



STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION



PAUL R. LEPAGE
GOVERNOR

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October 16, 2018

Ms. Kathryn Zeigler
Director, Environmental Remediation
Mallinckrodt US LLC
7777 Bonhomme Ave. Suite 1800
St. Louis, MO 63105

RE: Northern Drainage Ditch Closure Report Approval

Dear Kathy:

The Department has reviewed the Northern Drainage Ditch Construction Closure Report dated November 28, 2017. As you may recall, review of this Report was deferred by consent of the parties to complete review of higher priority documents and plans. In addition to review of the Report, the project Engineer participated in 23 progress meetings and conducted 25 site inspections during construction activities. In general, we concur that the work was completed in accordance with approved and modified work plans and requirements, but we offer the following comments:

Section 2.2.4.3-Replacement of Existing GWTP Discharge Pipe

This section states that the pipe was visually inspected and found to have no significant cracks, but does not mention that monitoring well B-320-B1 was drilled right through the GWTP discharge pipe.

Section 4.2.3-CQA Field Oversight Activities

Two of the CQA type one common fill particle size analyses indicated that the samples exhibited material that had greater than specified particles passing through the #4 sieve. The amount was not excessive and the integrity of the backfill will not be compromised as a result. It is noteworthy that all of the CQC tests were within the specified window.

Many (about half) of the initial backfill compaction tests failed to meet specification, probably due to unfavorable weather conditions (moisture and temperature). The Report adequately documents that failed lifts were re-worked and re-tested until passing results were obtained.

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Section 5-Conclusions

The sections of the Northern Drainage Ditch being used as a staging area for Landfill 1 activities has yet to be reseeded/final restoration, and that will be completed under the landfill 1 schedule. Please provide a timeframe for this to be done.

I do not believe that these comments require any response or revisions unless Mallinckrodt wishes to, and I ask that you accept this letter as approval of the closure report. Please do not hesitate to contact me if you should have questions or comments.

Sincerely

A handwritten signature in cursive script, appearing to read "Chris Swain".

Chris Swain

RCRA Corrective Action Program Manager
Maine Department of Environmental Protection

Chris.Swain@Maine.Gov

207-485-3852

Mallinckrodt US LLC

November 27, 2017

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

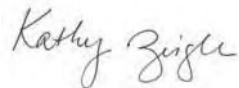
**Subject: Northern Drainage Ditch Closure Report
Orrington Remediation Site
Orrington, Maine**

Dear Mr. Jellison:

Please find enclosed the **Northern Drainage Ditch Closure Report** for the Orrington Remediation Site. This Closure Report includes a summary of the remedial construction activities completed in accordance with the Northern Drainage Ditch Corrective Measures Implementation (CMI) Plan – Rev 1 dated August 23, 2016. The report also summarizes the construction quality assurance (CQA) program, operations and submittals completed as part of the remedial work and related quality control documentation.

If you have questions or comments regarding this report, please feel free to contact me at 314-281-5947.

Sincerely,



Kathy Zeigler
Remediation Program Manager

cc: Chris Greene, Geosyntec
John Weston, CDM Smith
Pat Duft, Mallinckrodt US LLC
Susanne Miller, DEP-Bangor

CLOSURE REPORT

Northern Drainage Ditch Construction Closure Report

Orrington Remediation Site
Orrington, Maine

Prepared by:

CDM Smith, Inc.
25 Industrial Ave.
Chelmsford, MA 01824

Geosyntec Consultants, Inc.
289 Great Road, Suite 105
Acton, MA 01720

Mallinckrodt US LLC

November 2017

**CDM
Smith** Geosyntec[◊]
consultants

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Acronyms and Definitions

Alpha	Alpha Analytical
BEP	Board of Environmental Protection
CDM Smith	CDM Smith, Inc.
CES	CES, Inc.
CF1	Common Fill Type 1
Charter	Charter Contracting Company, LLC
CMI	Corrective Measures Implementation
CMI Plan	Norther Drainage Ditch CMI Plan
CQA	Construction Quality Assurance
DEP	Department of Environmental Protection
E&S	Erosion and Sediment
FDT	Field Density Test
ft	feet
Geosyntec	Geosyntec Consultants, Inc.
GWTP	Ground Water Treatment Plant (on-site)
HASP	Health and Safety Plan
HDPE	High Density Polyethylene
Lyford	Peter A. Lyford Inc.
Mallinckrodt	Mallinckrodt US LLC
MEPDES	Maine Pollutant Discharge Elimination System
MPS	Media Protection Standard
MQC	Manufacturers' Quality Control
NRPA	Natural Resources Protection Act
Order	State of Maine Board of Environmental Protection Order
OSM	Onsite Reuse Material
oz.	Ounce
PAMP	Perimeter Air Monitoring Plan
QA	Quality Assurance
QC	Quality Control
Report	Northern Drainage Ditch Closure Report
RFI	Requests for Information
Site	Orrington Remediation Site
TechLaw	TechLaw, Inc.
TSSA	Temporary Soil Stockpile Area
USACE	United States Army Corps of Engineers
USFWS	United States Fisheries and Wildlife Service
yd ³	Cubic yards
ZBA	Shoreland Protection Ordinance

Section 1.

Introduction and Project Organization

1.1 Purpose

The purpose of this Northern Drainage Ditch Construction Closure Report (Report) is to summarize the construction activities, quality control (QC) documentation, quality-assurance (QA) monitoring and QA documentation activities (Closure Activities) during the Northern Drainage Ditch Corrective Measures Implementation (CMI) construction at the Orrington Remediation Site (Site) located at 99 Industrial Way, Orrington, Maine. Work primarily occurred between October 17, 2016 and July 14, 2017 with minor activities occurring until September 1, 2017. The Northern Drainage Ditch is shown on the Site Plan in **Figure 1-1**. Requirements for the Northern Drainage Ditch Closure Activities were set forth in the State of Maine Board of Environmental Protection (BEP) Order (Order) (ME BEP, 2014) effective April 3, 2014, the Northern Drainage Ditch CMI Plan (CMI Plan)¹ (CDM Smith, 2016b), and other relevant contract documents herein referred to as the Project Documents, listed in Section 1.4.

1.2 Report Organization

The Report is organized as follows:

- Section 1 – Introduction and Project Organization;
- Section 2 – Summary of Construction Activities;
- Section 3 – Summary of Construction Quality Assurance (CQA) Program;
- Section 4 – Summary of QC and CQA Activities;
- Section 5 – Conclusion; and
- Section 6 – References.

Documentation presenting the results of the Construction Quality Assurance (CQA) monitoring and testing activities performed by Geosyntec Consultants Inc. (Geosyntec) and record drawings are provided in the appendices to this Report.

1.3 Project Team

Key stakeholders and companies for the Northern Drainage Ditch CMI area presented below, along with their roles and responsibilities.

Oversight Agency – Maine Department of Environmental Protection, Augusta, Maine

The Maine Department of Environmental Protection (DEP) provided oversight of the remediation work, including remediation construction activities, and provided feedback and approvals of the Project Documents submitted to them for review.

¹ Because of the numerous citations herein to the Northern Drainage Ditch CMI Plan, the reference (CDM Smith, 2016b) has not been inserted into the report text next to each citation.

Owner – Mallinckrodt US LLC

The Owner of the Site is Mallinckrodt US LLC (Mallinckrodt). Mallinckrodt was responsible for the remediation of the Northern Drainage Ditch CMI and contracted with the Remediation Project Manager to implement the Project Documents.

Remediation Project Manager – CDM Smith Inc., Boston, Massachusetts

CDM Smith Inc. (CDM Smith) was hired by Mallinckrodt to provide construction management services during the Northern Drainage Ditch CMI activities. CDM Smith retained a Design Engineer, Remediation Contractor and a CQA Engineer to implement the CMI Plan and perform the Closure Activities in accordance with the approved CMI Plan (CDM Smith, 2016b) and the Order (BEP, 2014). CDM Smith provided health and safety oversight, managed the Temporary Soil Stockpile Areas (TSSA) and rail car loading, and implemented the site-wide perimeter air-monitoring plan (PAMP) (CDM Smith, 2015a).

- Geosearch Inc., of Fitchburg, Massachusetts was the drilling subcontractor who provided drilling services to obtain confirmation samples along the sheet pile wall alignment.

Design Engineer, CQA Engineer and On-site Analytical Laboratory – Geosyntec Consultants, Acton, MA

Geosyntec prepared design documents presented in the CMI Plan (CDM Smith, 2016b) and performed CQA activities in accordance with the CQA Plan provided in the CMI Plan. Geosyntec was directly accessible to the Owner and the Remediation Project Manager for technical direction and issues relating to quality control/quality assurance (QC/QA) activities during construction. The CQA Engineer was responsible for carrying out the field sampling, QC/QA oversight, and the QC/QA documentation portion of the CMI Activities to ensure that the requirements of the Project Documents were met during construction. Geosyntec also operated and managed the Maine-certified on-site Analytical Laboratory during construction for confirmation and reuse soil sample analytical analysis. Geosyntec also subcontracted off-site laboratory services to the following:

- CDM Smith Geotechnical Laboratory, Somerville, MA was the CQA Engineer's off-site Geotechnical Testing Laboratory with experience in the physical testing of soils. The laboratory is familiar with, and properly equipped to perform the geotechnical testing required by the CQA Plan.

Remediation Contractor – Charter Contracting Company, LLC. (Charter), Boston Massachusetts

Charter performed the construction portion of the Closure Activities to satisfy the requirements of the Project Documents. Additionally, Charter performed construction QC activities to document that materials used and activities completed were in accordance with the project specifications and drawings. The Remediation Contractor employed the services of subcontractors, coordinated material sources, and interfaced with the Remediation Project Manager and the CQA Engineer throughout the Closure Activities. Charter subcontracted the following companies to support the QC activities:

- CES, Inc. (CES) of Brewer, Maine was Charter's Maine Land Surveyor and provided survey control and as-built surveys of the remedial construction.
- S. W. Cole of Bangor, Maine was Charter's Geotechnical Testing Laboratory and provided geotechnical soil testing on QC samples throughout construction.
- Alpha Analytical (Alpha) of Westborough, Massachusetts was Charter's off-site analytical testing laboratory.
- H. B. Fleming of South Portland, Maine was Charter's sheet pile installation and removal subcontractor.

Remediation Transportation and Disposal Contractor – US Ecology, Boise, Idaho

US Ecology was responsible for transporting and disposing of soils designated for off-site disposal. US Ecology was responsible for providing railcars for transportation, coordination with Pan-Am for picking up railcars, tracking railcars, weighing railcars, and preparing associated paperwork.

Ground Water Treatment Plant Operator - Woodward and Curran, Portland, Maine

Woodward and Curran operated the onsite ground water treatment plant (GWTP). Contact water from the construction activities was transported to the onsite GWTP for treatment prior to discharge in accordance with Maine Pollutant Discharge Elimination System (MEPDES) Permit ME0000C39.

Onsite Agency Representative – TechLaw, Inc. North Chelmsford, Massachusetts

The Regulatory Agency Onsite Representative provided onsite oversight for the Regulatory Agency (Maine DEP) and coordinated with the CQA Engineer for confirmation sampling. TechLaw, Inc. (TechLaw) also subcontracted off-site laboratory services to the following:

- Katahdin Analytical Services of Scarborough, Maine was the Onsite Agency Representative's analytical testing laboratory.

1.4 Project Documents and Communication

The requirements for the Northern Drainage Ditch Closure Activities are described in the following Project Documents:

- The State of Maine BEP Order, effective April 3, 2014.
- Northern Drainage Ditch Corrective Measures Implementation (CMI) Plan Revision 1, prepared by Geosyntec and issued by CDM Smith dated August 23, 2016, including:
 - *Health and Safety Plan (HASP), Orrington Remediation Site*, prepared by CDM Smith Inc. dated October 9, 2014; and
 - *PAMP, Orrington Remediation Site*, prepared by CDM Smith Inc. dated July 22, 2015.
- Contractor Construction Work Plans, prepared by Charter, including:
 - *Excavation and Restoration Plan*, dated August 16, 2016;
 - *Construction Water Management Plan*, dated August 16, 2016;
 - *Work Zone Air Monitoring Plan*, dated August 5, 2016; and
 - *Traffic Control Plan*, dated October 24, 2016.
- Corrective Measures Implementation General Guidelines for Confirmation Sampling and Split Sampling Protocols, prepared by Geosyntec and Maine DEP dated August 8, 2016;
- *Construction Submittals*, prepared by Charter, and *Construction Submittal Responses*, prepared by Geosyntec; and
- *Contractor Requests for Information (RFIs)*, prepared by Charter, and Responses to Contractor RFIs, prepared by Geosyntec.

The organizational structure and lines of communication for the Project Team were set forth in the CQA Plan provided as an appendix in the CMI Plan. Members of the project team including CDM Smith, Charter, TechLaw, and Geosyntec held weekly construction progress meetings on site to review progress updates, address questions, and convey schedule updates. As part of the CQA Engineer

responsibilities, Geosyntec issued daily or weekly field reports summarizing daily or weekly construction progress, QC/QA activities, and highlighting any matters requiring action. The field reports were issued to CDM Smith regularly, and are included in **Appendix A**. Additional communications made throughout the Closure Activities were documented in Contractor RFIs and subsequent responses, QC submittals and subsequent responses, and Charter daily field reports. Weekly teleconferences with Maine DEP, and daily toolbox meetings were held to discuss progress and disseminate communications to the project team.

Section 2.

Summary of Construction Activities

2.1 Permitting

Permitting requirements were summarized in the CMI Plan. The following is a list of permits obtained for the Northern Drainage Ditch Closure Activities:

- National Resources Protection Act (NRPA) Permit-by-Rule – Category 13, approved by the Maine DEP on June 9, 2015, for work in and adjacent to wetlands and protected areas;
- Shoreland Protection Ordinance (ZBA), approved on April 9, 2016 for all Site activities through the submission of a Land Use Application to the Orrington Code Enforcement Officer;
- Jurisdictional Determination, approved by the United States Army Corps of Engineers (USACE) on July 31, 2015 for work in the Northern Drainage Ditch; and
- Maine Construction General Permit, approved by the Maine DEP on June 2, 2016, for construction activity greater than 1 acre.

A permit was not required to be filed with the United States Fisheries and Wildlife Service (USFWS). After correspondence was initiated in March 2015, the USFWS responded that no known protected species or habitats are present at the Site. Responses from the USFWS were included in all permit applications submitted to the USACE.

The general construction permit required weekly Erosion and Sediment (E&S) Control inspection and reports. E&S reports are discussed in Section 4.2 below.

2.2 Scope of Activities

The CMI Plan includes details for the excavation of soils with mercury concentrations above the mercury media protection standard (MPS) (e.g., materials required for off-site disposal) and restoration of the Northern Drainage Ditch. Remedial construction in the Northern Drainage Ditch included the following primary components in the general order in which they were executed:

- Installation of an underdrain collection manhole at the former Chlorate Building;
- Pre-construction activities, site setup, clearing, grubbing, and access road construction;
- Construction of the Northern Drainage Ditch Bypass;
- Implementation of the PAMP;
- Excavation, transportation, and disposal of materials required for off-site disposal;
- Survey, reuse soil sampling, and confirmation sampling of the excavation area;
- Backfilling the excavation to final grades;
- Surface stabilization of the final grading area; and
- Restoration of the area.

A photographic log summarizing the major construction components is provided in **Appendix B**.

Conditional Approval of the CMI Plan was received from the Maine DEP on August 7, 2016. The requirements of the Conditional Approval were met in the submission of the Northern Drainage Ditch CMI Plan submitted on August 23, 2016.

Charter mobilized to the Northern Drainage Ditch area on November 11, 2016 and began preconstruction activities. Charter commenced excavation of materials requiring off-site disposal on November 29, 2016 in accordance with the conditions of the approvals discussed above. The following subsections describe the work Charter performed for each component of construction. **Table 2-1** summarizes the construction equipment Charter used for each component.

2.2.1 Site Preparation and Pre-Construction Activities

CDM Smith implemented and operated the perimeter air monitoring stations across the Site in accordance with the PAMP (CDM, 2015). Air monitoring stations were set up around the Site at designated locations as shown on **Figure 1-1**.

As part of Site preparation, CDM Smith began installing an underdrain collection manhole at the former Chlorate Building on October 17, 2016 and completed the manhole installation, piping to the onsite GWTP, and paving over the piping on November 18, 2016. The installation consisted of a manhole structure placed northwest of the former Chlorate Building, a pump equipped with a float switch, and a 2-inch high density polyethylene (HDPE) pipe from the installed manhole to the onsite GWTP. Soils removed from the manhole and pipe excavations were stockpiled on polyethylene sheeting on the concrete pad west of the Maintenance Building, and stockpiles were covered with polyethylene sheeting at the end of each work day. Stockpiled soils from the excavation were used as backfill, followed by layers of clean protective cover soil, road base material, and asphalt pavement. Excess soil removed from the excavation but not used as backfill was transported to a TSSA for disposal. The stockpiled soils were not tested for reuse because the manhole and remaining soils will be removed as part of the Plant Area CMI activities.

Upon arrival, Charter established E&S controls including berms, silt fence, the Northern Drainage Ditch bypass, and a turbidity curtain prior to performing Site work. The Northern Drainage Ditch bypass pipe consisted of a 15-inch HDPE corrugated pipe that connected directly to the outlet pipe of the paved sump north of the Northern Drainage Ditch.

Charter then commenced stripping, clearing, and grubbing activities and began importing access road construction materials. Charter constructed an access road leading from the area east of Landfill 1 to the Northern Drainage Ditch area as shown on the CMI Plan drawings. An exclusion zone and contaminant reduction zone were established in accordance with Charter's Excavation and Restoration work plan. A temporary decontamination pad was established for use during excavation activities.

In accordance with the Remediation Contractor's *Construction Water Management Plan*, dated August 16, 2016, Charter mobilized and set up four 21,000-gallon fractionation tanks, a bag filter system, a flow meter and totalizer, and installed a 3-inch diameter HDPE pipe from the filters to the GWTP. The system also included sump pumps used in the excavation area as the excavations progressed.

In accordance with the *Support of Excavation Plan* dated September 26, 2016, H. B. Fleming mobilized a 60 ton crane to the Site to install sheet piles in the Northern Drainage Ditch area. Sheet piles were installed in the Northern Drainage Ditch area between November 18, 2016 and December 15, 2016.

2.2.2 Northern Drainage Ditch Bypass

Prior to the commencement of excavation activities, a bypass was installed to divert water flowing into the Northern Drainage Ditch construction area. A 15-inch diameter HDPE corrugated pipe was installed from the weir structure at the paved sump to the dissipation pad southwest of the former Northern

Drainage Ditch discharge point. The bypass started upstream of the Northern Drainage Ditch at the paved sump and included the construction of the dissipation pad at the outlet of the Northern Drainage Ditch bypass pipe.

2.2.3 Sheet Piles

Prior to the commencement of excavation in the southern portion of the Northern Drainage Ditch area, Charter subcontracted H. B. Fleming to install temporary sheet piles. H.B. Fleming mobilized a 60-ton crane to the Site to install sheet piles at the locations shown in the Northern Ditch CMI Plan drawings. The sheet piles were installed to facilitate excavation and dewatering activities, and to help prevent temporary excavation slope instabilities where deep excavations in the Northern Drainage Ditch were proposed along the mean high tide line of the Penobscot River.

2.2.4 Excavation and Confirmation Sampling

Charter excavated 17,531 cubic yards (yd³) of impacted soil from the Northern Drainage Ditch, based on a comparison of the existing conditions (pre-construction) survey and the bottom of excavation survey, and relocated the material to TSSA No. 2 between November 29, 2016 and March 6, 2017.

Excavation of each excavation area (e.g., ND-1, ND-2, etc.) progressed generally from the northeast-to-southwest with lateral extent and uniform bottom elevations defined in the CMI Plan, including the specifications and drawings. Excavation slopes were maintained by benching in accordance with the Contractor Excavation and Restoration Plan, Site HASP, and applicable safety regulations.

Two types of materials were excavated; materials requiring off-site disposal (e.g., materials with mercury concentrations greater than the MPS) and Onsite Reuse Material (OSM) (e.g., material excavated from the Northern Drainage Ditch area with concentrations less than the MPS that did not require off-site disposal).

2.2.4.1 Materials for Off-Site Disposal

Charter transported the soils requiring off-site disposal to TSSA No. 2, where CDM Smith loaded the soil into railcars operated by US Ecology. Charter decontaminated haul trucks prior to exiting the exclusion zone and traveling to TSSA No. 2. Soil was transported via railcar to off-site disposal facilities.

2.2.4.2 Onsite Reuse Materials

Excavated OSM was transported to the area west of the Maintenance Building where it was stockpiled and sampled to assess whether it was acceptable for reuse. Equipment used to excavate and transport OSM was decontaminated if it had been previously used to excavate and transport material for off-site disposal. Additional details regarding OSM sample procedures, results, and approvals are provided later in this Report.

2.2.4.3 Replacement of the Existing GWTP Discharge Pipe

The GWTP discharge pipe was observed to be a 24-inch asbestos concrete pipe in excavation cells ND-6, ND-7, ND-8, ND-15, and ND-26. The sections of the GWTP discharge pipe in the Northern Drainage Ditch excavation area were removed between January 26, 2017 and February 2, 2017 and a temporary bypass system was installed on January 26, 2017. Bedding was not observed beneath the asbestos concrete pipe. The asbestos concrete pipe was removed in intact sections and transported to a TSSA to be loaded into rail cars for off-site disposal. The asbestos concrete pipe was visually inspected and found to have no significant cracks. The temporary bypass consisted of a high volume pump equipped with a float switch inside the Discharge Shed, a 3-inch HDPE pipe, and a 3-inch flexible hard hose.

Charter connected the high volume pump equipped with a float switch to the 3-inch HDPE pipe to transport water from the Discharge Shed to the edge of the Northern Drainage Ditch excavation area. The 3-inch HDPE pipe was connected to a 3-inch flexible hard hose at the edge of the Northern Drainage Ditch excavation area that could be repositioned as the construction schedule required. Charter connected the temporary bypass to the existing discharge pipe southwest of ND-26 using a PVC pipe reducer and braced the reducer against tidal forces using large rocks. Alarms were put into place to notify the GWTP operator of high water conditions in the Discharge Shed, and GWTP discharge rates could be remotely adjusted by Woodard and Curran as needed. After excavation was completed in the cells referenced above and backfill was placed to the elevation of the existing discharge pipe, a 24-inch PVC pipe was installed at the same location of the removed discharge pipe and put into service on March 8, 2017. After the 24-inch PVC pipe was installed, backfill was completed to the grades shown in the drawings.

2.2.4.4 Dewatering

Charter performed excavation dewatering during and after storm events and when groundwater was encountered within an excavation area. Excavation dewatering was performed using sumps constructed by placing 2- and 3-inch diameter trash pumps inside a perforated section of HDPE corrugated pipe surrounded by crushed stone. The pumps transferred water to the fractionation tanks previously described in Section 2.2.1 of this Report.

2.2.4.5 Confirmation Sampling

Geosynthec, Inc. of Fitchburg, Massachusetts performed confirmation sampling along the proposed sheet pile wall alignments in the NDD area between September 12, 2016 and September 14, 2016 using a track mounted Geoprobe/7822DT drill rig. Sample locations were surveyed and provided to Geosynthec. The results of these confirmation samples were incorporated into the final NDD CMI Plan drawings.

Post-excavation confirmation samples were obtained throughout the excavation, and the location of each sample was surveyed. Confirmation sample results were reviewed and discussed by Charter, CDM Smith, Geosynthec, TechLaw, and the Maine DEP. Email notification was then sent to the Maine DEP to indicate that soils requiring off-site disposal had been removed based on the results of the confirmation samples and that the results and backfilling area had been discussed on-site with TechLaw in accordance with Confirmation Sampling and Split Sampling Protocols, dated August 8, 2016. CDM Smith then provided notification to Charter that it was acceptable to backfill each area or group of areas. Additional details regarding confirmation sample results and approvals are provided later in this Report.

Charter was notified by Geosynthec and CDM Smith if confirmation sample results exceeded the mercury MPS. If the results exceeded the MPS, Charter performed additional excavation around the sample location as described in Section 4.2.2.2. Charter excavated and transported the additional material to TSSA No. 2. Additional confirmation samples were obtained by Geosynthec, results were reviewed, and approvals were issued according to the methods described above. Once excavation for an area(s) was complete, Charter's surveyor (CES) obtained as-built survey information of the lateral extent and elevations of the excavation.

2.2.4.6 Sheet Pile Removal

H.B. Fleming remobilized a Link-Belt LS 108B crane to the Site and removed the sheet piles adjacent to the Northern Drainage Ditch from February 28, 2017 to March 13, 2017. Sheets were placed on polyethylene sheeting in the Northern Drainage Ditch excavation area until they were transported to TSSA No. 1 for decontamination by Charter.

2.2.5 Backfill

Backfill activities including material delivery, placement, and compaction occurred between December 5, 2016 and March 27, 2017. Two types of backfill material were used; OSM and imported Common Fill Type 1 (CF1). Charter began importing CF1 on November 3, 2016. CF1 was directly placed, stockpiled within a completed excavation area, or stockpiled on a plastic tarp in the area behind the Maintenance Building. Stockpiled soils containing frost were separated into an additional stockpile and aerated with an excavator to promote drying prior to being used.

Excavated OSM was stockpiled and sampled in the area west of the Maintenance Building. After review of the sampling results by CQA personnel, OSM with mercury concentrations below the MPS was used as backfill in the Northern Drainage Ditch. Additional details regarding OSM sampling procedures, results, and approvals are provided later in this Report.

As described above, backfill of soil materials commenced upon notification of the confirmation sampling results being sent to the Maine DEP. In preparation for backfilling activities during winter conditions, snow, ice, and any soils containing frost were removed from the bottom and sides of the area to be backfilled and transported to TSSA No. 2. Backfill was placed in excavation areas in 12-inch thick loose lifts, moisture conditioned if necessary, and compacted. In locations where standing water was observed on the excavation surface (e.g., due to runoff accumulation or groundwater), Charter dewatered the area by manual removal or by using 2- and 3-inch diameter pumps. Once water was removed from the area, backfilling commenced.

In excavation cells ND-1, ND-5, ND-6, ND-8, ND-9, ND-10, ND-15, and ND-26, water could not be removed from the excavation cells prior to backfill being placed because of the tidal influence and a coarse gravel layer at the bottom of the excavation. On February 1, 2017, a strategy was established in collaboration with the Maine DEP to address backfilling procedures in this area. The discussion of this strategy is documented in the Daily CQA Field Report from February 1, 2017 (**Appendix A**). In accordance with this plan, Charter placed a 1-ft lift of 1-1/2-inch stone followed by an approximately 3-ft lift of CF1. The lifts were bucket-compacted and placed during low tide to further minimize the water level in the excavation area. After the approximately 3-ft lift of CF1 was placed, backfilling continued in accordance with the specifications. Density testing was not performed on these soil layers due to the tidal influence and the large particle size of the 1-1/2-inch stone.

2.2.6 Revegetation and Restoration

2.2.6.1 Relocated Northern Drainage Ditch Channel

Construction of the relocated Northern Drainage Ditch channel was initiated on February 1, 2017. Portions of the channel located in the Northern Drainage Ditch remediation area were excavated following backfilling operations in each area. As construction of the channel progressed, Charter placed 32-ounce per square yard (oz/yd²) non-woven geotextile and 4- to 12-inch riprap in the channel. Construction of the channel was completed on April 12, 2017. The bypass pipe was realigned to drain into the completed channel on April 13, 2017. Prior to the bypass realignment, Charter drained the paved sump north of the Northern Drainage Ditch. Sediment was removed from the paved sump and transported to TSSA No. 1 for disposal. A portion of the channel adjacent to the staging area was regraded on May 10, 2017 due to an observation that water was flowing from the channel. Charter constructed and paved a plunge pool at the top of the channel on June 1, 2017. The bypass pipe was then aligned to discharge into the plunge pool on June 5, 2017.

2.2.6.2 Staging Area

Between April 11, 2017 and May 18, 2017, Charter constructed a staging area in the southwestern portion of the Northern Drainage Ditch area in preparation for activities associated with the Southern Cove remediation. From April 11, 2017 through April 13, 2017, Charter placed 8 oz/yd² non-woven geotextile over the subgrade in the staging area and then placed and compacted Dense Graded Gravel. Charter also placed ¾-inch Stone to the southwest of the staging area and adjacent to the Penobscot River to stabilize the ground surface against erosion. Final grading of the staging area was performed May 18, 2017.

2.2.6.3 Well Abandonment

Between May 22, 2017 and May 31, 2017, seven 18-inch former production wells (R1 through R7) located in the Northern Drainage Ditch were abandoned. Charter cut approximately 40 inches off the top of the steel well casings. Geosearch, Inc. of Fitchburg, Massachusetts (Geosearch) abandoned the wells in general accordance with the Maine DEP Guidance for Well and Boring Abandonment (DEP, 2009) and specific procedures outlined in a March 29, 2017 email sent to the Maine DEP. Geosearch installed bentonite chips in the screened section of each well to a minimum of 2-ft above the screen. The wells were then filled with cement grout to 2 ft below the graded surface and the remaining 2-ft was filled with soil. Upon completing abandonment of wells R5, R6, and R7, Charter repaired the existing geotextile and placed Dense Graded Gravel over the wells. Upon completing abandonment of wells R1, R2, R3, and R4, Charter placed CF1 and topsoil over the area. Well abandonment logs were completed for each location, and are provided in **Appendix H**.

2.2.6.4 Revegetation

After completing backfill activities in March 2017, Charter placed topsoil in the Northern Drainage Ditch. Charter imported topsoil between April 27, 2017 and June 1, 2017 and placed it directly on the prepared subgrade or stockpiled it in the Northern Drainage Ditch remediation area. The topsoil was spread in one continuous lift generally from the southeast to the northwest of the Northern Drainage Ditch area. Charter then prepared the topsoil for hydroseeding. Hydroseeding and application of fertilizer was performed by Peter A. Lyford Inc. (Lyford) on June 6, 2017. Lyford also installed erosion control blankets along both sides of the Northern Drainage Ditch channel. Charter hand-seeded an area of disturbed ground in the northwestern portion of the Northern Drainage Ditch adjacent to the access road. Charter periodically watered the seeded areas through July 14, 2017.

2.3 Requests for Information

During construction activities, Charter issued RFIs for clarifications regarding the Project Documents. Responses to RFIs were prepared by Geosyntec. Responses to RFIs are listed in **Table 2-2** and are presented in **Appendix C**.

Consistent with CQA procedures for CMI construction in other areas of the Site, the responses to RFIs were marked with either a “Yes (Y)” or “No (N)” indicating whether the response includes a modification to the approved design as presented in the CMI Plan. As shown on **Table 2-2**, none of the Northern Drainage Ditch Responses to RFIs were marked (Y). Fifteen Responses to RFIs were marked as (N). For responses marked as (N), the issues were addressed in the field and additional guidance was given, if necessary, regarding the intent of the design. Three RFIs (RFI-010, RFI-010R, and RFI-011) were retracted as noted in **Table 2-2**.

Section 3.

Summary of CQA Program

3.1 Overview of CQA Program

The scope of CQA activities performed by Geosyntec during the Closure Activities included review of QC documents, coordination of QC/CQA sampling and testing, obtaining and testing post-excavation confirmation and OSM samples, review of confirmation sample and OSM test results, and monitoring and documentation of the Remediation Contractor's work and any associated field CQA operations to ensure that work was performed according to the CMI Plan.

3.2 Field CQA Operations

Geosyntec monitored construction activities, reviewed QC documentation provided by Charter, reviewed QA test results collected by Geosyntec, and compared observations and construction progress to the requirements of the Project Documents. Geosyntec notified Charter when construction practices and/or QC/CQA results were not in compliance with the Project Documents. Charter then implemented appropriate corrective actions which were monitored and/or tested by Geosyntec.

The main components of the field CQA operations included:

- observing construction activity and performing tests for quality assurance inspection activities;
- verifying that the QC testing of materials was implemented in accordance with the Northern Drainage Ditch CQA Plan and Specifications;
- performing independent on-site inspections of the work to assess compliance with design criteria, drawings, and specifications;
- obtaining post-excavation confirmation samples in accordance with the Confirmation Sample Protocol and the drawings presented in the CMI Plan;
- obtaining OSM stockpile samples in accordance with the Reuse Stockpiling and Soil Sample Protocol included as part of the Soil Use Plan in the CMI Plan;
- verifying that QC and CQA tests were conducted according the requirements of the specifications and CQA Plan presented in the CMI Plan; and
- reporting the results of inspections and corrective actions to the Maine DEP.

Weekly meetings were held on site to discuss the following:

- health and safety;
- construction progress and schedule;
- Site management activities (erosion and sediment control, dust, noise, traffic, air monitoring, trespassing, etc.);
- project management activities (e.g., status of submittals and RFIs); and
- additional project-related topics as necessary.

As previously mentioned, daily CQA activities and construction activities were documented by Geosyntec in daily field reports, which are provided in **Appendix A**.

Section 4.

Summary of QC and CQA Activities

A description of the material prequalification process including QC document review, and CQA activities (as described in the section above) associated with remediation of the Northern Drainage Ditch is provided below. Each section summarizes the scope of QC and QA activities associated with construction work performed.

4.1 Materials Pre-Qualification and QC Submittal Review

Charter provided contractor work plans, material QC information, and as-built survey information in the form of submittals to CDM Smith and Geosyntec as required by the CMI Plan (specifically, the drawings and specifications). Geosyntec reviewed the submittals and generated corresponding submittal responses. Submittal responses marked as “Reviewed – no comments” or “Comments as noted” were issued to CDM Smith and Charter. For submittal responses marked as “Revise and Resubmit” Charter revised the submittal according to the comments, and Geosyntec reviewed the updated submittal to verify the materials, products, and/or methods met the requirements of the CMI Plan drawings and specifications. Submittals included imported soils (CF1, Dense Graded Gravel, Topsoil, ¾” Stone, and Drainage Sand Type 2), and riprap material source and QC result information, OSM QC results, geosynthetics, E&S control materials, Northern Drainage Ditch bypass materials, restoration and vegetation materials, contractor work plans, and as-built surveys.

A complete list of material pre-qualification and QC submittals and corresponding responses are provided in the Submittal Register and Log in **Table 4-1**. Below is a brief description of the prequalification and QC submittal review process relating to specific products. Further details are provided in the submittals and corresponding submittal responses provided in **Appendix D**.

Prior to delivery, imported soils were tested in accordance with the analytical testing requirements of the Soil Use Plan and the requirements of the specifications provided in the CMI Plan. CDM Smith imported materials for the underdrain manhole installation at the former Chlorate Building, including a concrete manhole, 2-inch HDPE piping and a sump pump equipped with a float switch. Imported soils (CF1, Drainage Sand Type 2, and Topsoil) used by Charter were from Thornton Construction’s Pit 5 mine in Orrington, ME. Stockpiled OSM was also tested according to the requirements described above prior to use.

Charter, or Charter’s geotechnical laboratory, S. W. Cole, collected QC samples of imported soil material and OSM either from the borrow source or as material was stockpiled on site. The samples were sent to S. W. Cole’s geotechnical laboratory for testing based on the frequencies set forth in the specifications. For each soil and riprap material, the required test, the required test frequency, the total quantity of imported material (as determined by truck count volumes (i.e., loose volume)), required number of QC test results, the number of tests performed, the actual frequency at which the test was performed, and whether or not the QC test result was passing (e.g., met the requirements of the CMI Plan specifications and drawings) are documented in **Table 4-2A**.

Product data sheets for the bypass pipe, geosynthetics, E&S controls, and revegetation materials listed above were submitted by CDM Smith or Charter and evaluated by Geosyntec prior to material deliveries to the Site. Charter submitted product data sheet certifications for each geosynthetic material and roll-specific manufacturers’ QC (MQC) test data for the geotextiles. In addition, several clarifications regarding material prequalification and QC requirements were made during this process and were recorded in the responses to the following RFIs:

- RFI 002 – addressing the requirements for Structural Fill in the access roads;
- RFI 004 – addressing the requirements for stone carbonate content testing;
- RFI 008 – addressing the requirements for ¾ inch stone in the decontamination pad; and
- RFI 009 – addressing the use of geotextile in the decontamination pad.

As discussed in Section 2.2, additional details regarding the response to RFIs, including the original RFIs, are summarized in **Table 2-2** and provided in **Appendix C**. Materials and products submitted as part of the material pre-qualification and QC submittal review process meet the requirements of the CMI Plan drawings and specifications and the response to RFIs identified above.

4.2 Summary of CQA Activities

As mentioned in Section 3.2 above, primary components of the Field Oversight Activities included CQA materials testing, confirmation sampling, and monitoring and performing independent inspections of construction activities. The following subsections provide a summary of those activities performed by Geosyntec in the field during the closure activities.

4.2.1 CQA Laboratory Testing

Samples of imported soil materials and OSM, as listed in the section above, were obtained by Geosyntec on-site personnel and sent to the CDM Smith Geotechnical Laboratory for CQA testing in accordance with the CQA Plan included in the CMI Plan. Geosyntec reviewed the laboratory test results and verified whether they met the requirements of the CQA Plan and Specifications included in the CMI Plan. The required CQA test, the test frequency, the total quantity of imported material (as determined by truck count volumes (i.e., loose volume)), required number of CQA test results, the number of CQA tests performed, the actual frequency at which the tests were performed, sample information, and whether or not the CQA test result was passing (e.g., met the requirements of the Project Documents) are provided for each soil in **Table 4-2B**. The actual frequency at which the CQA tests were performed is calculated as determined by truck count volumes (i.e., loose volume). Laboratory CQA test result reports are provided in **Appendix E**.

4.2.2 Confirmation Sampling

Geosyntec monitored the excavation and relocation of soil required for off-site disposal, inspected active excavation areas for visual signs or beads of mercury, reviewed preliminary bottom and extent of excavation surveys provided by Charter, coordinated collection of the post-excavation confirmation samples, and reviewed the results. Prior to collecting samples, preliminary surveys were provided to Geosyntec by Charter to confirm the bottom of excavation elevations and lateral extent of each excavation area had been met. Geosyntec notified CDM Smith, Charter, and TechLaw if there were areas that, based on these surveys, required additional excavation to reach the target elevations and extent. Post-excavation confirmation samples were then collected and delivered to the on-site analytical laboratory where they were entered into the project database and prepared for analytical testing. Split samples were created at the on-site analytical testing laboratory and provided to the Maine DEP off-site analytical laboratory as requested by the Maine DEP on-site representative (TechLaw), in accordance with the Confirmation Sampling Protocol incorporated as part of the CMI Plan and identified by sample names ending in “-DEP”. Results were provided to the Maine DEP regularly throughout construction activities.

4.2.2.1 Confirmation Sampling Along Temporary Sheet Pile Wall Alignments

Prior to excavation, sidewall confirmation samples were collected from nine locations in the Northern Drainage Ditch (SW-ND-01 through SW-ND-07, SW-ND-13, and SW-ND-14). These sidewall samples were collected in locations where temporary sheet piling was proposed for excavation support and to control groundwater. Collection of sidewall samples using typical methods was not possible once the sheet piles were installed. Confirmation sample results are summarized in **Table 4-3A** and **Table 4-3B**, and confirmation sample laboratory reports are provided in **Appendix F**.

Four of these locations (SW-ND-03, SW-ND-04, SW-ND-05, and SW-ND-06) had one or more depth intervals that exceeded the mercury MPS. To delineate the lateral extents of the excavation, additional sampling was performed at SW-ND-13 and SW-ND-14, approximately 20 and 25 feet southwest of SW-ND-04 and SW-ND-03, respectively. No MPS exceedances were measured in SW-ND-13 or SW-ND-14. The lateral extents of the excavation to the west and north of SW-ND-05 and SW-ND-06 were extended to the mean high tide line. Excavation below the mean high tide line is part of the Southern Cove remediation activities. Southern Cove samples SD-SC-31, SD-SC-32, and SD-SC-33 are approximately 15-ft east of the mean high tide line and had no exceedances of the mercury MPS. Southern Cove sample SD-SC-34 was along the southwestern boundary of excavation area ND-1 (at the intersection of area ND-1 and ND-2), and exceeded the mercury MPS. Excavation to the south and west of SD-SC-34, including removal of the material at SD-SC-34, was performed as part of the Northern Drainage Ditch excavation. Southern Cove samples RSD-06A, RSD-06B, and RSD-09A are below the mean high tide line, to the southwest of SD-SC-34 and have no exceedances of the MPS. Confirmation sampling during implementation of the Southern Cove remedy showed compliance with the MPS. Excavation extents and activities in the Southern Cove will be described in the Southern Cove closure report.

4.2.2.2 Confirmation Sample Collection and Results

Geosyntec collected bottom confirmation samples at 34 locations and sidewall confirmation samples at 14 locations in accordance with the CMI Plan. Results of the confirmation sample testing performed for those original confirmation bottom and sidewall sample locations are summarized in **Table 4-3A**. Confirmation sample laboratory reports from the on-site analytical laboratory are provided in **Appendix F**.

4.2.2.3 Re-Sampling

For locations where confirmation samples exceeded the mercury MPS, Geosyntec, CDM Smith, Charter, and TechLaw identified the required extent of additional excavation and performed additional excavation. For bottom samples exceeding the MPS, a 20 ft wide by 20 ft long by 1 ft deep square excavation centered on the sample location was performed by Charter and an additional confirmation sample at the bottom of that excavation was obtained and tested. For the sidewall sample that exceeded the MPS at SW-ND-11, additional excavation was advanced 3 ft beyond the original sidewall location and 10 ft in each direction, parallel to the sidewall. Geosyntec collected additional bottom of excavation confirmation samples at four locations (BS-ND-02, BS-ND-06, BS-ND-11, and BS-ND-16), and an additional sidewall confirmation sample at one location (SW-ND-11). **Figure 4-1** shows the extent of additional excavation around this sidewall sample. The limits of the additional excavations were discussed with TechLaw prior to performing the excavations. Results and details regarding the additional confirmation samples are provided in **Table 4-3B**, and on-site analytical laboratory reports are provided in **Appendix F**.

4.2.2.4 Maine DEP Notification and Backfilling

Prior to backfilling, Geosyntec issued email notifications to the Maine DEP summarizing each completed excavation area, the post-excavation confirmation samples taken, and their results. The backfill

notification was discussed with the Maine DEP on-site representative (TechLaw) prior to being submitted. Once the backfill notification was submitted to the Maine DEP, backfilling commenced in the areas discussed in the backfill notification. Backfilling was performed in accordance with the General Guidelines for Confirmation Sampling and Split Sampling Protocols, dated August 8, 2016. A list of backfill notifications showing the excavation areas and corresponding notification dates is provided in **Table 4-4**.

4.2.2.5 As-Built Survey

The horizontal and vertical extent of excavation is documented for the Northern Drainage Ditch in the Bottom of Excavation As-Built Survey submittal provided in **Figure 4-1**. Geosyntec received and reviewed the bottom of excavation survey prepared by CES and submitted by Charter.

4.2.2.6 OSM

Soil designated for OSM based on the pre-design investigation activities was excavated to the elevations and lateral extent presented in the CMI Plan and segregated from soils exceeding the MPS. OSM was excavated and transported using decontaminated excavators and haul trucks. OSM was transported to a concrete slab that had been swept clean of soil and other debris or to an area where new plastic tarps had been placed. OSM was stockpiled as presented in the Soil Use Plan (included in Appendix I of the CMI Plan). Due to the sequencing of construction activities, two of the eight stockpiles were further divided into two smaller stockpiles, and samples were analyzed separately. Stockpiles that were divided have letters added to their sample name to differentiate between the stockpiles (e.g. RSP-01A-ND and RSP-01B-ND).

Three grab samples of equal volume (greater than or equal to 60 ml) were collected from different areas of each haul truck load that was added to each stockpile. Samples were collected after the truck was unloaded in the stockpile area, but before the soil was moved into the stockpile. Each of the grab samples from each haul truck load was aggregated into three separate composite samples for each of the stockpiles presented in the Soil Use Plan. Each of the three composite samples was homogenized and analyzed for mercury following the procedures utilized for the pre-design investigation samples. If all three samples contained mercury concentrations less than the MPS, the stockpile was considered acceptable to be reused. If any of the three samples contained mercury concentrations above the MPS, the soil was transported to TSSA No. 2 to be disposed of off-site.

One OSM stockpile, RSP-05C-ND, contained mercury concentrations greater than the MPS and was transported to TSSA No. 2 for off-site disposal. The other samples for stockpiles that were analyzed contained mercury concentrations less than the MPS. Reuse soil testing results are presented in **Table 4-5A**.

OSM was analyzed by Alpha for VOCs, cadmium, and chloropicrin during the pre-design investigation described in the CMI Plan. The results of VOC testing are presented in **Table 4-5B**, and results of cadmium and chloropicrin testing are presented in **Table 4-5C**.

A portion of the soil designated for reuse in excavation cells ND-5, ND-9, and ND-13 was not analyzed in the on-site laboratory because it was located on the ground surface. This soil was disturbed during site preparation and preconstruction activities including installation of erosion and sediment controls, sheet piling, and access roads. This material was transported to TSSA No. 2 for off-site disposal.

4.2.3 CQA Field Oversight Activities

CQA field oversight activities included routine inspection of E&S controls, observation of construction activities, monitoring material deliveries, performing field density tests (FDTs) and thickness

verifications for backfill materials, attending daily and weekly construction meetings, and coordinating confirmation and reuse soil sampling as previously discussed. A summary of the daily CQA activities is provided in the Geosyntec daily field reports provided in **Appendix A**. A brief description of these CQA activities is provided below.

E&S controls inspections were performed weekly and after precipitation events accumulating ≥ 0.25 inches of rainfall. Forms completed during E&S inspections are provided in **Appendix G**. Geosyntec notified Charter when areas requiring repair or improvement of the E&S control measures were identified during Geosyntec's inspections. Charter then performed necessary corrective actions (e.g., repair/replacement of silt fences and removal of sediment buildup). Based on Geosyntec's observations and daily field reports, Charter installed and maintained E&S controls in accordance with the requirements set forth in the CMI Plan.

Geosyntec monitored the placement and compaction of on-site and imported soil materials including:

- Dense Graded Gravel for the Northern Drainage Ditch access roads and staging area;
- CF1 and OSM for general backfill;
- Drainage Sand Type 2 for the decontamination pad; and
- Topsoil for final restoration.

Geosyntec visually inspected the imported materials to minimize the use of soils containing undesirable constituents such as rubbish and large organic debris. Geosyntec inspected the subgrade prior to backfill material placement. Additionally, during winter conditions, the bottom and sides of approved backfill areas and soil stockpiles were visually inspected for the presence of snow, ice, and frost prior to backfilling. If snow, ice, or frost were observed on the bottom or sides of the excavation, the material was removed prior to backfilling. If snow, ice, or frost were observed in stockpiles to be used for backfilling, the material was scraped from the pile and placed into a separate stockpile and allowed to dry. FDTs and thickness verifications were performed for each lift of soil material to verify compaction and thicknesses met the requirements of the Project Documents. Thickness verifications were performed by visual monitoring and/or test holes at each location where an FDT was performed. **Table 4-2B** summarizes the number of FDT and thickness verification tests performed. FDT results were recorded for Dense Graded Gravel in **Table 4-6A**, and the locations of FDT and thickness verifications performed for Dense Graded Gravel are provided on **Figure 4-2**. FDT results for CF1 are presented in **Table 4-6B** and the locations of FDTs and thickness verifications for each lift of Common Fill Type 1 are shown on **Figure 4-3A** through **Figure 4-3O**. FDT results for OSM are presented in **Table 4-6C** and the locations of FDTs and thickness verifications for OSM are shown on **Figure 4-4A** through **Figure 4-4D**. If a FDT did not meet the requirements, the lift was recompacted and retested. If the FDT still did not meet the requirements the lift was moisture conditioned to add or remove moisture from the lift and the soil was recompacted and retested. If the lift failed a third time, then the lift was removed and new material was placed in the subject area and recompacted before retesting.

During restoration activities, Geosyntec inspected topsoil as it was delivered and stored at the Site, monitored topsoil placement, and monitored the installation of erosion control blankets. Geosyntec confirmed the following:

- topsoil was placed in one continuous lift from the bottom of the slope to the top, and track walked prior to applying straw mulch and tackifier;
- Topsoil was free of brush, litter, or deleterious material prior to mulch and erosion control blanket installation; and
- Erosion control blankets were properly stored, and deployed.

Hydroseeding and fertilizer application was completed on June 6, 2017. Supplemental hand-seeding was completed during the week of June 19, 2017.

After completion of the restoration and vegetation activities described above, erosion control blanket and restoration area limits were surveyed by CES and submitted by Charter. Geosyntec reviewed the Final Restoration Area As-Built Survey of Northern Drainage Ditch provided in **Figure 4-5**, and verified that the surveyed lateral extent of these items met the requirements set forth in the Project Documents and subsequent response to RFIs discussed below.

Charter issued the following RFIs requesting clarification on aspects of the restoration work:

- RFI 013 – Clarifications were made to the design and dimensions of the plunge pool at the top of the newly constructed Northern Drainage Ditch channel; and
- RFI 014 – Clarifications were made on the appropriate asphalt mix for paving the plunge pool.

Section 5.

Conclusions

Geosyntec observed the construction and implementation of the Northern Drainage Ditch CMI Plan at the Orrington Remediation Site during the period of October 24, 2016 to September 1, 2017. During that time, CQA field personnel monitored installation of the underdrain collection manhole at the former Chlorate Building, Northern Drainage Ditch bypass pipe, excavation of soils required for disposal (e.g., soils with mercury > MPS), excavation of and backfilling with imported materials and OSM, replacement of the GWTP discharge pipe, and restoration of the Northern Drainage Ditch including site grading, and preparation of the Southern Cove staging area.

Geosyntec CQA personnel collected bottom and sidewall confirmation samples from the completed excavation areas to verify mercury concentrations were below the MPS. Notifications of backfill were issued to the Maine DEP upon completion of confirmation sampling. Geosyntec CQA personnel collected composite samples of OSM in the Northern Drainage Ditch to verify MPS parameter concentrations were below the applicable limits. CQA personnel verified that conformance and CQA testing were performed on the construction materials at the frequencies required in the Project Documents, and that materials meeting the requirements set forth in the Project Documents were used for the remedy. CQA personnel correspondingly verified that conditions or materials identified as not conforming to the Project Documents were removed, replaced, repaired and/or retested, as described in this Report.

The results of the CQA activities performed by Geosyntec confirm that the excavation and restoration of the Northern Drainage Ditch was performed in accordance with the Project Documents and changes approved through the RFI process as described herein. Poor vegetative growth was observed in the hydroseeded portion of the Northern Ditch Remediation Area. This area was not reseeded because it will serve as a staging area for the Landfill 1 remediation work. The Landfill 1 staging area will be constructed and final restoration of the area will be performed in accordance with the Landfill 1 CMI Plan. As discussed previously, the southern portion of the Northern Drainage Ditch remediation area is being used as a staging area for ongoing remediation work in the Southern Cove. The Southern Cove staging area will be restored as part of the Southern Cove CMI Plan.



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Section 6.

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