESS OTHERWISE APPROVED.
9. REFER TO INDIVIDUAL SHEETS FOR DRAWING SPECIFIC NOTES.
10. THE STAGING AREAS AND ACCESS ROADS SHALL BE FREQUENTLY INSPECTED BY THE REMEDIATION CONTRACTOR FOR MATERIAL THAT MAY HAVE SPILLED DURING TRANSPORT. SPILLED MATERIAL SHALL BE TRANSPORTED TO THE TEMPORARY SOIL STOCKPILE AREA BY THE REMEDIATION CONTRACTOR FOR DISPOSAL OFF-SITE.
11. MONITORING AND EXTRACTION WELLS NOT ABANDONED PRIOR TO LANDFILL 1 CMI WORK SHALL BE PROTECTED BY THE REMEDIATION CONTRACTOR USING HIGH VISIBILITY FLAGGING AND PHYSICAL BARRIERS. IF DAMAGED OR DESTROYED, MONITORING AND EXTRACTION WELLS SHALL BE REPLACED BY REMEDIATION CONTRACTOR.
12. STORMWATER AND/OR GROUNDWATER WITHIN THE EXCAVATION AREAS (CONTACT WATER) SHALL BE COLLECTED, STORED TEMPORARILY, AND TREATED TO MEET THE INFLUENT REQUIREMENTS SET BY THE ON-SITE GROUNDWATER TREATMENT PLANT (GWTP). CONTACT WATER SHALL BE TRANSFERRED TO THE ON-SITE GWTP. THE REMEDIATION CONTRACTOR SHALL CONFIRM SUFFICIENT STORAGE CAPACITY IS AVAILABLE BASED ON DESIGN STORM INFORMATION, GWTP CAPACITY AND COORDINATION WITH OTHER REMEDIATION PROJECTS.
13. THE REMEDIATION CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT CONTACT WATER IS CONTAINED AND DOES NOT FLOW OUTSIDE OF THE EXCAVATION. ADDITIONAL CONTROLS, BEYOND THOSE SHOWN IN THIS DRAWING SET, MAY BE NECESSARY TO CONTROL AND MINIMIZE CONTACT WATER.
14. MATERIALS REMOVED FROM WITHIN THE LIMIT OF WORK, EXCEPT FOR "REUSE INTERVALS" IDENTIFIED ON THE DRAWINGS OR OTHER POTENTIAL REUSE SOILS MANAGED IN ACCORDANCE WITH SOIL AND CONCRETE USE PLAN, WILL BE TRANSPORTED TO AND STOCKPILED AT THE DESIGNATED TEMPORARY SOIL STOCKPILE AREA. MATERIALS SHALL BE SEGREGATED INTO SEPARATE STOCKPILES (I.E., CLEARING AND GRUBBING MATERIALS SHALL NOT BE MIXED WITH EXCAVATED SOILS). MATERIALS WILL BE DIRECT LOADED INTO RAIL CARS AND DISPOSED OF AT AN OFF-SITE DISPOSAL FACILITY.
15. POST-EXCAVATION CONFIRMATION AND RECORD SAMPLING WILL BE PERFORMED BY THE REMEDIATION PROJECT MANAGER.

SEQUENCE OF WORK FOR THE LANDFILL 1 MATERIAL REMOVAL

THIS SEQUENCE OF WORK IS INTENDED TO DESCRIBE THE OVERALL CONSTRUCTION PROJECT AND A GENERAL SEQUENCE OF ACTIVITIES. UNLESS OTHERWISE NOTED, IT IS NOT INTENDED TO ESTABLISH A RIGID OR REQUIRED CONSTRUCTION SEQUENCE.

SITE PREPARATION

1. THE REMEDIATION CONTRACTOR SHALL VERIFY THE TYPE AND LOCATION OF UTILITIES WITHIN THE LIMITS OF WORK PRIOR TO THE START OF WORK, ESTABLISH SURVEY CONTROL, AND VERIFY EXISTING CONDITIONS SHOWN ON THE PLANS ARE ACCURATE. CONTACT DIGSAFE (811 OR 1-888-340-7233).
2. INSTALL EROSION AND SEDIMENT CONTROLS AT LOCATIONS PER THE EROSION CONTROL AND SITE LAYOUT DRAWING. INSTALL ADDITIONAL TEMPORARY EROSION AND SEDIMENT CONTROLS AS SHOWN ON OTHER DRAWINGS AND THAT MAY BE NEEDED.
3. INSTALL SURFACE WATER CONTROLS (INCLUDING EXTENSION OF THE NORTHERN DRAINAGE DITCH BYPASS PIPE AND TEMPORARY DIVERSION BERMS) TO ALLOW COLLECTION OF STORMWATER RUNOFF FROM THE PLANT AREA AND TO PREVENT RUN-ON TO ACTIVE EXCAVATION AREAS WITHIN LANDFILL 1.
4. ESTABLISH ACCESS ROADS, REPAIR EXISTING ACCESS ROADS AS NECESSARY, AND CONSTRUCT STAGING AREA (EXISTING STAGING AREA ADJACENT TO MAINTENANCE BUILDING ALSO AVAILABLE FOR REMEDIATION CONTRACTOR USE).
5. THE REMEDIATION CONTRACTOR WILL BE RESPONSIBLE FOR MAINTAINING AND REPAIRING ACCESS ROADS IN THE LANDFILL 1 AREA THROUGHOUT CONSTRUCTION.
6. ESTABLISH AND MAINTAIN APPROPRIATE SUPPORT, CONTAMINATION REDUCTION, AND EXCLUSION ZONES IN ACCORDANCE WITH THE HASP.
7. CONSTRUCT A DECONTAMINATION PAD(S) FOR EQUIPMENT AND PERSONNEL.
8. INSTALL CONTACT WATER MANAGEMENT EQUIPMENT AND CONTROLS PER THE REMEDIATION CONTRACTOR'S CONSTRUCTION WATER MANAGEMENT PLAN.
9. PERFORM CLEARING AND GRUBBING ACTIVITIES WHERE NECESSARY WITHIN THE LIMIT OF WORK PRIOR TO INITIATING EXCAVATION. GRUBBING SHALL NOT OCCUR WITHIN LIMITS OF EXCAVATION.

CHLOROPICRIN TREATMENT AREA

10. THE "IN-SITU" TREATMENT OF THE CHLOROPICRIN TREATMENT AREA WILL COMMENCE PRIOR TO LANDFILL 1 CONSTRUCTION. EXCAVATION IN THE CHLOROPICRIN SPILL AREA IS NOT PERMITTED WITHOUT APPROVAL FROM THE REMEDIATION PROJECT MANAGER.

UTILITY ABANDONMENT

11. REMOVE AND/OR ABANDON UTILITIES AND UTILITY CONDUITS AS SHOWN ON THE EXCAVATION PLAN DRAWING.

GROUNDWATER EXTRACTION SYSTEM

12. NOTIFY REMEDIATION PROJECT MANAGER PRIOR TO ANY MODIFICATIONS OF EXISTING INTERIM EXTRACTION SYSTEM (IES).
13. AT NO TIME CAN THE ENTIRE SYSTEM BE SHUT DOWN FOR MORE THAN 30 DAYS.
14. THE IES SHALL REMAIN OPERATIONAL IN ITS CURRENT CONFIGURATION FOR AS LONG AS PRACTICABLE.
15. IF AN INDIVIDUAL WELL NEEDS TO BE TAKEN OFF-LINE, THE ELECTRICAL CONTROLS SHALL BE DISCONNECTED WITHIN THE IES SHED, AND THE FORCE MAIN VALVE IN THE SHED CLOSED.
16. ONCE THE IES SHED NEEDS TO BE REMOVED, THE REMEDIATION CONTRACTOR SHALL RELOCATE THE FORCE MAIN AND ELECTRICAL SUPPLY TO ALLOW GROUNWATER PUMPING FROM EW-3 ONLY. ONCE EW-3 IS OPERATIONAL, THE REMEDIATION CONTRACTOR SHALL REMOVE THE IES SHED AND ALL PIPING AND ELECTRICAL CONDUIT BETWEEN EW-1, EW-2, EW-4, EW-5 AND MW-601 AND STORE ALL MATERIALS ONSITE FOR REUSE. WELLS EW-1, EW-2, EW-4, AND MW-601 SHALL ALSO BE REMOVED.
17. AFTER COMPLETION OF THE FINAL GRADING AND SITE RESTORATION, THE IES SHED AND ALL ELECTRICAL AND PIPING CONNECTIONS TO EW-3 AND EW-5 WELLS SHALL BE RESTORED.
18. RELOCATE THE FORCEMAIN AND ELECTRICAL CONDUIT BETWEEN THE IES AND GWTP AS NECESSARY THROUGHOUT THE PROJECT.

EXCAVATION

19. CONDUCT ALL EXCAVATIONS IN ACCORDANCE WITH OSHA STANDARDS RELATING TO SLOPING AND BENCHING. THE REMEDIATION CONTRACTOR MAY ELECT TO INSTALL TEMPORARY SHORING OR SUPPORT TO FACILITATE EXCAVATION DEWATERING OR STABILIZE EXCAVATION SIDEWALLS.
20. REMOVE THE EXISTING GEOMEMBRANE WITHIN AN ACTIVE EXCAVATION AREAAND TRANSPORT THE GEOMEMBRANE MATERIAL TO A TSSA (AS DIRECTED BY THE REMEDIATION PROJECT MANAGER) FOR DISPOSAL.
21. EXCAVATE MATERIALS WITHIN LIMITS OF EXCAVATION TO THE GRADES SHOWN AND PER SURVEY CONTROL POINTS IDENTIFIED IN THE DRAWINGS AND THE EXCAVATION PLAN.
22. REMOVE THE INDUSTRIAL SEWER AND STORM SEWERS FROM THE EXCAVATION WHERE APPLICABLE AS SHOWN ON THE EXCAVATION PLAN DRAWING.
23. PERFORM DEWATERING AS NECESSARY DURING EXCAVATION. COLLECT, TREAT, STORE AND CONVEY CONTACT WATER. DISPOSE OF CONTACT WATER AS NECESSARY BY TRANSFERRING TO THE ON-SITE GROUNDWATER TREATMENT PLANT (GWTP).
24. RELOCATE THE NORTHERN DRAINAGE DITCH BYPASS PIPE AS NECESSARY DURING THE EXCAVATON.
25. DECONTAMINATE VEHICLES EXITING THE ACTIVE EXCAVATION AREA (I.E., LANDFILL 1 PHASE UNDER CONSTRUCTION) ON THE DECONTAMINATION PAD(S). TREAT WATER COLLECTED IN THE DECONTAMINATION PAD(S) AS CONTACT WATER AND PUMP TOTHE ON-SITE GWTP. WATER IN THE DECONTAMINATION PAD(S) MUST BE REMOVED PRIOR TO OVERTOPPING THE DECONTAMINATION PAD CONTAINMENT BERMS.
26. INSPECT FOR VISIBLE MERCURY DURING EXCAVATION ACTIVITIES. IF OBSERVED, THE REMEDIATION PROJECT MANAGER SHALL BE NOTIFIED IMMEDIATELY AND THE MATERIAL SHALL BE SEGRATED SEPARATELY FOR DISPOSAL AT AN APPROVED FACILITY.
27. INSTALL ORANGE PLASTIC SAFETY FENCE AROUND OPEN EXCAVATIONS AT THE END OF EACH WORK DAY.
28. THE REMEDIATION PROJECT MANAGER WILL PERFORM POST-EXCAVATION CONFIRMATION SAMPLING FOR MERCURY ON THE BOTTOM OF THE EXCAVATION AT THE LOCATIONS INDICATED ON THE DRAWINGS. REMEDIATION CONTRACTOR SHALL COOPERATE WITH AND SUPPORT THE SAMPLING ACTIVITIES.
29. IN AREAS WHERE MERCURY WITH CONCENTRATIONS ABOVE THE MPS ARE BEING LEFT IN PLACE CONFIRMATION OF EXCAVATION BOTTOM WILL INCLUDE AN INSPECTION TO CONFIRM THAT OBSERVABLE FILL MATERIAL (E.G., DEBRIS, ETC.) IS NOT REMAINING IN THE BOTTOM OF EXCAVATION. EXCAVATION BOTTOMS WILL BE INSPECTED FOR THE PRESENCE OF VISIBLE MERCURY. IF OBSERVABLE FILL OR VISIBLE MERCURY IS FOUND, ADDITIONAL EXCAVATION SHALL BE PERFORMED AS DIRECTED BY THE REMEDIATION PROJECT MANAGER.
30. SITE COCS AND REPRESENTATIVE MEDIA PROTECTION STANDARDS (MPS) ARE PRESENTED IN TABLE 1:

Table 1: Soil Media Protection Standards – Numeric

COC	Soil
	(mg/kg)
Mercury	2.2
Chloropicrin	0.125
PCBs	1.0
Cadmium	8
Ethylbenzene	13
Xylene	190

31. REMEDIATION CONTRACTOR SHALL CONDUCT AN AS-BUILT SURVEY OF THE VERTICAL AND LATERAL LIMITS OF THE EXCAVATION, CONFIRM THE EXCAVATION SURFACE PER THE EXCAVATION PLAN AND THE EXCAVATION SURVEY CONTROL PLAN, AND SHALL SURVEY THE CONFIRMATION SAMPLE LOCATIONS.
32. IF ANY CONFIRMATION SAMPLES IN FILL MATERIALS EXCEED THE MPS, ADDITIONAL FILL EXCAVATION WILL BE PERFORMED IN THE AREA OF THE EXCEEDANCE AND CONFIRMATION SAMPLING SHALL BE REPEATED. THE ADDITIONAL EXCAVATION WILL NOT EXTEND TO THE NATIVE MATERIALS LOCATED BENEATH THE FILL.
33. AFTER THE EXCAVATION OF FILL CONTAINING MERCURY CONCRENTRATIONS GREATER THAN 2.2 MG/KG HAS BEEN COMPLATED AND VERIFIED, THE REMEDICATION CONTRACTOR SHALL EXCVATE THE REMAINING FILL TO THE FILL/NATIVE MATERIAL INTERFACE WITHIN THE LANDFILL 1 BOUNDARY.
34. PLACE 8 OZ NONWOVEN GEOTEXTILE ALONG THE SIDEWALLS BETWEEN THE LANDFILL I EXCAVATION AREAS AND NORTHERN DRAINAGE DITCH EXCAVATION AREAS TO BE COMPLETED AS PART OF PLANT AREA CMI PLAN.

SITE RESTORATION

35. BACKFILL, GRADE, AND SHAPE THE EXCAVTION AREAS IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS. REMOVE EXCAVATION SUPPORT STRUCTURES AS NECESSARY DURING OR AFTER BACKFILLING AREAS.
36. REMOVE TEMPORARY STORMWATER CONTROL STRUCTURES, INCLUDING THE NORTHERN DRAINAGE DITCH BYPASS PIPE AND ANY TEMPORARY BERMS.
37. REMOVE DECONTAMINATION PAD AREA(S) AND THE STAGING AREA AT THE COMPLETION OF EXCAVATION ACTIVITIES. DECONTAMINATION PAD MATERIALS SHALL BE TRANSPORTED TO A TSSA (AS DIRECTED BY THE REMEDIATON PROJECT MANAGER) AND DISPOSED OF OFF-SITE. GRADE AND PLACE A MINIMUM OF 6-INCHES OF TOPSOIL AND SEEDING IN THE STAGING AREA AFTER REMOVAL.
38. CONSTRUCT PERMANENT ACCESS ROADWAY, SWALES AND CULVERTS, AND NORTHERN DRAINAGE DITCH AS SHOWN ON DRAWINGS.
39. PLACE TOPSOIL, EROSION CONTROL BLANKET, AND PERMANENT SEED IN DISTURBED AREAS.
40. MAINTAIN AND LEAVE EROSION CONTROL MEASURES IN PLACE UNTIL VEGETATION HAS BEEN RESTORED AND AS DIRECTED BY THE REMEDIATION PROJECT MANAGER.

SOIL EROSION AND SEDIMENT CONTROL NOTES:

1. WORK SHALL BE DONE IN ACCORDANCE WITH THE MAINE EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES.
2. SOIL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE INSTALLED PRIOR TO ANY MAJOR SOIL DISTURBANCES, OR IN THEIR PROPER SEQUENCE AND MAINTAINED UNTIL PERMANENT PROTECTION IS ESTABLISHED.
3. DISTURBED AREAS THAT WILL BE LEFT EXPOSED MORE THAN 7 DAYS AND NOT SUBJECT TO CONSTRUCTION TRAFFIC SHALL IMMEDIATELY RECEIVE TEMPORARY SEEDING AND MULCH. IF THE SEASON PREVENTS THE ESTABLISHMENT OF A TEMPORARY COVER, THE DISTURBED AREAS SHALL BE MULCHED WITH STRAW, OR EQUIVALENT MATERIAL, AT A RATE OF TWO (2) TONS PER ACRE.
4. PERMANENT VEGETATION SHALL BE SEEDED ON EXPOSED AREAS WITHIN SEVEN DAYS AFTER FINAL GRADING. MULCH AND TACKIFIER OR EROSION CONTROL BLANKET SHALL BE USED FOR PROTECTION UNTIL SEEDING IS ESTABLISHED.
5. A SUB-BASE COURSE (E.G., ¾-INCH STONE, OR EQUIVALENT AS APPROVED BY THE REMEDIATION PROJECT MANAGER) SHALL BE APPLIED IMMEDIATELY FOLLOWING ROUGH GRADING OF TRAVEL AREAS AND INSTALLATION OF IMPROVEMENTS TO STABILIZE ACCESS ROADWAYS.
6. IMMEDIATELY FOLLOWING INITIAL DISTURBANCE OR ROUGH GRADING OF CRITICAL AREAS SUBJECT TO EROSION (I.E., STEEP SLOPES) THESE AREAS SHALL RECEIVE A TEMPORARY SEEDING IN COMBINATION WITH STRAW MULCH, EROSION CONTROL BLANKET, OR A SUITABLE EQUIVALENT, AT A RATE OF TWO (2) TONS PER ACRE.
7. AT THE TIME WHEN THE SITE PREPARATION FOR PERMANENT VEGETATIVE STABLIZATION WILL BE ACCOMPLISHED, ANY SOIL THAT WILL NOT PROVIDE A SUITABLE ENVIRONMENT TO SUPPORT ADEQUATE VEGETATIVE GROUND COVER, SHALL BE REMOVED OR TREATED IN SUCH A WAY THAT WILL PERMANENTLY ADJUST THE SOIL CONDITIONS AND RENDER IT SUITABLE FOR VEGETATIVE GROUND COVER. IF THE REMOVAL OR TREATMENT OF THE SOIL WILL NOT PROVIDE SUITABLE CONDITIONS, NON-VEGETATIVE MEANS OF PERMANENT GROUND STABILIZATION WILL BE REQUIRED.
8. ANY CHANGES TO THE EROSION AND SEDIMENT CONTROL PLAN WILL REQUIRE THE SUBMISSION OF REVISED EROSION AND SEDIMENT CONTROL PLANS TO THE REMEDIATION PROJECT MANAGER.
9. THE REMEDIATION CONTRACTOR IS RESPONSIBLE FOR KEEPING ADJACENT ROADS CLEAN FROM SEDIMENT TRACK-OUT DURING THE DURATION OF THE CONSTRUCTION PROJECT.
10. THE REMEDIATION CONTRACTOR SHALL BE RESPONSIBLE FOR REMEDIATING ANY EROSION OR SEDIMENT PROBLEMS THAT ARISE AS A RESULT OF ONGOING CONSTRUCTION AT THE REQUEST OF THE REMEDIATION PROJECT MANAGER.
11. THE NORTHERN DRAINAGE DITCH BYPASS PIPE WILL BE RELOCATED, EXTENDED OR REMOVED AS CONSTRUCTION OF THE NORTHERN DITCH PROGRESSES FROM SOUTH TO NORTH. THE REMEDIATION CONTRACTOR IS RESPONSIBE FOR MAINTENANCE, MANAGEMENT AND REPAIR OF THE SYSTEM DURING CONSTRUCTION.

LEGEND

- FENCE LINE
- FENCE LINE
- RAILROAD
- EXISTING GROUND ELEVATION (FEET)
- APPROXIMATE LIMIT OF LANDFILL
- UTILITY POLE LOCATION
- INDUSTRIAL SEWER PIPE
- MW-411-B1 — HISTORIC MONITORING WELL/SOIL BORING (THERE MAY BE A CLUSTER OF WELLS IN SOME LOCATIONS)
- SB-LF1 — PRE-DESIGN SOIL BORING
- TP-LF1 — PRE-DESIGN TEST PIT
- GB-LF1-02 — PRE-DESIGN GEOTECHNICAL BORING
- MW-411-B1 — HISTORIC MONITORING WELL/SOIL BORING/EXTRACTION WELL TO BE MAINTAINED (THERE MAY BE A CLUSTER OF WELLS IN SOME LOCATIONS)
- SURFACE WATER FLOW
- TRAILER
- INLET TO GROUNDWATER TREATMENT PLANT
- TS-ND — STREAM TRANSECT SAMPLE LOCATION
- W — MEAN HIGH WATER (EL 6.62)
- PROPOSED SILT FENCE
- PROPOSED SUPER SILT FENCE
- FR — FIBER ROLL
- APPROXIMATE PIPE LOCATION
- DB — TEMPORARY DEVERSION BERM
- CHECK DAM
- PAMS — PERMANENT AIR MONITORING STATION
- SOUTHERLY STREAM CULVERT
- CATCH BASIN
- MANHOLE
- TOP OF STRATUM
- 50 — BOREHOLE AND SPT N VALUE
- GROUNDWATER
- CONTROL POINT
- LIMIT OF WORK
- LIMIT OF FINAL GRADING
- LIMIT OF PLANT AREA MATERIAL REMOVAL AREA
- 30 — PROPOSED FINAL GRADE ELEVATION (FEET)
- ACCESS ROAD
- ACCESS ROAD WITH 2-INCH BINDER
- TEMPORARY SOIL STOCKPILE AREA
- LF1-1 — PROPOSED EXCAVATION AREA IDENTIFICATION / BOUNDARY
- PRELIMINARY EXCAVATION BOUNDARY, DEPENDENT ON FINAL CONFIRMATION SAMPLE
- BYPASS PIPE
- PRE-EXCAVATION SIDEWALL SAMPLE (MERCURY BELOW THE MPS AT EACH INTERVAL)
- PRE-EXCAVATION BOTTOM SAMPLE
- CLEAN BOTTOM INTERVAL NOT IDENTIFIED IN PRE-DESIGN INVESTIGATION
- POST-EXCAVATION BOTTOM CONFIRMATION SAMPLE
- POST-EXCAVATION RECORD SAMPLE
- POST-EXCAVATION SIDE WALL SAMPLE (1 INTERVAL)
- POST-EXCAVATION SIDE WALL SAMPLE (2 INTERVALS)
- CONTACT WATER PIPE
- 2016 SURVEYED SCRAP METAL YARD AND SOUTHERLY STREAM BOUNDARY LIMITS
- SUPPLEMENTAL SOIL BORING
- FM — APPROXIMATE FORCE MAIN PIPE LOCATION
- UE — APPROXIMATE ELECTRICAL CONDUIT LOCATION
- C — CONTACT WATER PIPE
- EXCAVATION BOTTOM AT FILL / NATIVE INTERFACE OR IN NATIVE SOIL
- LISTED WASTE AREA
- BOUNDARY OF CELL 1A, CELL 1B, AND LINED PROCESS LAGOON
- CONTROL POINT - LISTED WASTE AREA
- D — STORM DRAIN PIPE
- WATER BAR
- CONTROL POINT - ADDITIONAL EXCAVATION AREA
- LANDFILL 1 BOUNDARY
- RIP RAP PROTECTION
- EROSION CONTROL BLANKET AND PERMANENT SEED MIX
- PERMANENT SEED MIX AND MULCH
- INDUSTRIAL SEWER OR STORM SEWER ANTICIPATED TO BE REMOVED
- INDUSTRIAL SEWER OR STORM SEWER OUTISDE THE EXCAVATION BOUNDARY TO BE ADDRESSED AS PART OF THE PLANT AREA CMI WORK
- INDUSTRIAL SEWER OR STORM SEWER BELOW THE EXCAVATION LIMITS TO BE ADDRESSED AS PART OF THE PLANT AREA CMI WORK
- TEMPORARY ACCESS ROAD AND STAGING AREA
- AREAS OF DEEP EXCAVATION

25' WIDE 2-WAY GRAVEL ACCESS ROAD — CALLOUT LABELS WITHOUT BOX ARE EXISTING SITE FEATURES

25' WIDE 2-WAY GRAVEL ACCESS ROAD (boxed) — CALLOUT LABELS WITH A BOX AROUND THE LABEL ARE PROPOSED SITE FEATURES

DRAWING LABEL/CALLOUT LEGEND

DETAIL NUMBER — 4 / 6 — SHEET ON WHICH ABOVE DETAIL IS PRESENTED

SECTION LOCATION — 4+79 / 14 — SHEET ON WHICH ABOVE SECTION IS PRESENTED

DETAIL NUMBER — 4 — DETAIL

SHEET ON WHICH ABOVE DETAIL WAS FIRST REFERENCED — 3 — TITLE OF DETAIL

SCALE: 1"=2'

OR STATION LOCATION

EXAMPLE: DETAIL NUMBER 4 PRESENTED ON SHEET NO. 6 WAS REFERENCED FOR THE FIRST TIME ON SHEET NO.3.

ABOVE SYSTEM ALSO APPLIES TO SECTION IDENTIFICATIONS.

SECTION / DETAIL IDENTIFICATION LEGEND

(1in) (2in) (3in) (4in)

SCALE IS BASED ON 22" X 34" NON-REDUCED SHEET SIZE (BORDER = 21" X 32")

ISSUED FOR CONSTRUCTION - REV2

REV	DATE	DESCRIPTION	DRN	APP
2	04/30/18	ADDRESS MAINE DEP COMMENTS DATED 04/10/2018	SLB	CMG
1	03/07/18	UPDATES TO LISTED WASTE BOUNDARY AND EXCAVATION LIMITS	SLB	CMG

CDM Smith

Geosyntec consultants

TITLE: GENERAL NOTES AND LEGEND

PROJECT: LANDFILL 1 CORRECTIVE MEASURES IMPLEMENTATION PLAN
ORRINGTON REMEDIATION SITE

SITE: ORRINGTON, MAINE

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION UNLESS SEALED.

SIGNATURE

MARCH 7, 2018

DATE

STATE OF MAINE — SCOTT M. LUETTICH — No. 7482 — LICENSED — PROFESSIONAL ENGINEER

DESIGN BY:	JHG/LJP	DATE:	OCTOBER 2017
DRAWN BY:	JHT/RMK	PROJECT NO.:	BR0292
CHECKED BY:	MEP/DTD	FILE:	
REVIEWED BY:	CMG	DRAWING NO.:	
APPROVED BY:	SML	2 OF 29	

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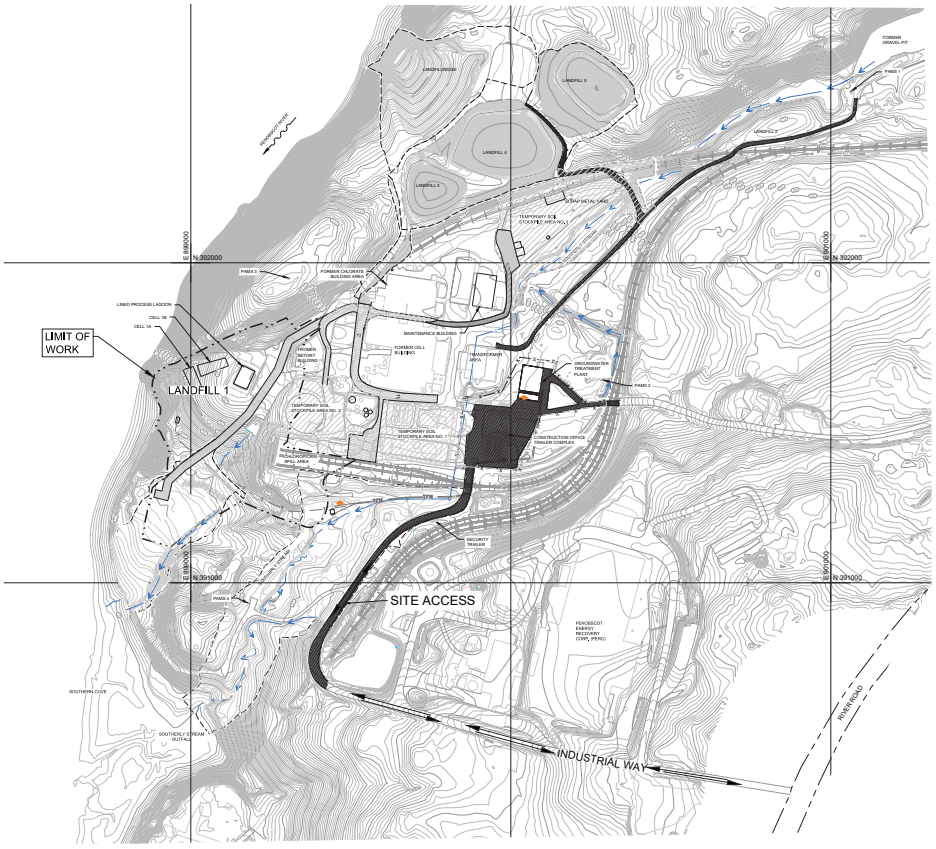

LEGEND

- FENCE LINE
- FENCE LINE
- RAILROAD
- EXISTING GROUND ELEVATION (FEET)
- APPROXIMATE LIMIT OF LANDFILL
- SOUTHERLY STREAM CULVERT
- SURFACE WATER FLOW
- TRAILER
- INLET TO GROUNDWATER TREATMENT PLANT
- LIMIT OF WORK
- ACCESS ROAD
- ACCESS ROAD WITH 24-INCH BINDER
- TEMPORARY SOIL STOCKPILE AREA
- PERMANENT AIR MONITORING STATION
- 2016 SURVEYED SCRAP METAL YARD AND SOUTHERLY STREAM BOUNDARY LIMITS

NOTES:

1. SEE DRAWING NO. 2 FOR GENERAL NOTES AND ADDITIONAL LEGEND INFORMATION.
2. CURRENT SITE STRUCTURES INCLUDE MAINTENANCE BUILDING, GROUNDWATER TREATMENT PLANT AND CONSTRUCTION OFFICE TRAILER COMPLEX. ALL OTHER BUILDINGS HAVE BEEN DEMOLISHED, HOWEVER FOUNDATIONS REMAIN IN-PLACE.

SCALE IN FEET

REV	DATE	DESCRIPTION	DRN	APP
2	04/30/18	ADDRESS MAINE DEP COMMENTS DATED 04/10/2018	SLB	CMG
1	03/07/18	UPDATES TO LISTED WASTE BOUNDARY AND EXCAVATION LIMITS	SLB	CMG

CDM Smith | Geosyntec consultants

TITLE: SITE PLAN

PROJECT: LANDFILL 1 CORRECTIVE MEASURES IMPLEMENTATION PLAN
ORRINGTON REMEDIATION SITE

SITE: ORRINGTON, MAINE

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

SIGNATURE

MARCH 7, 2018
DATE

SCOTT M. LUETTICH No. 7482 LICENSED PROFESSIONAL ENGINEER STATE OF MAINE

DESIGN BY:	JHG/LJP	DATE:	OCTOBER 2017
DRAWN BY:	JHT/RMK	PROJECT NO.:	BR0292
CHECKED BY:	MEP/DTD	FILE:	
REVIEWED BY:	CMG	DRAWING NO.:	3 OF 29
APPROVED BY:	SML		

ISSUED FOR CONSTRUCTION - REV2

SCALE IS BASED ON 22" X 34" NON-REDUCED SHEET SIZE (BORDER = 21" X 32")

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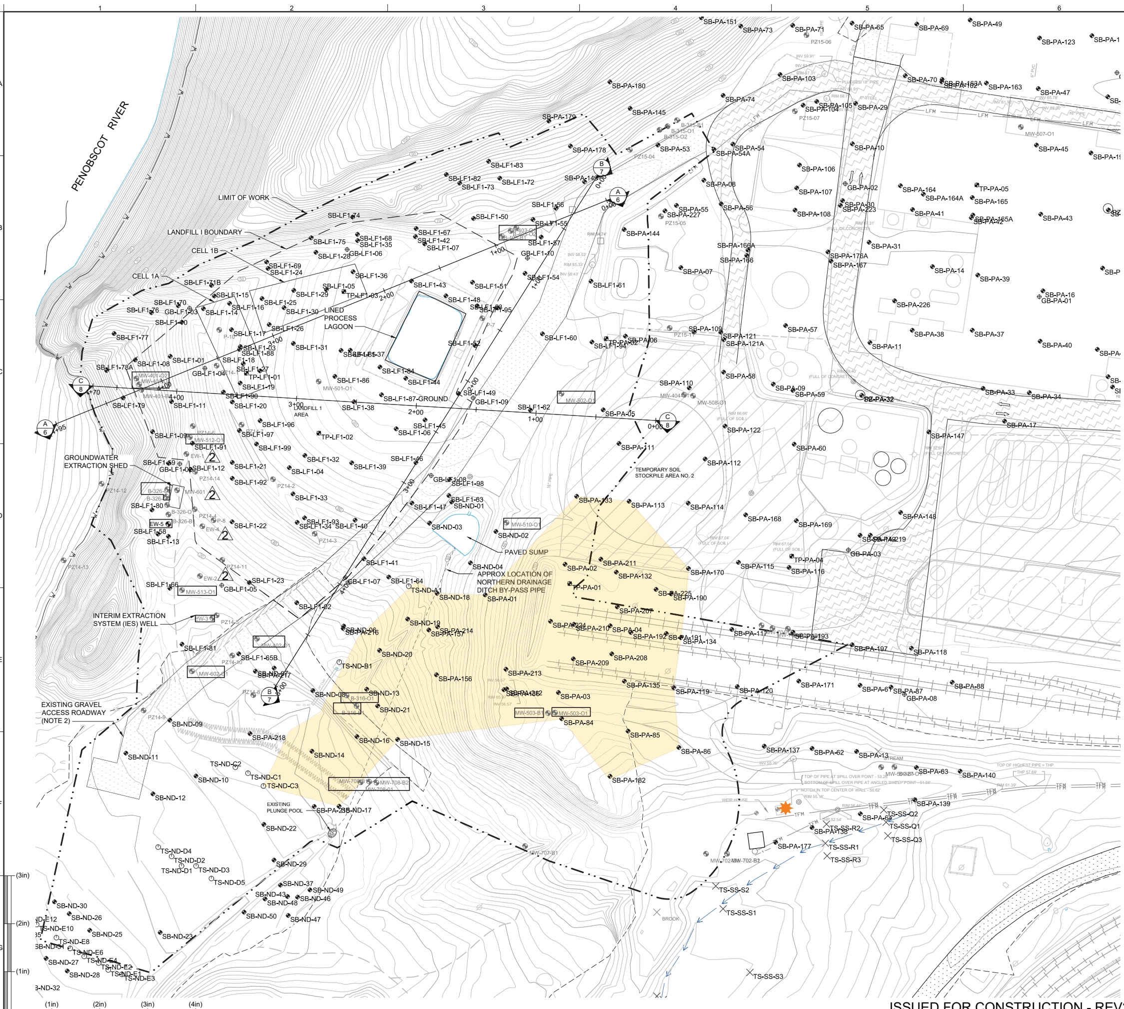

ISSUED FOR CONSTRUCTION - REV2

LEGEND

	UTILITY POLE LOCATION
SB-LF1-01	PRE-DESIGN SOIL BORING
TP-LF1-01	PRE-DESIGN TEST PIT
TS-ND-A1	STREAM TRANSECT BORING LOCATION
GB-LF1-02	PRE-DESIGN GEOTECHNICAL BORING
W	MEAN HIGH WATER (EL 6.62)
	HISTORIC MONITORING WELL/PIEZOMETER/EXTRACTION WELL TO BE MAINTAINED (THERE MAY BE A CLUSTER OF WELLS IN SOME LOCATIONS)
	BY-PASS PIPE
	CHLOROPICRIN TREATMENT AREA

NOTES:

1. SEE DRAWING NO. 2 FOR GENERAL NOTES AND ADDITIONAL LEGEND INFORMATION.
2. EXISTING GRAVEL ACCESS ROAD WITHIN THE LIMIT OF WORK WILL BE REMOVED DURING EXCAVATION.
3. GEOMEMBRANE MAY BE PRESENT WITHIN THE LANDFILL 1 BOUNDARY.

N

0 40' 80'
SCALE IN FEET

REV	DATE	DESCRIPTION	DRN	APP
2	04/30/18	ADDRESS MAINE DEP COMMENTS DATED 04/10/2018	SLB	CMG
1	03/07/18	UPDATES TO LISTED WASTE BOUNDARY AND EXCAVATION LIMITS	SLB	CMG

CDM Smith
Geosyntec consultants

TITLE:
EXISTING CONDITIONS

PROJECT:
LANDFILL 1 CORRECTIVE MEASURES IMPLEMENTATION PLAN
ORRINGTON REMEDIATION SITE

SITE:
ORRINGTON, MAINE

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

SIGNATURE
MARCH 7, 2018
DATE

STATE OF MAINE
SCOTT M. LUETTICH
No. 7482
LICENSED
PROFESSIONAL ENGINEER

DESIGN BY:	JHG/LJP	DATE:	OCTOBER 2017
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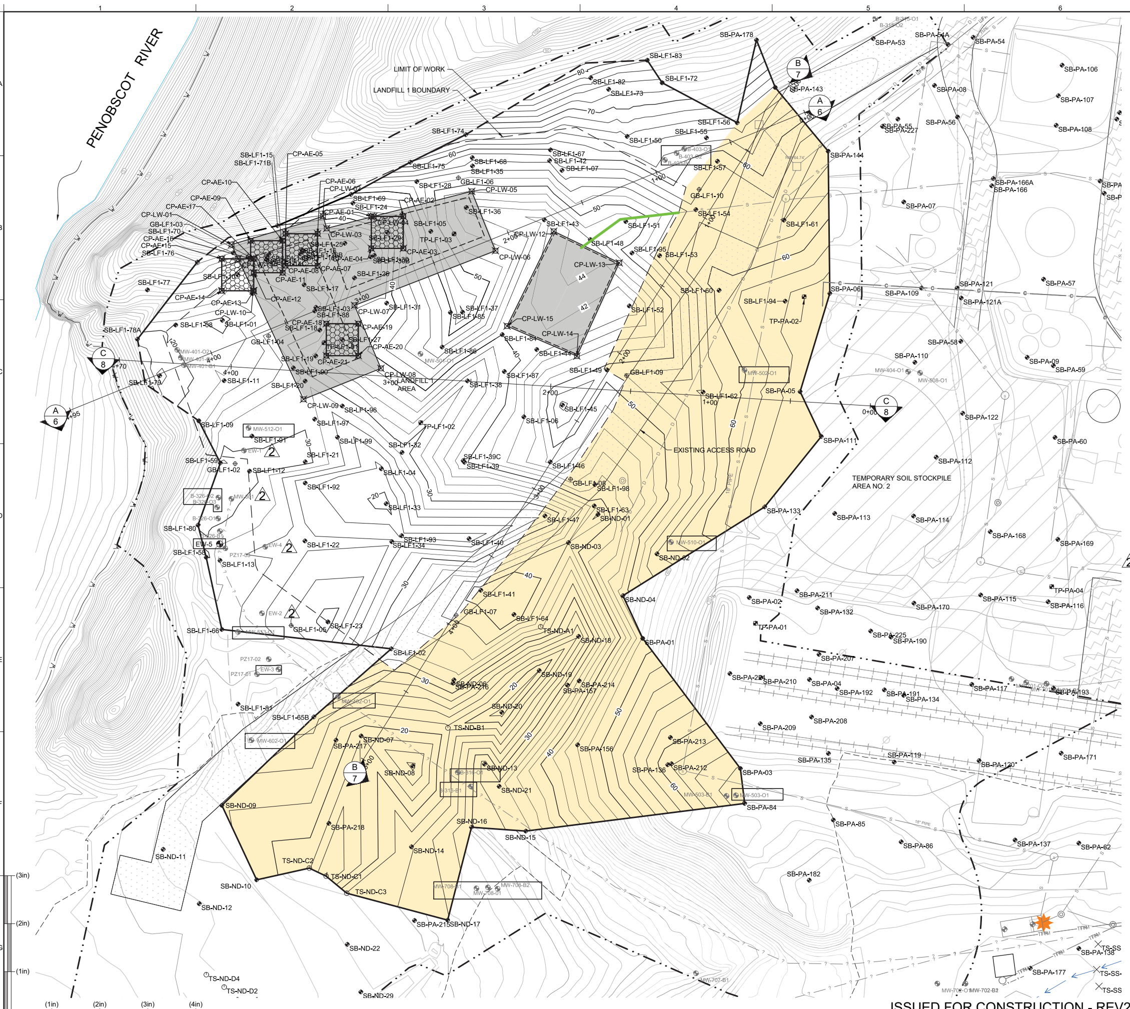


LEGEND

- PRELIMINARY EXCAVATION BOUNDARY, DEPENDENT ON FINAL CONFIRMATION SAMPLE
- EXCAVATION BOUNDARY
- INDUSTRIAL SEWER OR STORM SEWER ANTICIPATED TO BE REMOVED
- LISTED WASTE AREA
- HISTORICAL BOUNDARY OF CELL 1A, CELL 1B, AND LINED PROCESS LAGOON
- CONTROL POINT - LISTED WASTE AREA
- 20 — BOTTOM OF EXCAVATION GRADE (10 FT INTERVAL)
- 16 — BOTTOM OF EXCAVATION GRADE (2 FT INTERVAL)
- AREAS OF DEEP EXCAVATION (NOTE 6)
- CONTROL POINT - ADDITIONAL EXCAVATION AREA
- AREA TO BE EXCAVATED AS PART OF THE PLANT AREA CMI PLAN

NOTES:

1. SEE DRAWING NO. 2 FOR GENERAL NOTES AND ADDITIONAL LEGEND INFORMATION.

2. REMEDIATION CONTRACTOR SHALL REMOVE EXISTING GEOMEMBRANE AS THE EXCAVATION PROCEEDS AND TRANSPORT THE GEOMEMBRANE TO A TSSA FOR OFF-SITE DISPOSAL.

3. REFER TO EXCAVATION TABLES ON DRAWING 12 FOR BOTTOM OF EXCAVATION ELEVATIONS.

4. REFER TO EXCAVATION TABLES ON DRAWING 12 FOR LISTED WASTE EXCAVATION CONTROL POINTS AND CHARACTERISTIC WASTE CONTROL POINTS.

5. GROUNDWATER EXTRACTION SYSTEM:
   a. THE REMEDIATION CONTRACTOR SHALL NOTIFY REMEDIATION PROJECT MANAGER PRIOR TO ANY MODIFICATIONS OF EXISTING INTERIM EXTRACTION SYSTEM (IES).
   b. AT NO TIME CAN THE ENTIRE SYSTEM BE SHUT DOWN FOR MORE THAN 30 DAYS. ALL SHUTDOWNS MUST BE APPROVED BY THE REMEDIATION PROJECT MANAGER. EXTRACTION WELLS EW-3 AND EW-5 SHALL REMAIN OPERATIONAL AT ALL TIMES UNLESS OTHERWISE APPROVED BY THE REMEDIATION PROJECT MANAGER.
   c. THE IES SHALL REMAIN OPERATIONAL IN ITS CURRENT CONFIGURATION FOR AS LONG AS PRACTICABLE.
   d. IF AN INDIVIDUAL WELL NEEDS TO BE TAKEN OFF-LINE, THE ELECTRICAL CONTROLS SHALL BE DISCONNECTED WITHIN THE IES SHED, AND THE FORCE MAIN VALVE IN THE SHED CLOSED.
   e. ONCE THE IES SHED NEEDS TO BE REMOVED, THE REMEDIATION CONTRACTOR SHALL RELOCATE THE FORCE MAIN AND ELECTRICAL SUPPLY TO ALLOW GROUNWATER PUMPING FROM EW-3 AND EW-5 ONLY. ONCE EW-3 AND EW-5 ARE OPERATIONAL, THE REMEDIATION CONTRACTOR SHALL REMOVE THE IES SHED AND ALL PIPING AND ELECTRICAL CONDUIT BETWEEN EW-1, EW-2, EW-4 AND MW-601 AND STORE ALL MATERIALS ONSITE FOR REUSE.
   f. AFTER COMPLETION OF THE FINAL GRADING AND SITE RESTORATION, THE IES SHED AND ALL ELECTRICAL AND PIPING CONNECTIONS TO THE FIVE IES WELLS SHALL BE RESTORED TO THEIR ORIGINAL CONFIGURATION AND OPERATION.
   g. RELOCATE THE FORCEMAIN AND ELECTRICAL CONDUIT BETWEEN THE IES AND GWTP AS NECESSARY THROUGHOUT THE PROJECT.
   h. (2) EXISTING EXTRACTION WELLS MW-601, EW-1, EW-2, AND EW-4 WILL BE OPERATED AS LONG AS PRACTICAL DURING THE LANDFILL 1 REMEDIATION, HOWEVER THESE WILL NOT BE PROTECTED DURING SOIL EXCAVATION AND WILL BE DECOMMISSIONED AT THE APPROPRIATE TIME DURING THE REMEDIATION ACTIVITIES. EXISTING EXTRACTION WELLS EW-3 AND EW-5 WILL BE PROTECTED DURING THE LANDFILL 1 SOIL REMEDIATION THEN RETAINED FOR THE PURPOSE OF WATER LEVEL ELEVATION MONITORING OF THE FINAL GROUNDWATER EXTRACTION SYSTEM.

3. ADDITIONAL EXCAVATION WILL BE PERFORMED IN 20 FT BY 20 FT AREAS CENTERED ON BORINGS SB-LF1-10, SB-LF1-14, SB-LF1-16, SB-LF1-27, and SB-LF1-29. THE EXCAVATION DEPTHS WILL BE EXTENDED BY 4 FEET AT SB-LF1-10 AND SB-LF1-27, BY 2 FEET AT SB-LF1-14 AND SB-LF1-29 AND BY 1 FOOT NEAR SB-LF1-16.

4. THE FINAL BOTTOM OF EXCAVATION SURFACE WILL BE PROVIDED IN ELECTRONIC FORMAT WITH THE ISSUED FOR CONSTRUCTION VERSION OF THE DRAWINGS.

5. THE BOUNDARIES OF THE LISTED WASTE AREAS INCLUDE A 1-FOOT WIDE BUFFER AROUND THE HISTORICAL BOUNDARIES OF CELL 1A AND CELL 1B AND THE EXISTING BOUNDARY OF THE LINED PROCESS LAGOON. THE LISTED WASTE BOUNDARY AROUND THE CELLS WAS ALSO CONNECTED TO INCLUDE THE AREA BETWEEN CELLS 1A AND 1B.

N

0 30' 60'
SCALE IN FEET

REV	DATE	DESCRIPTION	DRN	APP
2	04/30/18	ADDRESS MAINE DEP COMMENTS DATED 04/10/2018	SLB	CMG
1	03/07/18	UPDATES TO LISTED WASTE BOUNDARY AND EXCAVATION LIMITS	SLB	CMG

CDM Smith — Geosyntec consultants

TITLE: EXCAVATION PLAN (SOILS ≥ 2.2 MG/KG)

PROJECT: LANDFILL 1 CORRECTIVE MEASURES IMPLEMENTATION PLAN ORRINGTON REMEDIATION SITE

SITE: ORRINGTON, MAINE

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

SIGNATURE

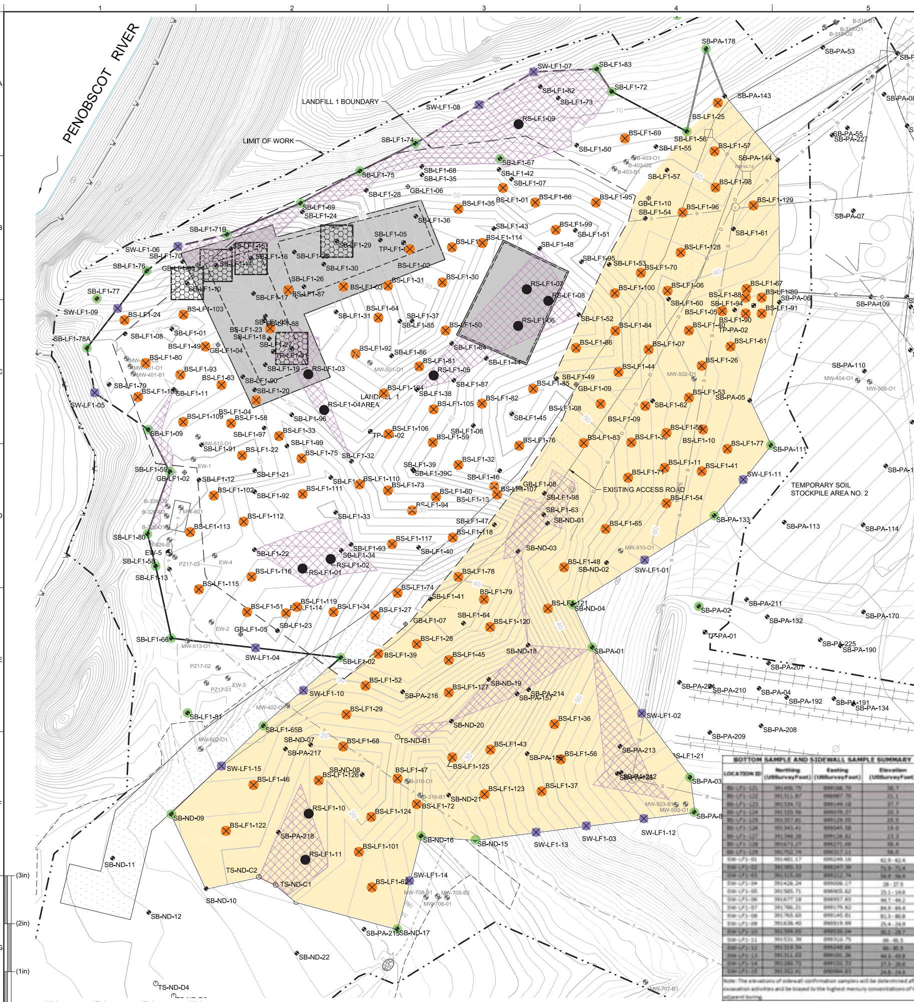
MARCH 7, 2018
DATE

STATE OF MAINE — SCOTT M. LUETTICH — No. 7482 — LICENSED PROFESSIONAL ENGINEER

DESIGN BY:	JHG/LJP	DATE:	OCTOBER 2017
DRAWN BY:	JHT/RMK	PROJECT NO.:	BR0292
CHECKED BY:	MEP/DTD	FILE:	
REVIEWED BY:	CMG	DRAWING NO.:	
APPROVED BY:	SML	11 OF 29	

ISSUED FOR CONSTRUCTION - REV2

SCALE IS BASED ON 22" X 34" NON-REDUCED SHEET SIZE (BORDER = 21" X 32")



BOTTOM SAMPLE AND SIDEWALL SAMPLE SUMMARY			
LOCATION ID	Northing (USSurveyFoot)	Easting (USSurveyFoot)	Elevation (USSurveyFoot)
BS-LF1-01	391713.73	899180.71	53.2
BS-LF1-02	391675.38	899102.48	47.7
BS-LF1-03	391652.03	899061.09	40.4
BS-LF1-04	391381.02	899006.57	28.8
[illegible]	[illegible]	[illegible]	[illegible]

POST-EXCAVATION RECORD SAMPLE SUMMARY TABLE			
LOCATION ID	Northing (USSurveyFoot)	Easting (USSurveyFoot)	Elevation (USSurveyFoot)
RS-LF1-01	391475.80	899035.46	23.20
RS-LF1-02	391481.74	899053.07	23.71
RS-LF1-03	391597.26	899039.08	37.14
RS-LF1-04	391574.89	899048.97	33.65
RS-LF1-05	391596.50	899117.41	35.65
RS-LF1-06	391627.46	899170.17	41.95
RS-LF1-07	391650.33	899175.56	43.96
RS-LF1-08	391643.13	899189.02	42.40
RS-LF1-09	391753.55	899170.44	68.35
RS-LF1-10	391322.62	899039.33	17.84
RS-LF1-11	391293.80	899037.25	17.40

BOTTOM SAMPLE AND SIDEWALL SAMPLE SUMMARY			
LOCATION ID	Northing (USSurveyFoot)	Easting (USSurveyFoot)	Elevation (USSurveyFoot)
[illegible]	[illegible]	[illegible]	[illegible]

Note: The elevations of sidewall confirmation samples will be determined after excavation activities and be biased to the highest mercury concentrations of the adjacent boring.

LEGEND

- PRELIMINARY EXCAVATION BOUNDARY, DEPENDENT ON FINAL CONFIRMATION SAMPLE
- EXCAVATION BOUNDARY
- PRE-EXCAVATION SIDE WALL SAMPLE (MERCURY BELOW THE MPS AT EACH INTERVAL)
- SIDE WALL SAMPLE (1 INTERVAL)
- POST-EXCAVATION BOTTOM CONFIRMATION SAMPLE
- LISTED WASTE AREA
- HISTORICAL BOUNDARY OF CELL 1A, CELL 1B, AND LINED PROCESS LAGOON
- EXCAVATION BOTTOM AT FILL / NATIVE INTERFACE OR IN NATIVE SOIL
- CHARACTERISTIC WASTE AREA
- POST-EXCAVATION RECORD SAMPLE
- AREAS OF DEEP EXCAVATION
- AREA TO BE EXCAVATED AS PART OF THE PLANT AREA CMI PLAN

NOTES:

1. SEE DRAWING NO. 2 FOR GENERAL NOTES AND ADDITIONAL LEGEND INFORMATION.
2. REFER TO EXCAVATION TABLES ON DRAWING 12 FOR BOTTOM OF EXCAVATION ELEVATIONS.
3. SIDE WALL SAMPLES WILL BE OBTAINED BY THE REMEDIATION PROJECT MANAGER PRIOR TO EXCAVATION.
4. SHADED CELLS INDICATED SAMPLES THAT ARE IN AN AREA THAT WILL BE EXCAVATED AS PART OF THE PLANT AREA CMI PLAN.

0 30' 60'
SCALE IN FEET

REV	DATE	DESCRIPTION	DRN	APP
2	04/30/18	ADDRESS MAINE DEP COMMENTS DATED 04/10/2018	SLB	CMG
1	03/07/18	UPDATES TO LISTED WASTE BOUNDARY AND EXCAVATION LIMITS	SLB	CMG

CDM Smith — Geosyntec consultants

TITLE: CONFIRMATION SAMPLING PLAN

PROJECT: LANDFILL 1 CORRECTIVE MEASURES IMPLEMENTATION PLAN
ORRINGTON REMEDIATION SITE

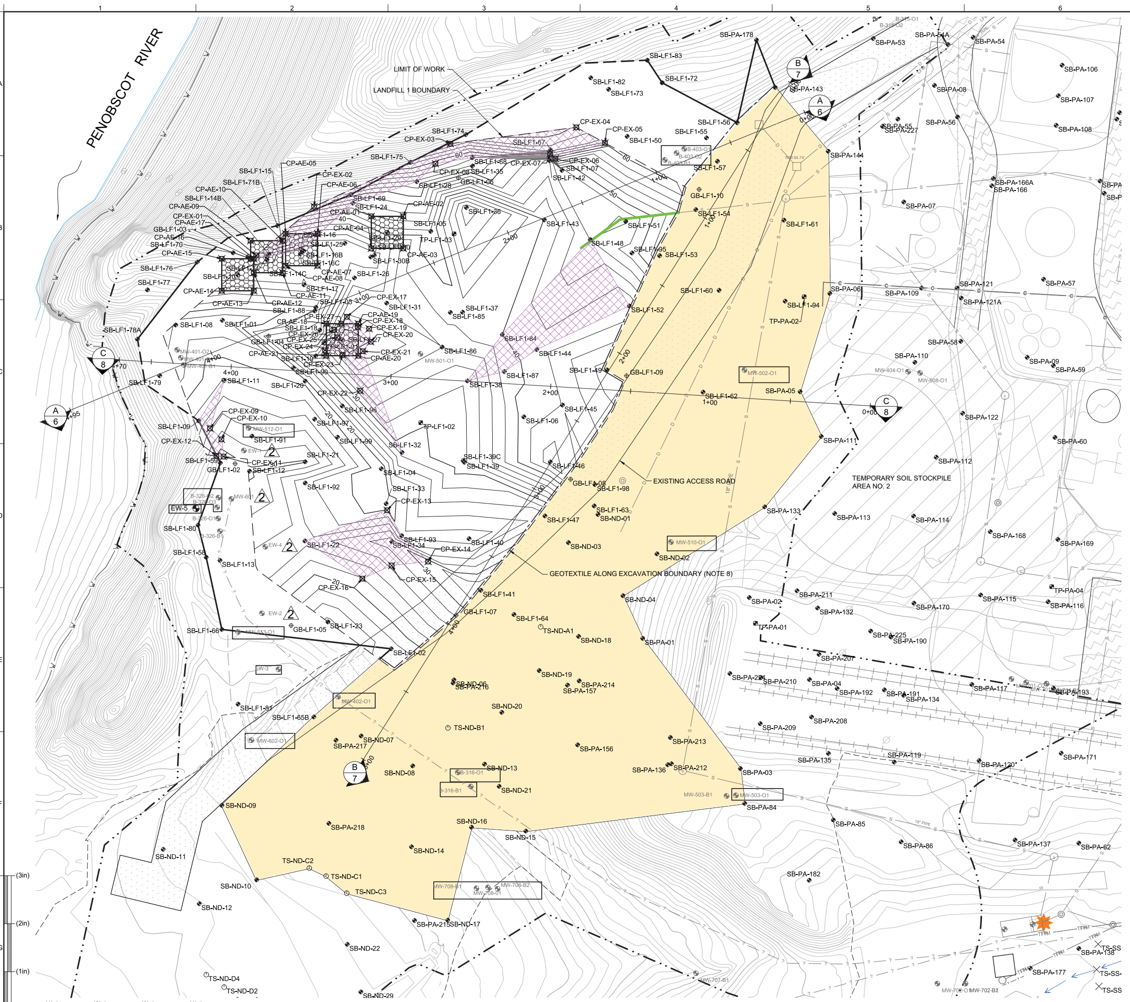
SITE: ORRINGTON, MAINE

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION UNLESS SEALED.

SIGNATURE — MARCH 7, 2018 — DATE

DESIGN BY:	JHG/LJP	DATE:	OCTOBER 2017
DRAWN BY:	JHT/RMK	PROJECT NO.:	BR0292
CHECKED BY:	MEP/DTD	FILE:	
REVIEWED BY:	CMG	DRAWING NO.:	
APPROVED BY:	SML	15 OF 29	

ISSUED FOR CONSTRUCTION - REV2



SCALE IS BASED ON 22" X 34" NON-REDUCED SHEET SIZE (BORDER = 21" X 32")

ISSUED FOR CONSTRUCTION - REV2

LEGEND

- PRELIMINARY EXCAVATION BOUNDARY, DEPENDENT ON FINAL CONFIRMATION SAMPLE
- EXCAVATION BOUNDARY
- INDUSTRIAL SEWER OR STORM SEWER ANTICIPATED TO BE REMOVED
- HISTORICAL BOUNDARY OF CELL 1A, CELL 1B, AND LINED PROCESS LAGOON
- 20 — BOTTOM OF EXCAVATION GRADE (10 FT INTERVAL)
- 16 — BOTTOM OF EXCAVATION GRADE (2 FT INTERVAL)
- GEOTEXTILE ALONG BOUNDARY (NOTE 8)
- AREA TO BE EXCAVATED AS PART OF THE PLANT AREA CMI PLAN
- EXCAVATION BOTTOM AT FILL / NATIVE INTERFACE OR IN NATIVE SOIL (NOTE 9)

NOTES:

1. SEE DRAWING NO. 2 FOR GENERAL NOTES AND ADDITIONAL LEGEND INFORMATION.
2. REMEDIATION CONTRACTOR SHALL REMOVE EXISTING GEOMEMBRANE AS THE EXCAVATION PROCEEDS AND TRANSPORT THE GEOMEMBRANE TO A TSSA FOR OFF-SITE DISPOSAL.
3. REFER TO EXCAVATION TABLES ON DRAWING 17 FOR BOTTOM OF EXCAVATION ELEVATIONS.
4. REFER TO EXCAVATION TABLES ON DRAWING 17 FOR LISTED WASTE EXCAVATION CONTROL POINTS AND CHARACTERISTIC WASTE CONTROL POINTS.
5. SEE DRAWING 11 FOR NOTES REGARDING OPERATION OF THE GROUNDWATER EXTRACTION SYSTEM DURING EXCAVATION.
6. AFTER EXCAVATION OF SOILS CONTAINING MERCURY CONCENTRATIONS GREATER THAN 2.2 MG/KG IN ACCORDANCE WITH DRAWINGS 11 THROUGH 15, EXCAVATION OF ADDITIONAL FILL WILL BE CONDUCTED WITHIN THE LANDFILL I BOUNDARY AS SHOWN ON THIS DRAWING. THE ADDITIONAL FILL WILL BE MANAGED IN ACCORDANCE WITH THE SOIL USE PLAN.
7. SEE DRAWING 11 FOR NOTES REGARDING THE LOCATION OF THE LISTED WASTE BOUNDARY.
8. AFTER THE POST-EXCAVATION SURVEY IS COMPETE BUT PRIOR TO BACKFILLING, THE REMEDIATION CONTRACTOR SHALL PLACE 8 OZ NONWOVEN GEOTEXTILE ALONG THE SIDEWALLS BETWEEN LANDFILL 1 EXCAVATION AREAS AND EXCAVATION AREAS TO BE COMPLETED UNDER THE PLANT AREA CMI PLAN.
9. IN AREAS WHERE THE EXCAVATION OF FILL CONTAINING MERCURY CONCENTRATIONS GREATER THAN 2.2 MG/KG ENDS AT THE FILL/NATIVE INTERFACE, NO ADDITIONAL EXCAVATION WILL BE CONDUCTED.

N

0 30' 60'
SCALE IN FEET

REV	DATE	DESCRIPTION	DRN	APP
2	04/30/18	ADDRESS MAINE DEP COMMENTS DATED 04/10/2018	SLB	CMG
1	03/07/18	UPDATES TO LISTED WASTE BOUNDARY AND EXCAVATION LIMITS	SLB	CMG

CDM Smith — Geosyntec consultants

TITLE: EXCAVATION PLAN (FILL <2.2 MG/KG WITHIN THE LANDFILL 1 BOUNDARY)

PROJECT: LANDFILL 1 CORRECTIVE MEASURES IMPLEMENTATION PLAN ORRINGTON REMEDIATION SITE

SITE: ORRINGTON, MAINE

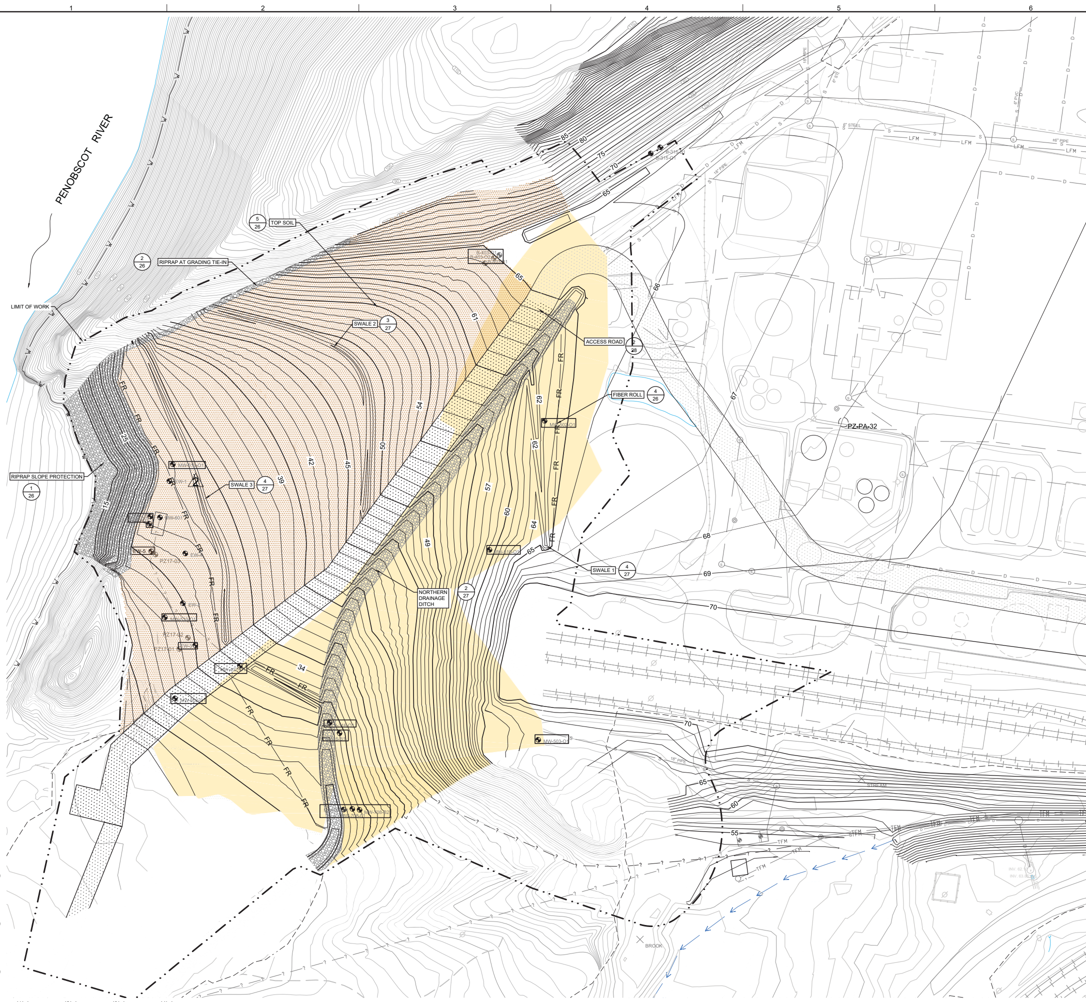
THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

SIGNATURE

MARCH 7, 2018
DATE

STATE OF MAINE — SCOTT M. LUETTICH — No. 7482 — LICENSED — PROFESSIONAL ENGINEER

DESIGN BY:	JHG/LJP	DATE:	OCTOBER 2017
DRAWN BY:	JHT/RMK	PROJECT NO.:	BR0292
CHECKED BY:	MEP/DTD	FILE:	
REVIEWED BY:	CMG	DRAWING NO.:	
APPROVED BY:	SML	16 OF 29	



LEGEND

- RIPRAP PROTECTION
- GRAVEL ACCESS ROAD
- EROSION CONTROL BLANKET AND PERMANENT SEED MIX (3/26)
- AREA TO BE RESTORED AS PART OF THE PLANT AREA CMI PLAN

NOTES:

1. SEE DRAWING NO. 2 FOR GENERAL NOTES AND ADDITIONAL LEGEND INFORMATION.
2. ADDITIONAL EXTRACTION WELLS OR EXISTING WELLS WILL BE BROUGHT BACK ONLINE - THESE ACTIVITIES WILL BE ADDRESSED UNDER SEPARATE COVER.
3. AREAS THAT WILL BE EXCAVATED AS PART OF THE PLANT AREA CMI PLAN WILL BE RESTORED WITH EROSION CONTROL BLANKET AND PERMANENT SEED MIX DURING THE PLANT AREA CMI PLAN.

N

0 40' 80'
SCALE IN FEET

REV	DATE	DESCRIPTION	DRN	APP
2	04/30/18	ADDRESS MAINE DEP COMMENTS DATED 04/10/2018	SLB	CMG
1	03/07/18	UPDATES TO LISTED WASTE BOUNDARY AND EXCAVATION LIMITS	SLB	CMG

CDM Smith

Geosyntec consultants

TITLE:
SITE RESTORATION AND STABILIZATION PLAN

PROJECT:
LANDFILL 1 CORRECTIVE MEASURES IMPLEMENTATION PLAN
ORRINGTON REMEDIATION SITE

SITE:
ORRINGTON, MAINE

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

SIGNATURE

MARCH 7, 2018
DATE

STATE OF MAINE — SCOTT M. LUETTICH No. 7482 — LICENSED PROFESSIONAL ENGINEER

DESIGN BY:	JHG/LJP	DATE:	OCTOBER 2017
DRAWN BY:	JHT/RMK	PROJECT NO.:	BR0292
CHECKED BY:	MEP/DTD	FILE:	
REVIEWED BY:	CMG	DRAWING NO.:	
APPROVED BY:	SML	23 OF 29	

ISSUED FOR CONSTRUCTION - REV2

SCALE IS BASED ON 22" X 34" NON-REDUCED SHEET SIZE (BORDER = 21" X 32")

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