CORRECTIVE MEASURES IMPLEMENTATION PLAN

Southern Cove
Orrington Remediation Site
Orrington, Maine

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Table of Contents

List of Tables

List of Figures

List of Exhibits

List of Appendices

Acronyms

ADCP	Acoustic Doppler Current Profiler
BMP	best management practices
CMI Plan	*Corrective Measures Implementation Plan*
CMS	Corrective Measures Study
CQA	Construction Quality Control
CU	Certification Unit
CWA	Clean Water Act
Delineation Technical Memorandum	*Proposed Delineation of Sediment Removal Areas for Basis of Remedial Design*
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ft/s	foot per second
GWTP	ground water treatment plant
Maine BEP	State of Maine Board of Environmental Protection
Mallinckrodt	Mallinckrodt US LLC
Maine DEP	Maine Department of Environmental Protection
MEPDES	Maine Pollutant Discharge Elimination System
mg/kg	milligrams per kilogram
MPS	Media Protection Standard
NTU	nephelometric turbidity units
Order	Maine BEP Order dated August 19, 2010, and effective April 3, 2014, which incorporates, with modifications, the Compliance Order issued by Maine DEP dated November 24, 2008
PERC	Penobscot Energy Recovery Company
RCRA	Resource Conservation and Recovery Act
RTK GPS	real-time kinematic global positioning system
SI Report	*Site Investigation Report*
SMA	Sediment Management Area
SPCC	Spill, Prevention, Control, and Countermeasure
TCLP	Toxicity Characteristic Leaching Procedure
TESC	temporary erosion and sediment control
TSSA	Temporary Soil Stockpile Area
USACE	U.S. Army Corps of Engineers
WQFMP	*Water Quality and Fish Monitoring Plan*

Section 1. Introduction

1.1 Purpose

This Southern Cove *Corrective Measures Implementation Plan* (CMI Plan) was prepared by Anchor QEA, LLC, and CDM Smith, Inc., on behalf of Mallinckrodt US LLC (Mallinckrodt). The purpose of this CMI Plan is to present the corrective measures necessary to remediate sediment within the Southern Cove of the Penobscot River adjacent to the Orrington Remediation Site located at 99 Industrial Way, Orrington, Maine, shown on **Figure 1-1**. The CMI Plan presents the objectives of the corrective measures, results of the pre-design activities, Design Drawings, and Technical Specifications to implement the remedial action.

Plans and engineering designs for the Southern Cove remediation were developed in accordance with the State of Maine Board of Environmental Protection (Maine BEP) Order dated August 19, 2010, and effective April 3, 2014, which incorporates, with modifications, the Compliance Order issued by the Maine Department of Environmental Protection (Maine DEP) dated November 24, 2008 (collectively referred hereafter as the "Order"). The Order requires corrective measures to achieve Media Protection Standards (MPSs) for mercury in sediment.

1.2 Site Description

The Southern Cove is located in the Penobscot River bordering the Orrington Remediation Site, as shown on **Figure 1-1**. A full description of the site, which included a former manufacturing plant and five landfills, is included in the *Site Investigation Report* (SI Report; CDM 1998) and the *Corrective Measures Study* (CMS; CDM 2003). The Southern Cove lies to the south of the historical manufacturing plant area, on the eastern side of the main channel of the Penobscot River. The Penobscot River is subject to tidal fluctuations up to 16 feet, and a portion of the cove is tidal mudflats exposed under low tide conditions.

Two outfalls and two drainages that currently discharge to the Southern Cove are shown on **Figure 1-2.** One of the two outfalls is the permitted effluent pipe from the on-site groundwater treatment plant (GWTP), which runs beneath the beach at the northern side of the cove and discharges into the river. The other outfall is the cooling water discharge pipe from the Penobscot Energy Recovery Company (PERC) facility; the pipe is buried beneath the beach and runs offshore near the central portion of the Southern Cove. The two drainages that flow into the cove are the Northern Drainage Ditch and the Southerly Stream.

1.3 Report Organization

The report is organized as follows:

- Section 1: Introduction
- Section 2: Summary of the Southern Cove Pre-design Activities
- Section 3: Design Objectives
- Section 4: Southern Cove Corrective Measures Implementation Activities
- Section 5: Permitting
- Section 6: Schedule
- Section 7: References

The following technical appendices (A through G) are also included and referenced in these sections:

- Appendix A: Pre-design Activities Report
  - Attachment A.1: Bathymetric Report
  - Attachment A.2: Acoustic Doppler Current Profiler Report
  - Attachment A.3: Boring Logs
  - Attachment A.4: Geotechnical Data
  - Attachment A.5: Treatability Report
  - Attachment A.6: Mercury Data Report
  - Attachment A.7: Data Usability Assessment
- Appendix B: Turbidity Control Evaluation Report
- Appendix C: Delineation of Sediment Removal Areas for Basis of Remedial Design Technical Memorandum
- Appendix D: Water Quality and Fish Monitoring Plan
- Appendix E: Drawings
- Appendix F: Technical Specifications
- Appendix G: Construction Quality Assurance Plan
- Appendix H: Confirmation Sampling Protocol

Section 2. Summary of Southern Cove Pre-design Activities

2.1 Background

During the SI and CMS investigation phases, a total of 250 sediment samples were collected from the Southern Cove and analyzed for mercury, with some samples also analyzed for additional physical parameters. The majority of these samples were collected and reported as part of the SI Report and CMS, which were reviewed by Maine DEP and the Maine BEP and formed the basis of their final decisions on the remedial actions required for the Southern Cove in the Order.

Additional data were collected from the Southern Cove during the pre-design field activities conducted in 2015 and 2016. A full report of the pre-design methods and results is included in **Appendix A**. Results are also briefly summarized in the following subsections.

2.2 Pre-design Activities Overview

Initial pre-design field work was completed in the late spring and fall 2015, and served as the basis of delineation of sediment removal areas described in the March 25, 2016 technical memorandum included in **Appendix C, Attachment C.2**. Based on comments from Maine DEP, additional pre-design sediment samples were collected in May and June 2016, and the delineation was updated as described in **Appendix C, Attachment C.1**.

Pre-design field work was completed in accordance with the Maine DEP-approved *Southern Cove Pre-design Work Plan* (Anchor QEA and CDM Smith 2015). Subsequent work plan modifications were requested during the field activities and approved by Maine DEP, including e-mails from Maine DEP dated May 21, 2015, regarding drilling equipment and oceanographic survey time intervals, and June 12, 2015, regarding sampling sediment for chloropicrin. A work plan addendum was approved by e-mail from Maine DEP on September 4, 2015.

Based on initial feedback from Maine DEP, a memorandum was submitted to Maine DEP on April 27, 2016, describing a plan for additional sampling completed in May 2016. Following review of May 2016 sample data, an e-mail was submitted to Maine DEP describing additional sampling needed to complete delineation. The final sampling was completed in June 2016.

Field work was completed in accordance with the *Quality Assurance Project Plan* (CDM Smith 2014a), the *Project Health and Safety Plan* (CDM Smith 2014b), and the Southern Cove *Health and Safety Plan* (Anchor QEA 2014) prepared specifically for remedial data collection activities in the Southern Cove.

Field data collection and laboratory analyses conducted as part of the pre-design field activities included:

- Bathymetric survey
- Hydrodynamic study (including Acoustic Doppler Current Profiler [ADCP] survey and tide gaging)
- Geotechnical investigations
- Disposal characterization

- Treatability testing
- Sediment chemical characterization
- Intertidal vegetation survey

A report of pre-design work is included in **Appendix A** and summaries are provided in subsequent sections.

2.3 Bathymetric Survey

A bathymetric survey of the Southern Cove was conducted in 2015 and is depicted in the *Pre-design Activities Report* (**Figure 2-1** in **Appendix A**).

2.4 Hydrodynamic Study

A hydrodynamic study was conducted to evaluate the range of expected tidal fluctuation and current velocities, and to provide data for hydrodynamic analyses to support the design of turbidity control measures. A temporary tidal gage was installed in the Southern Cove to measure water levels over tidal cycles between June 15 and 20, 2015. Tidal fluctuations were approximately 15 feet.

Water flow velocities across the Penobscot River channel adjacent to the Southern Cove were measured during an ADCP survey in June 2015. Flow velocities measured at the surface and the average of velocities measured at 0.25-foot depth intervals through the water column were evaluated. Velocity data were collected hourly over the study period. **Table 2-1** lists the maximum surface and depth-averaged velocities for the upstream, middle, and downstream locations during the flood and ebb tides measured in the vicinity of the Southern Cove sediment removal areas.

Table 2-1: Flow Velocity Summary – Maximums Measured Near the Southern Cove Over a 12-hour Tidal Cycle on August 3, 2016

ADCP Transect	Flood Tide		Ebb Tide	
	Surface Velocity (ft/s)	Depth-averaged Velocity (ft/s)	Surface Velocity (ft/s)	Depth-averaged Velocity (ft/s)
Upstream Transect	3.5	2.6	3.2	2.7
Middle Transect	2.9	2.3	3.5	2.8
Downstream Transect	2.8	2.1	3.2	3.1

Note:
ft/s = feet per second

Based on review of collected field data and published tidal and current data, a hydrodynamic evaluation, including modeling of flood and ebb conditions and flow rates, was completed and results are included in **Appendix B**. The results were used to evaluate loadings from flows in the river on potential silt curtain designs/orientations. Based on this analysis, a mobile turbidity curtain system is being recommended rather than larger, stationery silt curtains, which may not be stable in high flow conditions.

2.5 Geotechnical Investigation

Geotechnical data were collected to support engineering design with the following objectives. Sample locations are shown on **Figure 1-2**.

- Collect standard penetration test data to evaluate the depth to competent strata and to determine the type and design of footings if required for a silt curtain
  - Sample data were collected outside the sediment removal areas, near or at the break between the Southern Cove and the edge of the Penobscot River Channel at SD-SC-01, -02, and -03
- Collect standard penetration test and grain size data to support design of an equipment access road across the intertidal area of the Southern Cove, if needed
  - Sample data were collected within the intertidal area at locations SD-SC-04, -05, and -06
- Characterize physical properties of sediment to be removed and stratigraphy to support engineering for the sediment removal design
  - Data were collected from all locations sampled during the pre-design investigation

Subsurface sampling conditions were difficult, with frequent refusals encountered. Both vibracore (4-inch diameter) and split-spoon (2- or 3-inch diameter) sampling techniques were employed, and both sampling techniques met with refusal between 1 and 2 feet at many of the sampling locations. Details on the techniques used at specific sampling locations are available in the boring logs included in the *Pre-design Activities Report* in **Appendix A**.

Overall, based on field observations and geotechnical analyses, material within the sediment removal areas is generally characterized as well graded, ranging from cobbles to clay, with medium to coarse sand as the dominant grain sizes. Sediment is finest in the southern sections of the cove where a discontinuous soft silt layer occurs within the top 1 to 2 feet below the mudline. This surface silt layer is generally absent toward the north (SD-SC-07) and toward the Penobscot River Channel (SD-SC-01 and -02).

Generally, deposits coarsen with depth. The extent of cobbles and coarse gravel in the material throughout the cove is unclear because both vibracore and split-spoon subsurface sampling equipment encountered refusal at several locations, which was most likely on cobbles, although samples could not be collected. Thus, the geotechnical sample results may not reflect some of the coarser material (coarse gravel and cobbles) in some areas. The sonic drilling technique was successfully used to collect cores from the Southern Cove in June 2016. This technique breaks up large-sized material, so the presence of cobbles could not be confirmed.

Although refusal was met at several locations, bedrock was not confirmed in any of the explorations in the Southern Cove, nor is it expected to be present in the removal areas. Bedrock maps developed for the upland portion of the site during the SI (CDM 2003) indicate a phyllite bedrock with elevation varying steeply. The bedrock surface appears to outcrop where the Southerly Stream discharges to the Southern Cove, but maps indicate it may be 90 feet below ground surface along the beach at the northern end of the Southern Cove.

2.6 Disposal Characterization

Sediment from within the horizontal and vertical extents of the sediment removal areas was sampled for disposal characterization. Methods and results are detailed in the *Pre-design Activities Report* in **Appendix A**, and an overview of the studies is provided in Section 2.8.

Mercury in the Southern Cove is assumed to be primarily from historical wastewater discharges from the plant. Based on chemical data, the sediment is not a characteristic waste as defined by the U.S. Environmental Protection Agency (EPA) Resource Conservation and Recovery Act (RCRA) Toxicity Characteristic Leaching Procedure (TCLP) methods. Disposal characterization consisted of analyses for a suite of chemical and physical characteristics typically required by waste disposal facilities. Four composite samples (SD-SC-07 through -10) were collected from within the extent of each sediment

removal area to characterize material for handling and disposal requirements. Sampling locations are shown on **Figure 1-2**. Samples were analyzed using EPA TCLP methods for volatile organic compounds, semivolatile organic compounds, metals, pesticides, and select herbicides (i.e., 2,4,5-TP and 2,4-D). Samples were also analyzed for a suite of additional chemical and physical characteristics that could be required by disposal facilities. The results were either non-detect or below the disposal facility requirements; thus, the material is not characteristically hazardous in accordance with RCRA requirements and can be characterized as solid, non-hazardous waste.

2.7 Treatability Testing

Sediment samples collected for disposal characterization were also subject to treatability testing to determine feasible post-removal dewatering methods for the project. Details of the study are included in Attachment A.5 to the *Pre-design Activities Report* in **Appendix A**.

The treatability testing evaluated the rate that sediments would dewater, the need for adding amendments to achieve low moisture requirements (i.e., the ability to pass the "paint filter" test), and the chemical composition of the dewatering elutriate in comparison to the on-site GWTP requirements. In general, the material drained well, and the addition of several types of amendments was successful in achieving the low moisture requirements for transport and disposal. Dewatering elutriate generally met requirements to be accepted by the on-site GWTP, although some filtering may be necessary to reduce the level of total suspended solids prior to delivery to the on-site GWTP.

2.8 Sediment Chemical Characterization

In addition to sediment samples collected for treatability testing and disposal characterization, samples were collected during pre-design activities to complete delineation of mercury in sediments, and to support delineation of removal areas that will meet MPS requirements outlined in the Order. A full description of samples collected, objectives, and results are presented in the *Pre-design Activities Report* (**Appendix A**) and *Proposed Delineation of Sediment Removal Areas for Basis of Remedial Design* (Delineation Technical Memorandum; **Appendix C**). Results are also discussed in Section 4.

A history of the development of the contaminated sediment delineation for the Southern Cove is as follows:

- October 29, 2015: Submitted to Maine DEP the draft *Southern Cove, Orrington Remediation Site Proposed Delineation of Sediment Removal Areas for Basis of Remedial Design* (Delineation Technical Memorandum) describing the delineation for the basis of remedial design for the Southern Cove.
- February 18, 2016: Presented an overview of the draft Delineation Technical Memorandum to Maine DEP.
- February 26, 2016: Received Maine DEP comments on the draft Delineation Technical Memorandum.
- March 15, 2016: Presented to Maine DEP during a webinar responses to Maine DEP comments.
- March 25, 2016: Submitted the revised Delineation Technical Memorandum (**Appendix C, Attachment C.2**), along with specific responses to Maine DEP's comments, including the agreement to collect additional samples.
- April 27, 2016: Submitted a memorandum to Maine DEP describing the May 2016 field sampling plan.

- May 27, 2016: Submitted an e-mail to Maine DEP describing additional sampling in June 2016 to complete delineation.
- June 2016: Collected and analyzed additional sediment samples.
- July 2016: Collected additional sediment samples based on analytical results from samples collected in June.
- July 15, 2016: Submitted to Maine DEP the *Addendum to the Delineation of Removal Areas for Basis of Remedial Design – Updated Based on 2016 Field Data* (**Appendix C, Attachment C.1**).

The sediment removal areas are illustrated on **Figure 2-1**.

2.9 Intertidal Vegetation Survey

The extent of wetland communities within the project area were delineated during a field survey in May 2015. At the time of the survey, the plants within the wetland had not reached full growth for the season but had grown enough for the extent and species present to be identified.

Three separate wetland communities were identified covering 2.1 acres, as shown on **Figure 2-2**. The three communities were composed of the following:

- A high marsh community of beaked spikerush growing near the shoreline on a thick base of peat (0.15 acre)
- Multiple, sparse beds of common three-square growing in soft, unconsolidated mud (1.9 acres)
- A small bed of densely growing hardstem bulrush embedded within the sparse common three-square, which appeared to be growing partly on a small chunk of peat mat, as well as soft mud (0.03 acre)

Only one of the species identified is listed as a Maine rare, threatened, or endangered plant. Beaked spikerush is identified as threatened in Maine, as of September 2015, and was identified in the high marsh community at the Orrington Remediation Site (Maine Natural Areas Program 2015).

Section 3. Design Objectives

3.1 Corrective Measures Implementation Plan Objectives

The primary objectives of the remedy for the Southern Cove are to remove sediments that are above the MPS as required in the Order, and to restore the sediment surface (i.e., mudline) elevations and vegetation to pre-remediation conditions.

3.2 Media Protection Standards

The MPSs identified in the Order require that sediment be removed where mercury levels exceed 2.2 milligrams per kilogram (mg/kg), averaged over a 0.25-acre area. Irrespective of concentrations, sediment within the two hot spot areas identified for three separate depth intervals must also be removed. The hot spots are defined in the Order by both the map and a list of sample locations included as a "narrative MPS" that must be encompassed in the sediment removal areas.

3.3 Compliance with the Order Media Protection Standards

The Order-defined sediment removal areas and the final sediment removal areas are depicted on **Figure 2-1** and **Drawing C-4**. The sediment removal areas include the areas and depths required by the Order, with one exception where removal was assumed to be required but where data had not previously been collected. The basis of the sediment removal areas and compliance with the MPS is described in detail in the Delineation Technical Memorandum (March 25, 2016) and Addendum (July 15, 2016); these are included in **Appendix C, Attachments C.2 and C.1**, respectively.

Based on recent sampling and review of historical data, three sediment removal areas/prisms have been identified to meet the requirements in the Order. These areas have been designated as Sediment Management Area (SMA)-1 (nearshore), SMA-2 (northern), and SMA-3 (southern). The horizontal and vertical extents of the removal prisms are shown on **Figure 2-1**, along with the removal areas and depth intervals required by the MPS in the Order. One section of the removal area identified in the Order was excluded from the sediment removal areas based on data collected since the Order was issued. The Order included a vegetated wetland hummock east of SMA-3 (Southern Sediment Removal Area) where no sample data were available from the SI and CMS. Samples collected as part of the pre-design investigation from SD-SC-22 (0 to 0.2 and 0.8 to 1 foot) showed mercury levels below 2.2 mg/kg at this location; therefore, it was excluded from the sediment removal areas.

The rationale for delineation of the horizontal and vertical extents of the three sediment removal areas is explained in Sections 3.4, 3.5, and 3.6; more detail is provided in **Appendix C**.

3.4 Nearshore Sediment Removal Area (SMA-1)

The horizontal extent of SMA-1 was established based on mercury concentrations greater than 2.2 mg/kg and applying the narrative MPS of an average mercury concentration of less than 2.2 mg/kg over a 0.25-acre area to sample locations outside removal area, as shown in **Appendix C, Figures 2 and 3**. The average concentration was calculated based on samples from similar depth intervals. The depth of this removal area is 0.8 foot (**Figure 2-1**) based on concentrations meeting the MPS in samples from the 0.8- to 1-foot depth interval.

3.5 Northern Sediment Removal Area (SMA-2)

The horizontal extent of SMA-2 is defined by all data points that exceed 2.2 mg/kg in this vicinity. This removal area has been divided into three subsections based on differences in the depth of mercury contamination, as discussed in the following sections and shown on **Figure 2-1**.

3.5.1 Northern Sediment Removal Area (SMA-2) – Northern Portion

The highest and deepest mercury concentrations are found in the northern portion of SMA-2, which is close to the Maine Pollutant Discharge Elimination System (MEPDES) discharge point. The elevated concentrations of mercury are localized and decrease rapidly in the horizontal direction out from RSC-024, the location with the highest concentration, especially to the west with increasing water depth toward the main river channel.

Sample collection at depth was difficult in the Southern Cove, especially in the northern section of SMA-2. The Draft CMI Plan indicated the sediment removal depth in this area would be at least 3 feet, with the final sediment removal depth to be determined in the field during construction. However, the sonic drilling technique used by Mallinckrodt for the subsequent June 2016 field investigation was able to collect deeper sediment samples and complete the vertical delineation. Sediment samples were collected from three locations at the 2.5- to 3-foot depth interval within the northern section of SMA-2 (**Appendix C.1, Figure 6**). Two of these locations (SD-SC-47 and SD-SC-49) were immediately adjacent to SD-SC-07, where 13 mg/kg mercury was detected in 2015 at this depth. Detected concentrations at SD-SC-47 and SD-SC-49 were 0.28 mg/kg and 0.27 mg/kg mercury, respectively. SD-SC-48, located to the south of SD-SC-07, had mercury at 1.87 mg/kg. In summary, all three additional samples showed mercury concentrations below the MPS within the 2.5- to 3-foot depth interval, and the earlier reported exceedance at SD-SC-07 appears to be very isolated. Therefore, the removal depth for this area is fixed at 3 feet below the design mudline established by the 2015 bathymetric survey (**Figure 2-1**).

3.5.2 Northern Sediment Removal Area (SMA-2) – Southern Portion

Mercury concentrations in the southern portion of SMA-2 are lower than to the north, but still exceed the MPS in the top 2 feet. The deeper sample (SD-SC-08) indicates a much lower mercury concentration of 0.06 mg/kg at 3 feet depth (**Appendix C.1, Figures 2 through 6**). Therefore, the removal depth in this area is conservatively fixed as 3 feet below the design mudline.

3.5.3 Northern Sediment Removal Area (SMA-2) – Western Edge

Mercury concentrations exceed the MPS to a maximum depth of 1 foot below the design mudline along the western edge of SMA-2, where water depths increase. Thus, the removal depth of the western edge of SMA-2 is set at 1 foot to meet the MPS.

3.6 Southern Sediment Removal Area (SMA-3)

The horizontal extent of SMA-3 includes all sample locations in the area exceeding 2.2 mg/kg in any sampled depth intervals, as depicted on **Appendix C.1, Figure 7**. One exception outside the removal area is a concentration of 2.6 mg/kg mercury detected at SD-10-C1 from 0 to 0.2 foot. However, with consideration of samples from the same depth interval within a 0.25-acre area that includes SD-10-C1, the average mercury concentration of the 0.25-acre area is 2.1 mg/kg, which is less than the MPS (**Appendix C.1, Figure 2**). Therefore, this sample location is not included in SMA-3.

The additional data generated from the May and June 2016 sampling resulted in expansion of SMA-3 to meet SMA-2, as shown on **Figure 2-1**. During the May sampling event, the highest concentration of mercury in this area was 110 mg/kg at two adjacent sample locations at the 1- to 1.5-foot depth interval (**Appendix C.1, Figure 4**), with mercury concentrations up to 44 mg/kg in the shallower 0.8- to 1-foot

depth interval (**Appendix C.1, Figure 3**). Additional sampling performed in June 2016 to delineate these elevated areas showed concentrations less than 1 mg/kg at the 1.5- to 2-foot interval at all sample locations (**Appendix C.1, Figure 5**), bounding the delineation vertically at 1.5 feet and establishing 1.5 feet as the removal depth.

Based on this additional sampling data, the final delineation and sediment removal areas are depicted on **Figure 2-1**.

Section 4. Southern Cove Corrective Measures Implementation Activities

The Southern Cove remedial action will involve removal of sediment to comply with the MPS, as described in previous sections, and restoration of the removal areas to pre-construction elevation. Details of the corrective action implementation are provided in the Design Drawings in **Appendix E**, and the Technical Specifications are in **Appendix F.**

The Southern Cove corrective measures are part of the overall work at the Orrington Remediation Site. As such, the project will utilize existing facilities and infrastructure previously set up for the upland work at the site. The following description provides an overview of the Remediation Contractor's proposed means and methods to achieve the cleanup goals at the Southern Cove. Because of the site challenges, the Remediation Contractor may be required to modify its methods to adapt to changing hydrodynamic, tidal, and climatic conditions at the site.

4.1 Overview of the Remedial Action

4.1.1 Site Preparation

Prior to beginning sediment removal activities, support areas for staff and equipment, access to sediment removal areas, and sediment management and stockpiling will be established. Temporary erosion and sediment control (TESC) measures will also be established. These requirements are described in the following subsections.

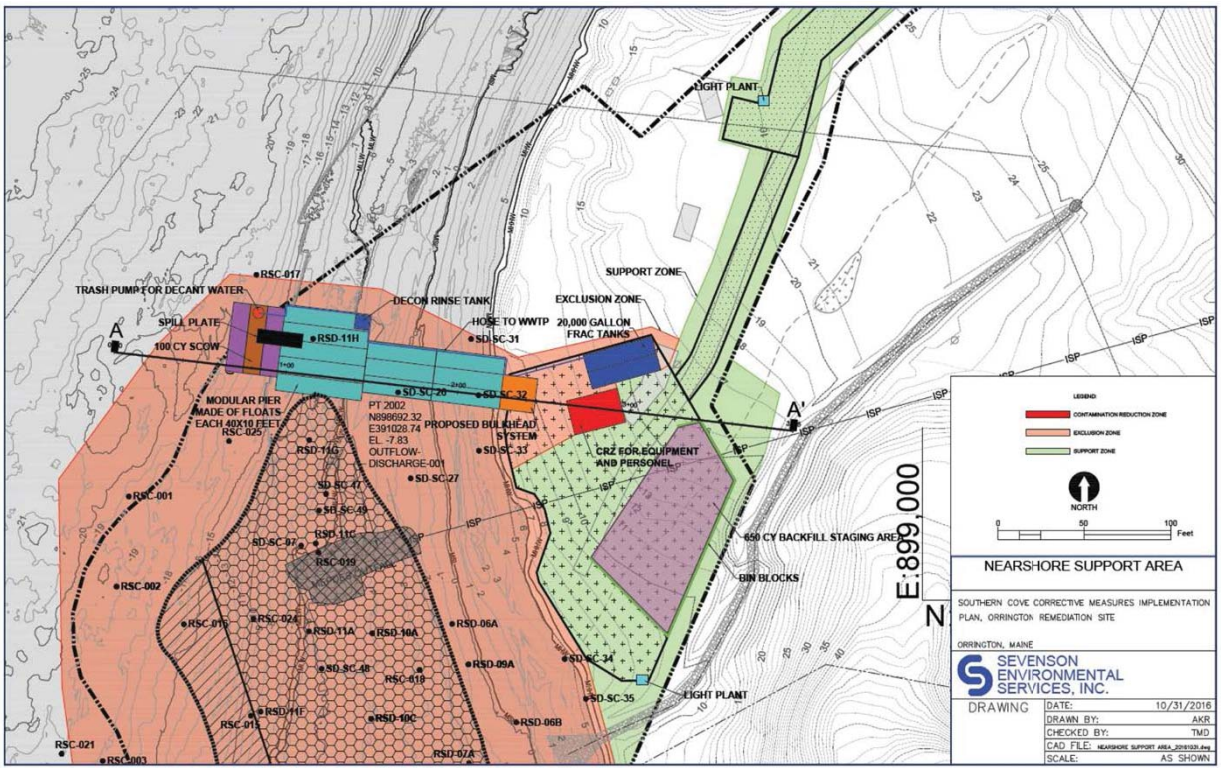
Trailers for Mallinckrodt, the Remediation Project Manager, Maine DEP, an on-site laboratory, and restroom facilities were established at the Site during previous work phases.

A small staging area (labeled as Nearshore Support Area on **Drawing G-4**) has been established as part of the Northern Drainage Ditch corrective actions. The Remediation Contractor will use this area to offload dredged/excavated sediments for transport to the Temporary Soil Stockpile Area (TSSA)-2 and to load clean materials for backfilling.

4.1.2 Sediment Offloading Area

A temporary offloading area will be established to support transfer of sediment to trucks for transport to the TSSA-2. The location of the offloading area is shown in **Exhibit 4-1**.

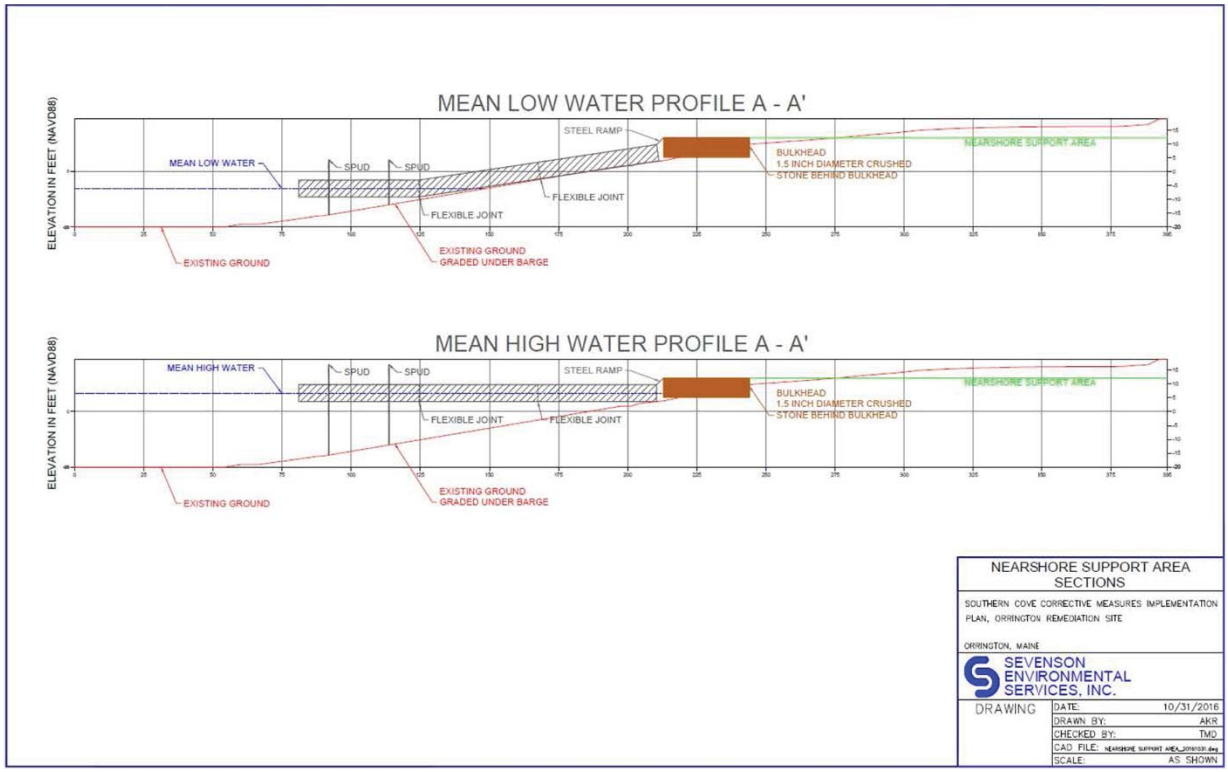
Exhibit 4-1: Sediment Offloading Area Detail



Due to the extreme fluctuation of tides, the Remediation Contractor will need a system of barges and a small bulkhead to efficiently work around the tides at the offloading area. The floating pier will be made from approximately 11 modular floats that will each measure 10 by 40 by 5 feet. The total surface area of the pier system will be 4,400 square feet. During low tide, approximately 60 to 65% of the barge surface area will be in contact with the mudline. The barge system will be held in place using two to three spuds. The spuds will have "pockets" attached to the exterior of the pier system. The spuds will allow the pier to raise and lower with the tides. Each spud will be approximately 12 inches in diameter. To gain access to the shoreline from the pier, engineered ramps will span 20 to 30 feet from a bulkhead made of concrete bin blocks or steel sheeting on the shoreline. A schematic of the design for low- and high-tide conditions in shown in **Exhibit 4-2**.

Placement and removal of the floating pier and construction mats in intertidal areas for excavation will be conducted in a manner to avoid and minimize disturbance of contaminated areas, as practical. To minimize sediment disturbance in all cases, marine equipment will not be pushed or pulled when in contact with the sediment bottom.

Exhibit 4-2: Bulkhead System Details



The bulkhead system will extend approximately 15 feet past the mean high water mark into the river. The bulkhead will be backfilled with crushed stone and structural fill similar to the materials used for the access road to SMA-1. Approximately 50 tons of materials will be placed behind the bulkhead, below the mean high water mark. Another 50 tons will be placed above the mean high water mark to complete the bulkhead ramp system.

The following photograph shows a similar setup, including a bulkhead, ramp, and pier system at another site.

4.1.3 Sediment Processing and Stockpiling Areas

Sediment will be stockpiled and dewatered at the TSSA-2, which has been previously established and is operated for the entire site (both soil and sediment; see location on **Drawing G-4**). Dredged and excavated sediment will be transported from the Nearshore Support Area to the TSSA-2 in sealed containers or trucks. Prior to transferring the sediment onshore, the Remediation Contractor will remove any accumulated overlying water (Section 4.1.8.1). Sediment will be further dewatered by mixing additives (e.g., cement or other dry site soils approved for re-use) directly into the sediment on a processing pad, as shown on **Drawing G-3**. Stockpiles of dewatered sediment will be managed in accordance with **Drawing C-3** and the Technical Specifications (**Appendix F**, Section 01 57 19).

Clean stockpile areas for imported backfill have been previously established and will be managed to minimize dust.

4.1.4 Access Roads

The access road between the Nearshore Support Area and the existing Remediation Support Area (**Drawing G-4**) will be established as part of the Northern Drainage Ditch CMI Plan. Material transferred along this access road will be contained within sealed containers or trucks; therefore, housekeeping of the road is expected to be minimal. This road will remain in place after construction is complete.

To access the nearshore Sediment Removal Area (SMA-1), the Remediation Contractor will need to establish a temporary access roadway along the shoreline. The roadway will be constructed of stone, as shown on **Drawing C-9**. Prior to stone placement for the roadway, a 10-ounce fabric will be laid down to separate the existing marsh materials from the crushed stone materials. The roadway will be approximately 720 feet long and 15 feet wide and follow the alignment shown on **Drawing C-1**.

If contaminated materials are transferred along this access road, they will be contained within sealed and covered containers; however, the road will be inspected regularly and any material that is dropped on the road will be removed and transferred to TSSA-2. Road materials, including gravel placed in intertidal areas, will be removed, and the area will be restored after construction is complete. The Environmental Protection Plan provides procedures to limit the possibility of spills and outlines responses to any accidental releases.

4.1.5 Temporary Erosion and Sediment Control

It is not expected that activities immediately adjacent to the Southern Cove will significantly disturb upland soils and require TESCs per Maine DEP Stormwater Construction General Permit conditions. However, as shown on **Drawing C-1**, silt fences will be installed between the Nearshore Staging Area and the river as a precaution to contain any accidental spills during sediment transfer. Existing TESCs, around the Remediation Support Area, will be maintained and supplemented, as necessary, in accordance with the Technical Specifications (**Appendix F**, Section 01 57 19).

4.1.6 Excavation

Certification Units (CUs) will be established to confirm sediment removal and backfill depths and facilitate MPS compliance sampling. For consistency, the CUs for both sediment excavation in the dry and dredging will be the approximate size of the interior dimensions of the moon pool used for dredging.

The Remediation Contractor will remove the sediment within SMA-1, and accessible portions of SMA-2 and SMA-3, using excavation equipment during low tide. Excavations will likely occur over several tidal cycles.

To minimize the potential for recontamination between tidal cycles, all excavated areas will be immediately backfilled after verification that the design removal targets, in terms of depth and extent, have been achieved and approved by the Construction Quality Assurance (CQA) Engineer. Verification

will be based on traditional survey methods to verify that the required removal depth has been achieved throughout the excavation. The Technical Specifications (**Appendix F**, Sections 02 21 00 and 35 20 23) include minimum requirements for survey accuracy and performance.

Figure 4-1 shows the anticipated access for the dredging adjacent to the two outfalls. Dredging at the two outfalls will be performed in the dry using conventional equipment and construction mats to access the areas. The schedule for excavation near the PERC outfall will be coordinated with the PERC so that the discharge is not operating when nearby excavation is occurring. During routine operations at PERC, only air is discharged through the pipe for the purpose of keeping the outfall clear. Effluent is only discharged when the PERC boilers are shut down. Any unforeseen damage to the outfalls due to CMI Plan activities will be fixed immediately before they are brought back into operational mode.

The schedule for excavation near the GWTP outfall will be coordinated with Woodard & Curran (the operator of the GWTP) so that there is no discharge while the Remediation Contractor is actively digging around the outfall. The GWTP operates in batch mode and does not discharge continually. Because of the short, tidally determined work window to complete the work, no interruption to groundwater treatment is anticipated. The facility also has the ability to store a minimum of 40,000 gallons of influent.

4.1.7 Dredging

For dredging, CUs are generally defined as the interior footprint of the moon pool barge. The Construction Work Plan includes more details on the moon pool dimensions. The Remediation Contractor anticipates completing two moon pools per day/tidal cycle. Generally, the sequence of dredging operations will be as follows:

1. Move the barge and moon pool turbidity curtain into position.
2. Perform a survey of the work area using a DIDSON or similar camera to identify fish.
3. As necessary, coax the fish out of the moon pool area.
4. Perform dredging.
5. Perform a post-dredge survey to confirm achievement of the design dredge depth.
6. Decontaminate the bucket.
7. Collect a confirmation sample in accordance with the Confirmation Sampling Protocol included in Appendix H.
8. Place the initial backfill layer.
9. Confirm the thickness of the initial backfill layer.
10. Reposition barge to the next CU.

Figure 4-1 shows the general configuration of the CUs. Each CU is approximately the size of the interior the moon pool (44 feet by 31 feet) with a 3-foot buffer around all four sides for overlap and positioning the barge.

Sediment removal within the SMA-2 and SMA-3 will occur predominantly using traditional mechanical dredging equipment. The required removal areas and depths are shown on **Drawing C-4** and the sequence of work will generally occur from upstream to downstream. The Technical Specifications (**Appendix F**, Sections 02 21 00 and 35 20 23) include detailed requirements for positioning control so the Remediation Contractor removes the sediment with the most practicably achievable precision. The Technical Specifications also include best management practices (BMPs) that must be followed to

minimize the potential to generate excessive turbidity during dredging and recontamination of previously dredged areas.

Dredging will occur within a mobile turbidity curtain system as shown on **Drawing C-2**. Each position of the system will define a dredging CU. Prior to moving the system to the next CU, the Remediation Contractor will survey the dredged area in accordance with the Technical Specifications (**Appendix F**, Section 35 20 23) and the CQA Engineer will verify the required removal depth has been achieved. Once approved, a confirmation sample will then be collected from the CU in accordance with the Confirmation Sampling Protocol included in Appendix H. Immediately following confirmation sample collection, the Remediation Contractor will place an initial backfill layer and then move on to the next CU. The intent of the initial backfill layer is to stabilize any thin veneer of disturbed sediment remaining on the post-dredge surface to minimize the potential for subsequent water quality impacts. The Remediation Contractor will place the dredged sediment either into a storage barge (scow) or transport containers located on a flat-deck barge.

The eastern portion of the SMA-2 contains two industrial outfalls that require special consideration during dredging and excavation. The areas immediately adjacent to the industrial outfalls will be dredged using careful procedures and, potentially, special dredging equipment to prevent damage to the outfall. These areas will be dredged in small-area intervals and immediately backfilled with clean backfill to prevent undermining of the outfalls. Dredging around these outfalls is discussed further in the Construction Work Plan.

4.1.8 Sediment Dewatering

Sediment dewatering will occur during dredging operations and at TSSA-2. Water management is designed to minimize environmental impacts and meet water quality criteria.

4.1.8.1 Decant Water at the Dredge Area

During dredging of each CU, a small, 2- to 3-inch submersible pump will be lowered into the barge and water overlying the dredged material will be pumped through a 5-micron bag filter on the deck of the dredge. The discharge from the bag filter will be directed to the interior of the moon pool. The Remediation Contractor will routinely inspect the filter system to ensure it is operating properly.

4.1.8.2 Decant Water at the Unloading Pier

Once the barge docks at the unloading pier, a second surface water decanting operation may occur, if necessary, prior to material offloading. This water will be pumped to an 18,000-gallon frac tank located on the shoreline. As needed, the frac tank will be emptied into a truck and hauled to the GWTP on site. Water from the GWTP will be treated and discharged in accordance with the current MEPDES permit (#ME0000639).

4.1.8.3 Dewatering at TSSA-2

Prior to final off-site transport to the disposal facility, the dredged material will require dewatering and verification using the paint filter test. These activities will occur at TSSA-2. Based on the results of the Treatability Study (*Pre-design Activities Report* in **Appendix A, Attachment A.5**), sediment dewatering will include gravity draining and a stabilization process that generates limited excess water. Any dewatering effluent generated during dewatering activities will be transferred to the on-site GWTP for processing prior to discharge in accordance with the MEPDES permit (#ME0000639) limits. As a contingency, existing storage tanks may be used to temporarily store dewatering effluent so GWTP capacity is not exceeded. Dewatering effluent will be tested to determine if it meets influent criteria of

the on-site GWTP. All dewatered sediment will be transported off site for disposal at an approved off-site disposal facility.

4.1.9 Restoration

Each area excavated or dredged will be backfilled to pre-construction grades. The backfill material will consist of imported clean gravely sand, similar in size distribution to materials currently found within the Southern Cove.

Where sediment is removed in the dry, the initial backfill will be placed after removing sediment to the design depth during the same tidal cycle in which dredging occurs. Where sediment is removed by dredging in water, the initial backfill lift (approximately 6 inches thick) will be placed prior to repositioning the mobile turbidity curtain system at an adjacent CU. After all CUs are dredged, the remaining backfill material will be placed to return the areas to pre-construction grades. Only the initial backfill lift will be placed within the moon pool; final backfill and habitat-amended backfill (see Section 4.1.10) placement will be completed without the use of turbidity curtains. The placement of the final layer of backfill will generally occur from upstream to downstream locations. Post-construction surveys will be used to confirm that the areas have been returned to pre-construction grades within acceptable tolerances.

4.1.10 Planting and Seeding

The preliminary limits of areas anticipated to be disturbed by construction and requiring revegetation are shown on **Drawing C-10**, and final limits will be finalized based on observations made during dredging activities. In spring 2018, once ice is thawed and temperatures support plant establishment and seed germination, these areas will receive a 6-inch layer of habitat-amended backfill followed by planting and seeding. The requirements for planting, seeding, and restoration of the intertidal vegetated areas are described in Technical Specification 32 91 00 in **Appendix F**.

An Overwinter Erosion and Sedimentation Control Plan (January 2017) for the upland portion of the Orrington Remediation Site was submitted to Maine DEP. If additional activities required for the Southern Cove remediation are not addressed in the existing plan, an amendment to this plan will be submitted to Maine DEP.

4.2 Best Management Practices

Dredging will occur within a mobile turbidity curtain system as shown in **Appendix E** (**Drawing C-2**). The *Turbidity Control Evaluation Report* (**Appendix B**) describes the site conditions and engineering evaluations that were used to select a mobile system in lieu of a stationary turbidity barrier enclosing the entire Southern Cove work areas.

The following BMPs and conservation measures will be implemented to minimize environmental impacts of the project.

4.2.1 General BMPs

- All permit conditions to be issued by the regulatory agencies, as well as the substantive requirements of state and local laws, will be followed.
- A project Spill, Prevention, Control, and Countermeasure (SPCC) Plan, including stormwater controls, will be followed to safeguard against an unintentional release of fuel, maintenance materials, contaminated sediment, or dewatering elutriate.
- Although upland excavation is not part of this project, the SPCC includes requirements for stormwater and erosion controls. During transfer of sediment onshore, the Remediation Contractor will establish temporary control, including silt fences, as shown in **Appendix E**

(**Drawing C-9**), to contain any potential spills that may occur during transfer and transport to the upland sediment/soil management area (TSSA-2).

- Dewatering discharge from the upland TSSA-2 will be directed to the existing GWTP for treatment and discharge to the Penobscot River under the facility MEPDES permit.
- Sediment removal in nearshore areas will be accomplished in the dry where possible to reduce water quality impacts.
- Construction mats, or similarly functioning equipment, will be used to access dry excavation areas to minimize impacts to intertidal sediments.
- Excess or waste materials will not be disposed of or abandoned waterward of mean higher high water, or allowed to enter waters of the state.
- Any floating debris generated during construction will be collected using a skiff and a net. Debris will be disposed of at an appropriate off-site disposal facility.
- Haul trucks or containers transporting wet materials will be lined and/or otherwise sealed to prevent release of sediment or effluent during transport.
- Construction materials will not be stored where high tides, wave action, or upland runoff can cause materials to enter surface waters.
- Imported fill material necessary to complete the project will be clean and obtained from an approved source.
- Monitoring consistent with the *Water Quality and Fish Monitoring Plan* (WQFMP; **Appendix D**) will be conducted.

4.2.2 Dredge Operations BMPs

- Barges will be water-tight and inspected to confirm water-tightness prior to dredging operations and dredged material transport.
- Sediment will be dredged in the dredge CU within turbidity control containment.
- The Remediation Contractor will use real-time kinematic global positioning system (RTK GPS) with Hypack Software to make the operator aware of the location of the dredge bucket in relation to the top of sediment to limit resuspension.
- An experienced environmental dredging operator, who is capable of implementing BMPs to limit resuspension, will perform the dredging and excavation work.
- Overfilling of the dredge bucket will be minimized.
- The operator will reduce the rate of bucket descent and retrieval as necessary to maintain project water quality standards.
- The operator will not overfill barges with dredged material.
- The rate of swing for bucket will be minimized to reduce sediment resuspension and settling out of resuspended solids in areas previously dredged.
- Each cut made by the bucket will overlap with the adjacent cut to avoid leaving ridges or windrows of contaminated sediment between adjacent cuts.

4.3 Environmental Controls

Temporary environmental controls are described in Technical Specification 01 57 19 (**Appendix F**) and the Remediation Contractor's Environmental Protection Plan. The primary controls for the protection

of water and fish are the use of mobile turbidity curtains surrounding active dredging operations, and implementation of a water quality and fish monitoring program during the construction period as described below.

4.3.1 Turbidity Curtains

Dredging operations will be performed within a mobile turbidity control system (moon pool). The moon pool will consist of a series of shafts driven by hydraulic motors along the perimeter of the sectional barges supporting a turbidity curtain extending from the water surface to the river bottom. This system was designed to allow the reefing cable of the turbidity curtain to be wrapped around each shaft. Each side of the moon pool barge was designed in multiple segments to give the dredge operator greater control of the bottom elevation of the curtain and maintain the minimum and maximum clearances from the sediment surface at all times. For this project, the bottom of the moon pool will be kept as close as practicable to the riverbed, depending on slope and tide conditions.

4.3.2 Water Quality and Fish Monitoring

The WQFMP (**Appendix D**) provides a detailed monitoring plan developed to meet requirements associated with the Clean Water Act (CWA) Section 401 water quality certification and the Endangered Species Act (ESA).

Water quality will be monitored during all in-water work either by hand from a small utility boat, or using anchored buoys equipped with monitoring and recording equipment. Monitoring points will be located in the Penobscot River, approximately 600 feet north and south of the Southern Cove. The upstream and downstream location will be determined based on tidal conditions and flow direction at any given time. The water quality monitoring criteria that will trigger corrective actions are 35 nephelometric turbidity units (NTUs) higher at the downstream buoy compared to the reference value based on the upstream measurement and a database of baseline measurements collected throughout the project area.

Prior to commencing sediment removal within the mobile turbidity curtain system, the contained dredge area will be checked for the presence of Atlantic salmon or Atlantic or shortnosed sturgeon using a DIDSON (or similar) camera. If these species are identified, the fish will be cleared from within the curtain and clearance will be confirmed using the DIDSON (or similar) camera, prior to commencing dredging.

Section 5. Permitting

5.1 U.S. Army Corps of Engineers Permit

A Maine General Permit Authorization Letter was issued by the U.S. Army Corps of Engineers (USACE) New England District for the Southern Cove project (USACE Permit #NAE-1999-02231; USACE GP ID #17-097).

This permit includes Section 404 of the CWA and Section 10 of the Rivers and Harbors Act of 1899. The following required consultations were also completed by USACE before granting the permit:

- Section 7 consultations with National Oceanic and Atmospheric Administration, National Marine Fisheries Service, and U.S. Fish and Wildlife Service for ESA and Essential Fish Habitat
- Section 106 of the National Historic Preservation Act and with local tribes

5.2 Shoreland Protection Act Permit

A permit application was approved on April 8, 2016, by the Orrington Code Enforcement Officer for work within 250 feet from the Penobscot River for the entire site. With respect to the Southern Cove CMI Plan, this permit covers construction and maintenance of staging areas and access roads necessary to perform sediment removal.

5.3 Maine Natural Resources Protection Act

A Permit-by-rule Notification Form was sent to Maine DEP on May 20, 2015, and because no response was received, presumptive approval was granted for the entire site, including the Southern Cove. The approval has been confirmed with Jim Beyer of Maine DEP during several subsequent meetings. An application for extension of this permit will be submitted prior to beginning the Southern Cove work. By email dated April 20, 2017, Mr. Beyer also confirmed that acceptance of the Permit-by-rule Notification by Maine DEP constitutes the CWA Section 401 Water Quality Certificate.

5.4 Other State Agency Reviews

Denis-Marc Nault of the Maine Department of Marine Resources confirmed by email dated March 1, 2017, that they had no concerns after reviewing the Draft Southern Cove CMI Plan.

Thomas Schaeffer of the Maine Department of Inland Fisheries and Wildlife verbally confirmed that any input from them would be provided directly to Maine DEP through the Natural Resources Protection Act permitting review, and they had no further input. This was confirmed by email from Erin Healy to Mr. Schaeffer, dated February 21, 2017.

Section 6. Schedule

The anticipated schedule for the Southern Cove is presented in **Table 6-1**.

Table 6-1: Southern Cove Schedule

Activity	Anticipated End Date
Final Permits Received	April 8, 2017
Final Maine DEP Approval	May 20, 2017
Remediation Contractor Mobilization and Low Tide Excavation in the Dry	June 2017
Begin In-water Dredging	July 15, 2017
Sediment Removal and Backfilling Complete	November 2017
Restoration – Planting	Spring 2018
Restoration – Final Inspection	Late Summer 2018

Section 7. References

Anchor QEA (Anchor QEA, LLC), 2014. *Health and Safety Plan*. Southern Cove, Orrington Remediation Site. Prepared for CDM Smith, Inc. December 2014.

Anchor QEA and CDM Smith (CDM Smith, Inc.), 2015. *Southern Cove Pre-design Work Plan.* Orrington Remediation Site, Orrington, Maine. Prepared for Mallinckrodt US LLC. June 2015.

CDM (Camp Dresser & McKee Inc.), 1998. *Site Investigation Report Volume I*. HoltraChem Manufacturing Site, Orrington, Maine. December 22, 1998; Revised August 15, 2001.

CDM, 2003. *Corrective Measures Study*. Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine. May 27, 2003; Revised September 19, 2003.

CDM Smith, 2014a. *Quality Assurance Project Plan.* Orrington Remediation Site, Orrington, Maine. Revision No. 01. December 15, 2014.

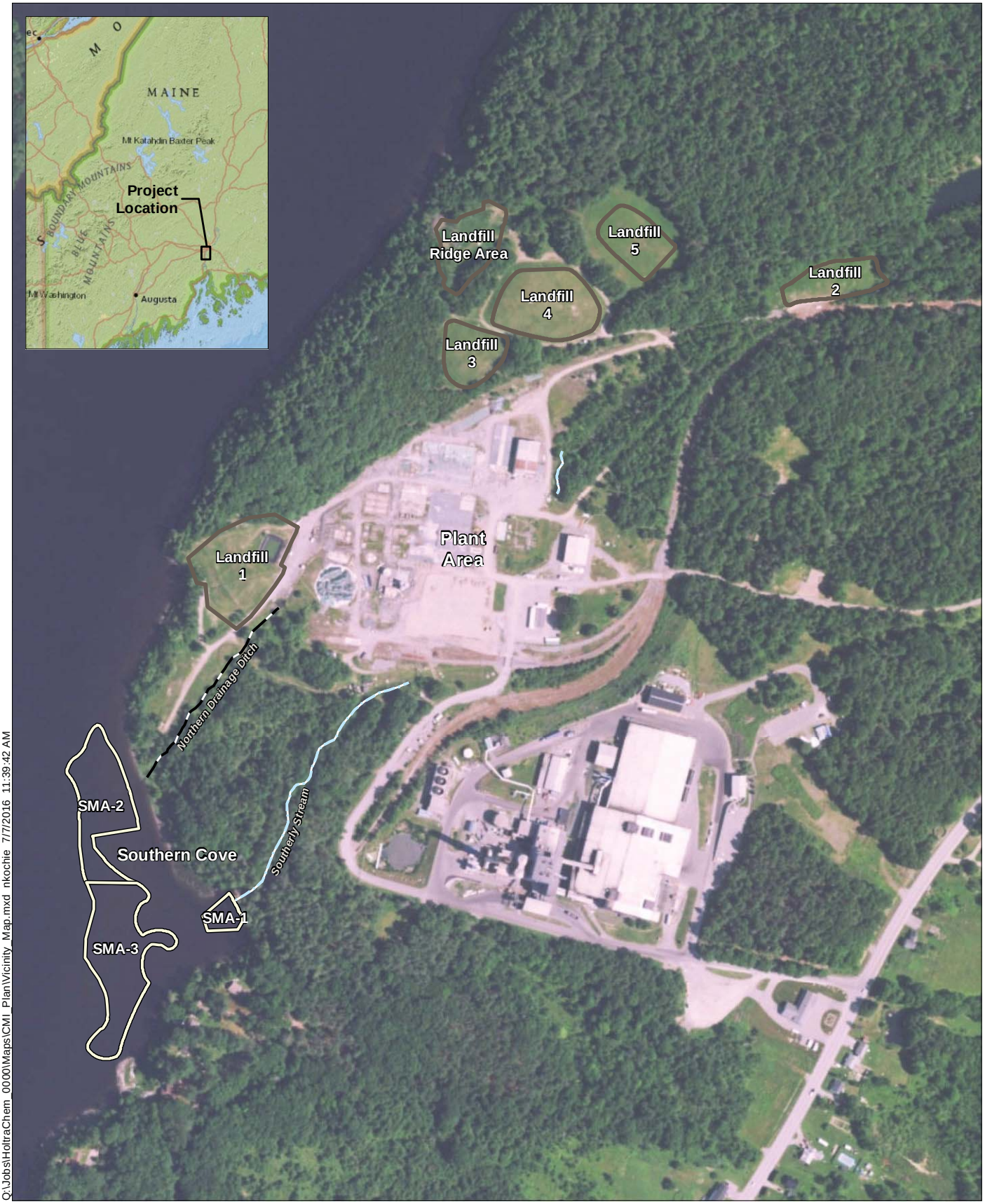
CDM Smith, 2014b. *Project Health and Safety Plan*. Orrington Remediation Site, Orrington, Maine. October 9, 2014.

Maine BEP (Maine Board of Environmental Protection), 2010. Appeal of Designation of Uncontrolled Hazardous Substance Site and Order, *Findings of Fact and Order on Appeal* in the Matter of United States Surgical Corporation and Mallinckrodt LLC Concerning a Chlor-alkali Manufacturing Facility in Orrington, Penobscot County, Maine Proceeding Under 38 M.R.S.A. § 1365, Uncontrolled Hazardous Substance Sites Law; August 19, effective date April 3, 2014.

Maine DEP (Maine Department of Environmental Protection), 2008. Compliance Order: Designation of Uncontrolled Hazardous Substance Site and Order in the Matter of United States Surgical Corporation, Mallinckrodt LLC Concerning a Chloralkali Manufacturing Facility in Orrington, Penobscot County, Maine Formerly Owned and Operated by Mallinckrodt Inc., Proceeding Under 38 M.R.S.A. § 1365, Uncontrolled Hazardous Substance Sites Law; November 24.

Maine Natural Areas Program, 2015. Department of Agriculture, Conservation and Forestry. Elements of Diversity: Rare, Threatened and Endangered Plants. September 2015.

FIGURES



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CDM Smith ANCHOR QEA

Figure 1-1
Site Map
Corrective Measures Implementation Plan
Southern Cove, Orrington Remediation Site

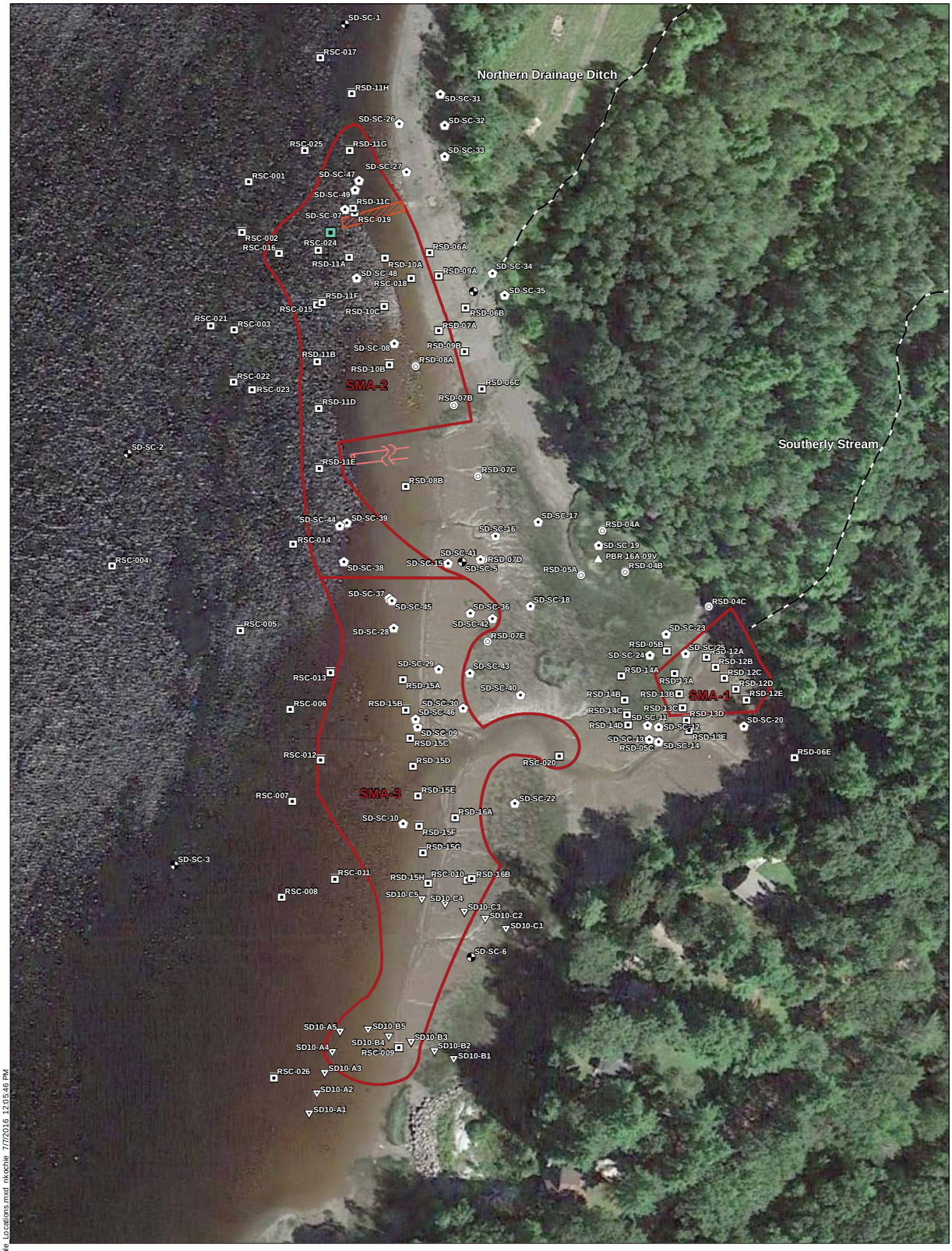


Figure 1-2
Sediment Sample Locations
Corrective Measures Implementation Plan
Southern Cove, Orrington Remediation Site

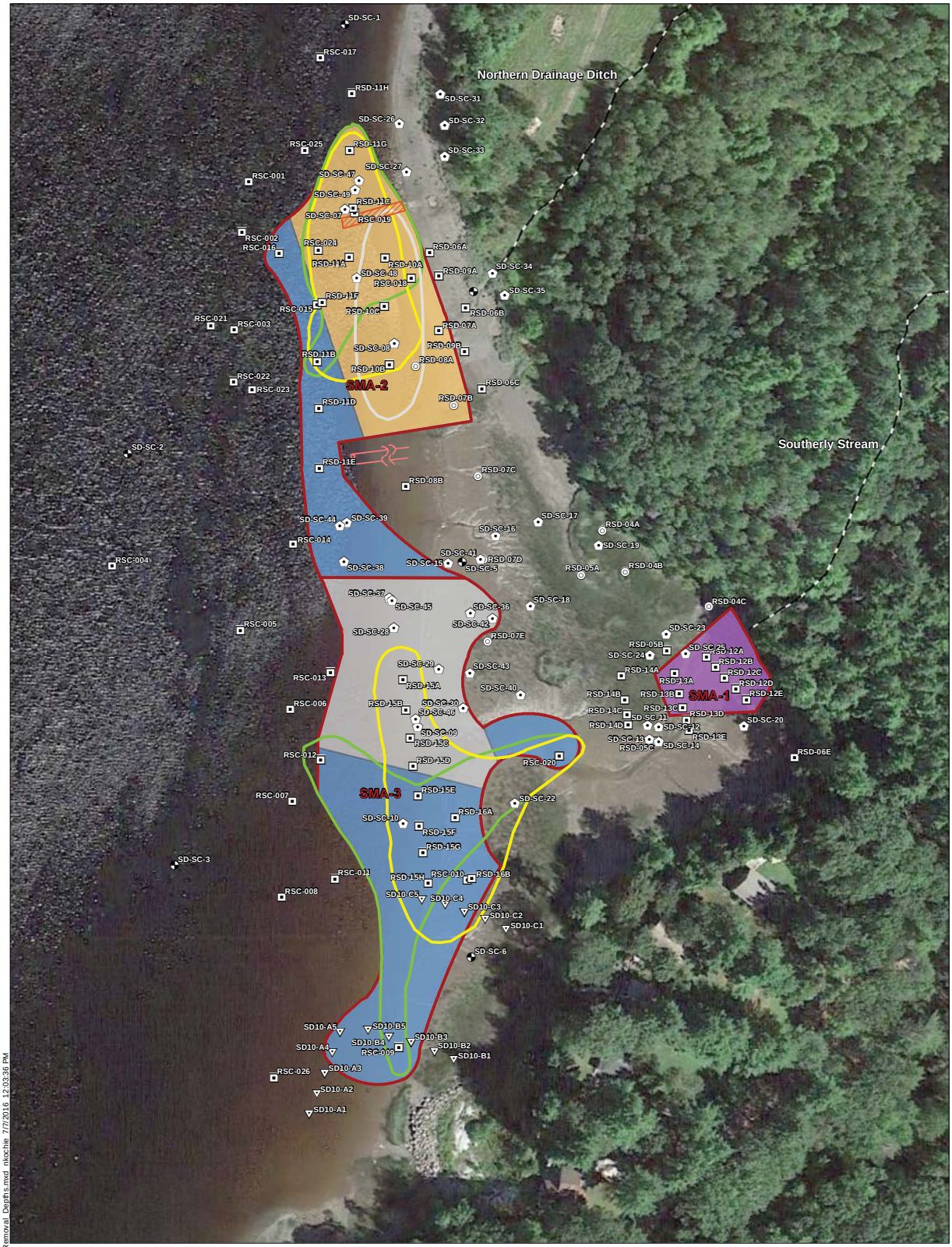


Figure 2-1
Sediment Removal Areas and Depths
Corrective Measures Implementation Plan
Southern Cove, Orrington Remediation Site

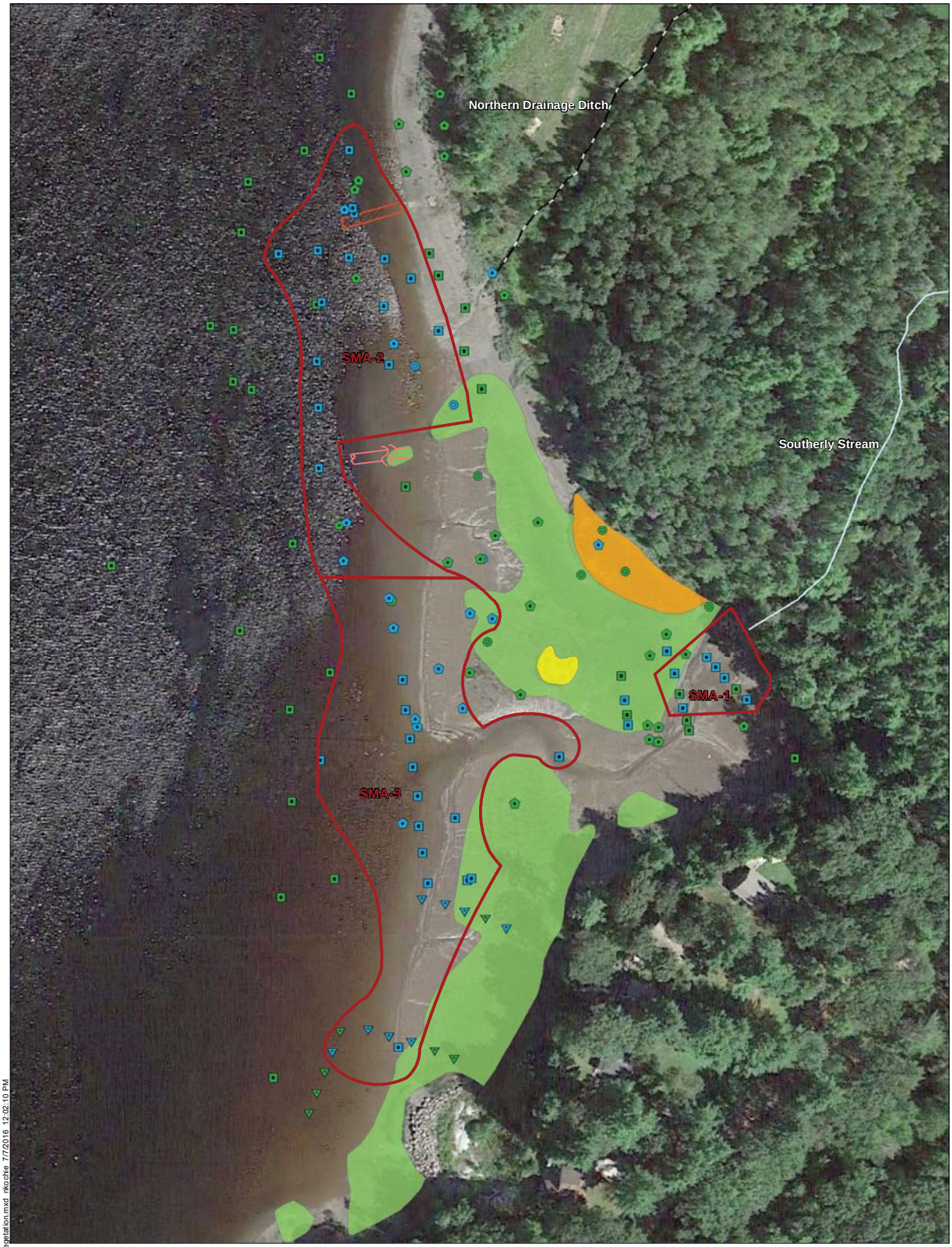
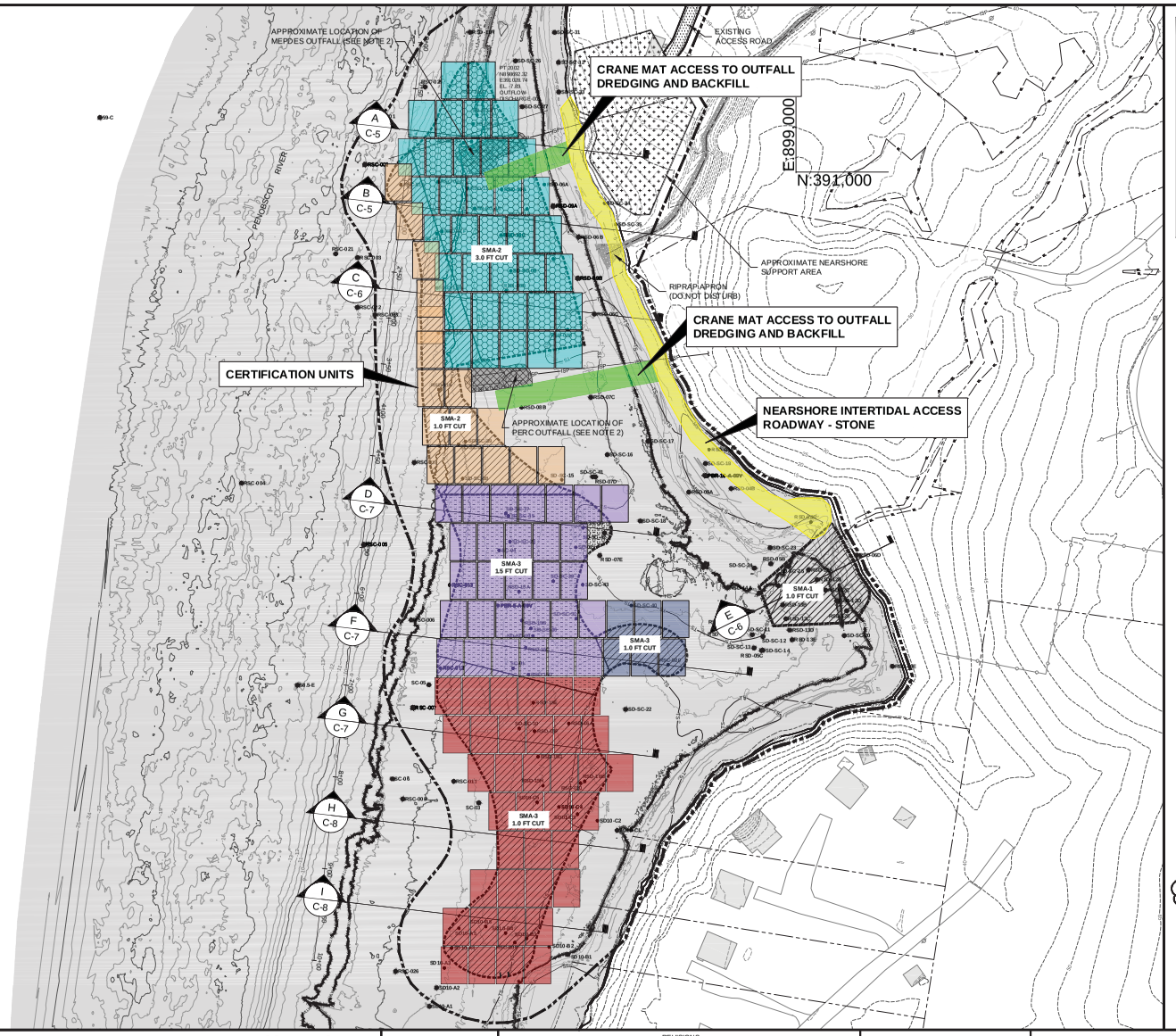
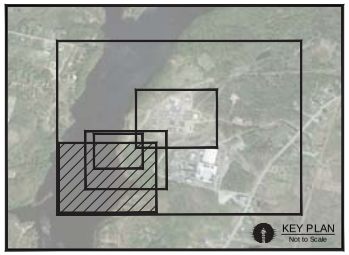


Figure 2-2
Extent of Intertidal Vegetation
Corrective Measures Implementation Plan
Southern Cove, Orrington Remediation Site





LEGEND:

- EXISTING CONTOURS (FEET NAVD88) (1-FOOT INTERVAL)
- MHHW — MEAN HIGHER HIGH WATER (7.13' NAVD88)
- MHW — MEAN HIGH WATER (6.62' NAVD88)
- MSL — MEAN SEA LEVEL (0.20' NAVD88)
- MLW — MEAN LOW WATER (-6.21' NAVD88)
- MLLW — MEAN LOWER LOW WATER (-6.55' NAVD88)
- WL — WETLAND BOUNDARY
- PROPERTY LINE
- TS — SPARSE THREE-SQUARE SEDGE
- MS — HIGH MARSH/SEDGE BED
- HS — DENSE HARDSTEM BULRUSH
- ISP — INDUSTRIAL SEWER PIPE (APPROXIMATE)
- MARINE REMEDIATION CONTRACTOR LIMIT OF WORK
- EXISTING ACCESS ROAD
- APPROXIMATE NEARHSORE SUPPORT AREA
- EXCAVATION AND IMMEDIATE BACKFILL WITHIN OUTFALL OFFSET
- MUDD DREDGED CONTOURS (FEET NAVD88) (1-FOOT INTERVAL)
- 1.0 FOOT DREDGE CUT BELOW EXISTING BATHYMETRY
- 1.5 FOOT DREDGE CUT BELOW EXISTING BATHYMETRY
- 3.0 FOOT DREDGE CUT BELOW EXISTING BATHYMETRY

HORIZONTAL DATUM: MAINE STATE PLANE EAST ZONE, NORTH AMERICAN DATUM OF 1983 (NAD83), U.S. SURVEY FEET.

VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM 1988, (NAVD88), U.S. SURVEY FEET.

NOTES:

1. SEE SHEET G-2 FOR GENERAL NOTES AND LEGEND.
2. REMEDIATION CONTRACTOR SHALL VERIFY LOCATIONS OF MEPDES AND PERC OUTFALLS. DREDGING AND BACKFILLING SHALL OCCUR IN INTERVALS IN ACCORDANCE WITH SECTION 35 20 23 - DREDGING AND EXCAVATION.
3. LOCATIONS OF OUTFALLS AND ASSOCIATED UNDERGROUND PIPING ARE APPROXIMATE AND SHALL BE FIELD VERIFED BY REMEDIATION CONTRACTOR.
4. BATHYMETRIC CONTOURS REPRESENT THE EXISTING, PRE-CONSTRUCTION CONDITIONS AS SURVEYED ON JUNE 29, AND 30, 2015.

NORTH

0 60 120

SCALE IN FEET

ANCHOR QEA

NOT FOR CONSTRUCTION

ISSUED FOR RFP 08 JULY 2016

REVISIONS

REV	DATE	BY	APP'D	DESCRIPTION
0	8 APRIL 2016	RG	PL	ISSUED FOR RPM REVIEW
1	8 JULY 2016	RG	PL	ISSUED FOR BID
2	02 AUG 2016	RG	PL	BATHYMETRY REVISED

DESIGNED BY:	R. PICKERING
DRAWN BY:	P. SCIABA
CHECKED BY:	R. GARDNER
APPROVED BY:	P. LaROSA
SCALE:	AS SHOWN
DATE:	8 JULY 2016

SOUTHERN COVE CORRECTIVE MEASURES IMPLEMENTATION PLAN, ORRINGTON REMEDIATION SITE ORRINGTON, MAINE

DREDGE / EXCAVATION PLAN

Figure 4-1
CMIP

Oct 26, 2016 10:13am pscalba A:\CAD - Boston\PROJECTS\0617 - Penobscot River - Orrington Maine\CONSTRUCTION MANAGEMENT\0617 - CM DREDGE PLAN AND SECTIONS.dwg C-4