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DISTRIBUTION LIST

ATTACHMENT A: DISTRIBUTION LIST

Table 1: Agencies

Agency	Contact	
	Email Address	**Address**
Massachusetts Environmental Policy Act (MEPA) Office	MEPA@mass.gov eva.vaughan@mass.gov	MEPA Office 100 Cambridge Street, Suite 900 Boston, MA 02114
Department of Environmental Protection, Boston Office	helena.boccadoro@mass.gov DEP.Waterways@mass.gov DEP.Wetlands@mass.gov	MassDEP Commissioner's Office 100 Cambridge Street, 9th Floor Boston, MA 02114 DEP Waterways Program Attn: Daniel J. Padien 100 Cambridge Street, 9th Floor Boston, MA 02114
Department of Environmental Protection, Northeast Regional Office	john.d.viola@mass.gov	MassDEP Northeast Regional Office Attn: MEPA Coordinator 150 Presidential Way Woburn, MA 01801
Massachusetts Department of Transportation – Boston	MassDOTPPDU@dot.state.ma.us	MassDOT Public/Private Development Unit 10 Park Plaza, Suite #4150 Boston, MA 02116
Massachusetts Department of Transportation – District 6 Office	michael.garrity@dot.state.ma.us	MassDOT, District 6 Office Attn: MEPA Coordinator 185 Kneeland Street Boston, MA 02111
Massachusetts Historical Commission	Mail a hard copy of the filling	The MA Archives Building 220 Morrissey Boulevard Boston, MA 02125
Massachusetts Office of Coastal Zone Management	joanna.m.yelen@state.ma.us patrice.bordonaro@mass.gov	Coastal Zone Management Attn: Project Review Coordinator 251 Causeway Street, Suite 800 Boston, MA 02114

Agency	Contact	
	Email Address	**Address**
EEA Environmental Justice Director[1]	MEPA-EJ@mass.gov	MEPA Office Attn: EEA EJ Director 100 Cambridge Street, Suite 900 Boston, MA 02114
Massachusetts Division of Marine Fisheries	DMF.EnvReview-North@mass.gov Kate.frew@mass.gov	DMF – North Shore Attn: Environmental Reviewer 30 Emerson Avenue Gloucester, MA 01930
Massachusetts Water Resources Authority (MWRA)	Katherine.ronan@mwra.com	Massachusetts Water Resource Authority Attn: MEPA Coordinator 100 First Avenue Boston, MA 02129
Metropolitan Area Planning Council (MAPC)	afelix@mapc.org mpillsbury@mapc.org	Metropolitan Area Planning Council 60 Temple Place, 6th Floor Boston, MA 02111
City of Everett City Council	Councilors@ci.everett.ma.us	Everett City Council 484 Broadway, Room 38 Everett, MA 02149
City of Everett Director of the Planning & Development Department	Matt.Lattanzi@ci.everett.ma.us	Everett Planning & Development Office 484 Broadway, Room 25 Everett, MA 02149
City of Everett Conservation Commission	Tom.Philbin@ci.everett.ma.us	Everett Conservation Commission 484 Broadway, Room 25 Everett, MA 02149
City of Everett Board of Health	Sabrina.firicano@ci.everett.ma.us	Everett Board of Health 484 Broadway, Room 20 Everett, MA 02149
City of Chelsea City Council	citycouncil@chelseama.gov fmelara@chelseama.gov	Chelsea City Council Chelsea City Hall, Room #306 500 Broadway Chelsea, MA 02150

[1] Advance notice of filing of this DEIR was submitted to community-based organizations and tribes based on a recommended list provided by the EEA EJ Director in accordance with the Final MEPA Public Involvement Protocol for Environmental Justice Populations (effective January 1, 2022).

Agency	Contact	
	Email Address	**Address**
City of Chelsea Permitting & Land Use Planning Board	jdpriest@chelseama.gov	Chelsea Permitting & Land Use Planning Board Chelsea City Hall, Room #101, 500 Broadway Chelsea, MA 02150
City of Chelsea Conservation Commission	jdpriest@chelseama.gov	Chelsea Conservation Commission Chelsea City Hall, Room #101-104 500 Broadway Chelsea, MA 02150
City of Chelsea Department of Public Health	famaya@chelseama.gov	Chelsea Department of Public Health Chelsea City Hall, Room #100B 500 Broadway Chelsea, MA 02150
United States Army Corps of Engineers	paul.j.sneeringer@nae02.usace.army.mil	United States Army Corps of Engineers New England District Attn: Paul Sneeringer 696 Virginia Road Concord, MA 01742
United States National Marine Fisheries Service	Kaitlyn.shaw@noaa.gov	NOAA GARFO Attn: Kaitlyn Shaw 55 Great Republic Drive Gloucester, MA 01930
United States Environmental Protection Agency	Croy.Rachel@epa.gov reiner.ed@epa.gov	EPA New England Attn: Rachel Croy and Ed Reiner 5 Post Office Square, Suite 100 Boston, MA 02109
Federal Aviation Administration	kenneth.patterson@faa.gov	Email only

Table 2: Additional Expanded Environmental Notification Form Commenters

Organization	Contact	
	Email Address	**Address**
Boston Harbor Now	kabbott@bostonharbornow.org	Boston Harbor Now Attn: Kathy Abbott 15 State Street, Suite 1100 Boston, MA 02109
Auction Nominee Trust	stephanie@torski.com kbuyuk@lwelaw.com	Lyne, Woodworth Evarts, LLP Attn: E. Kate Buyuk, Esq. 12 Post Office Sq., 2nd Floor Boston, MA 02109

Attachment B

RESPONSE TO COMMENTS

ATTACHMENT B: RESPONSE TO COMMENTS

The Secretary's Certificate on the Expanded Environmental Notification Form ("EENF"), which included the Scope for the Draft Environmental Impact Report ("DEIR"), was issued on April 14, 2023. The comment period for the EENF closed on April 7, 2023. The Certificate on the EENF included seven comment letters from state resource agencies, a local waterfront advocacy group, and an owner of a property in the vicinity of the Project Site.

The following pages contain tables with alphanumerically coded responses to the comments received, which are followed by copies of each comment letter. The letters are presented in the order in which they were attached to the Secretary's Certificate for the EENF. References to additional and technical detailed material elsewhere in this DEIR are also noted in these responses.

A. Massachusetts Office of Coastal Zone Management (CZM); April 6, 2023

#	Response
A-1	The area located west of the existing culverts is constrained by the heavily trafficked Beacham and Market Street rights-of-way, the existing culvert pipe alignments, the critical need for the proximate underground Storm Surge Control Facility ("SSCF") on adjacent private property, and other land acquisition/easement considerations. The Proponent has made a significant effort to locate most of the flood barrier system above the High Tide Line (HTL) to minimize adjacent resource area impacts. Where impacts are unavoidable, the Proponents have proposed offsetting mitigation in the form of resource area enhancement of the existing highly degraded riverbank and ample plantings to promote slope stability and habitat restoration. See Attachment C, Project Plans for additional information.
A-2	Based upon feedback from state agencies related to the prior Nature-based Approach (NBA) utilizing concrete planter technologies, the Proponents have revised the proposed design to eliminate the use of concrete planters and to incorporate a wider range of NBA along the riverfront. Proposed NBA include cobble nourishment, top-dressing of slopes with compatible sediments and vegetation, robust planting plan consisting of salt-tolerant species and other hardy vegetation types, and other approaches in addition to removal of debris from widespread areas of the Coastal Bank. These approaches are described in detail in Chapter 6, Wetlands and Water Quality. See Attachment C, Project Plans for additional information.
A-3	The Proponents have provided an updated Alternatives Analysis focused on NBA along the Island End River ("IER"). See Chapter 2, Alternatives Analysis for additional information.
A-4	Additional detail has been provided regarding proposed stabilization around SSCF outfall headwall system in Chapter 6, Wetlands and Water Quality. See for See Attachment C, Project Plans for additional information.
A-5	The access ramps to Island End Park have been redesigned to incorporate a pile-supported ramp foundation rather than solid fill and retaining walls to reduce the impacts to coastal resource areas. See Attachment C, Project Plans for additional information.

#	Response
A-6	A sediment sampling plan for the Project is provided in Attachment G, Sediment Sampling Plan, along with a full set of Project plans for details of the riprap apron at the SSCF outlet. See for See Attachment C, Project Plans for additional information.
A-7	An Operations & Maintenance (O&M) draft plan has been prepared for the SSCF and is provided as Attachment M, SSCF O&M Plan.
A-8	The Proponents continue to advance regional stormwater source reduction and treatment initiatives in the areas surrounding the Project Site. See Chapter 8, Infrastructure and Transportation for additional information.
A-9	Additional detail has been provided regarding wetlands enhancements, including salt-tolerant plantings and seed mixes list, in Chapter 6, Wetlands and Water Quality, as well as in the Attachment I, Salt Marsh Wetland Replication Plan, and Attachment J, Adaptive Management Plan for the Control of Invasive Species. See for See Attachment C, Project Plans and Attachment I, Salt Marsh Wetland Replication Plan, and Attachment J, Adaptive Management Plan for additional information.
A-10	An Adaptive Management draft plan has been prepared for proposed wetlands enhancements and is provided as Attachment F, Wetlands Delineation Report, Attachment I, Salt Marsh Restoration Plan, and Attachment J, Invasive Species Adaptive Management Plan.
A-11	Project plans have been updated to provide additional detail on proposed walkways associated with Resilience Provisions East ("RPE"). See Attachment C, Project Plans for additional information.
A-12	Additional detail has been provided regarding the Project design suitability for promoting both water-dependent industrial uses and flood resilience in a Designated Port Area (DPA) in Chapter 5, Mystic River Designated Port Area.
A-13	The Project list of permits has been updated to include CZM Federal Consistency Review as the recently updated U.S. Army Corps. of Engineers (USACE) New England District General Permit has been released. See Chapter 1, Project Summary for additional information.

B. Massachusetts Division of Marine Fisheries (DMF); April 6, 2023

#	Response
B-1	The Proponents acknowledge that upcoming USACE permitting review may result in additional mitigation associated with temporary and permanent impacts to subtidal and tidal flats.
B-2	The Project will sequence intertidal work during dry (i.e., low tide) conditions with stabilization of sediment prior to the return of water. All work within subtidal areas will be sequenced to occur in the dry behind cofferdams to minimize turbidity impacts.
B-3	The Project will comply with time of year restrictions (TOY) to protect marine fisheries and habitat.
B-4	An Adaptive Management draft plan has been prepared for proposed Nature-based Approaches and is provided as Attachment K, NbA Adaptive Management Plan.

C. Massachusetts Department of Environmental Protection (MassDEP), Waterways Regulatory Program (WRP); April 6, 2023

#	Response
C-1	Additional detail has been provided regarding the Project design suitability for promoting both water-dependent industrial uses and flood resilience in a Designated Port Area (DPA) in Chapter 5, Mystic River Designated Port Area.
C-2	The Proponents have continued stakeholder engagement efforts since submission of the EENF. Documentation of correspondence with property owners and stakeholders are provided as Attachment E, DPA Site Plans & Stakeholder Coordination Table.
C-3	Refer to detailed analysis of the Project's compliance with the categorical restrictions for work within DPAs at 310 CMR 9.32(1)(b) in Chapter 4, Tidelands.
C-4	Additional detail has been provided regarding the Project design suitability for promoting both water-dependent industrial uses and flood resilience in a Designated Port Area (DPA) in Chapter 5, Mystic River Designated Port Area. Proposed access points and walkways to promote public access to the Chelsea waterfront and Island End Park are located outside of the Mystic River DPA.
C-5	Additional detail has been provided regarding the Project design suitability for promoting both water-dependent industrial uses and flood resilience in a Designated Port Area (DPA) in Chapter 5, Mystic River Designated Port Area.
C-6	Additional detail has been provided regarding the Project design suitability for promoting both water-dependent industrial uses and flood resilience in a Designated Port Area (DPA) in Chapter 5, Mystic River Designated Port Area.
C-7	Additional detail, including site plans showing each individual property within the DPA, has been provided regarding the Project design suitability for promoting both water-dependent industrial uses and flood resilience in a Designated Port Area (DPA) in Chapter 5, Mystic River Designated Port Area.

D. Massachusetts Department of Environmental Protection (MassDEP), Wetlands Program as drafted by Thomas Maguire April 6, 2023

#	Response
D-1	The catchment area for stormwater infrastructure is described in Chapter 8, Infrastructure & Transportation. The Market Street Culvert catchment is approximately 420 Acres. The combined catchment for all stormwater systems that pass through the floodplain is approximately 1,060 acres. The SSCF has been sized with a calibrated understanding of the watershed informed by a Hydrologic & Hydraulic Study (H&H).
D-2	Based upon review of current the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) associated with the Project Site and all approved map amendments/revisions as published by FEMA to date, the Island End River does not currently have a regulatory floodway established by FEMA. Additionally, no new regulatory floodway is proposed in the pending FEMA FIRM 25017C0443F, which is part of the FEMA Middlesex County FIRM updates (originally scheduled for release in 2020). The only regulatory floodway that includes portions of the City of Everett is located on the Mystic River upstream of the Amelia Earhart Dam. Coastal modeling has been performed to evaluate the performance of the proposed flood barrier in current and future scenarios and to evaluate the potential for any impacts to adjacent portions of the riverfront area. See Chapter 7, Flood Resiliency and Attachment L,

#	Response
	Projected Coastal Flood Maps & RMAT.
D-3	In the design of this coastal resilience project, the Proponents utilized best available flood mapping for the current and future scenarios. In 2016, FEMA issued updated FIRMs and Flood Insurance Study (FIS) for Suffolk County that clearly identified the Island End River as a coastal flood risk for Chelsea properties as Land Subject to Coastal Storm Flowage (LSCSF) resource areas. Since 2018, FEMA has been in the process of issuing updated FIRMs and FIS for Middlesex County. Pending maps that were distributed to the City of Everett (most recently in January 2023) clearly identify the Island End River as a coastal flood risk for Everett properties within the Project Site as LSCSF resource areas. See Figure 1-19, Pending FIRM for the City of Everett for additional information.

E. Auction Nominee Trust – Property Owner of 155 Market Street, Everett; April 7, 2023

#	Response
E-1	Based upon feedback from the property owner of 155 Market Street, the Proponents have updated the proposed flood barrier alignment to site all proposed infrastructure within the Market Street right-of-way. Access to the 155 Market Street site will be maintained through two flood gates at curb cuts located at either end of the existing facility.

F. Boston Harbor Now; April 7, 2023

#	Response
F-1	The Proponents thank Boston Harbor Now for their comment letter and participation in the MEPA Remote Site Consultation for this project. The Proponents intend to continue their partnerships with community organizations to enhance stakeholder outreach and to promote environmental stewardship opportunities.
F-2	Based upon feedback from state agencies related to the prior Nature-based Approach (NBA) utilizing concrete planter technologies, the Proponents have revised the proposed design to eliminate the use of concrete planters and to incorporate a wider range of NBA along the riverfront. Proposed NBA include cobble nourishment, top-dressing of slopes with compatible sediments and vegetation, robust planting plan consisting of salt-tolerant species and other hardy vegetation types, and other approaches in addition to removal of debris from widespread areas of the Coastal Bank. These approaches are described in detail in Chapter 6, Wetlands and Water Quality. See Attachment C, Project Plans for additional information. The Proponents will continue to identify opportunities for community stewardship at the adjacent Island End Park and throughout the community.

G. Massachusetts Department of Environmental Protection (MassDEP), April 7, 2023

#	Response
G-1	The area located west of the existing culverts is constrained by the heavily trafficked Beacham and Market Street rights-of-way, the existing culvert pipe alignments, the critical need for the proximate underground Storm Surge Control Facility ("SSCF") on adjacent private property, and other land acquisition/easement considerations. The Proponent has made a significant effort to locate most of the flood barrier system above the High Tide Line (HTL) to minimize adjacent resource area impacts. Where impacts are unavoidable, the Proponents have proposed offsetting mitigation in the form of resource area enhancement of the existing highly degraded riverbank and ample plantings to promote slope stability and habitat restoration. See Attachment C, Project Plans & Details for

#	**Response**
	additional information.
G-2	A sediment sampling plan for the Project is provided in Attachment G, Sediment Sampling Plan, along with a full set of Project plans for details of the riprap apron at the SSCF outlet. See for See Attachment C, Project Plans & Details for additional information. An Operations & Maintenance (O&M) draft plan has been prepared for the SSCF and is provided as Attachment M, SSCF O&M Plan. This draft plan includes an inspection schedule, maintenance requirements, operational triggers/frequency, and other parameters.
G-3	An Operations & Maintenance (O&M) draft plan has been prepared for the SSCF and is provided as Attachment M, SSCF O&M Plan. The SSCF maintains combination gate cross sectional area equal to a culvert section, which was sized as part of an extensive H&H study. See Chapter 7 Flood Resiliency, for additional information on evaluation of the SSCF in a multitude of scenarios that identify that the proposed combination gate system will not result in increased inland flooding conditions. See Chapter 8, Infrastructure and Transportation for regional stormwater analysis to date and long-term stormwater management initiatives within the watershed.
G-4	The Proponents anticipate starting the preparation of a Conditional Letter of Map Revision (CLOMR) in 2024 in accordance with potential construction funding requirements by federal agencies.
G-5	Based upon feedback from state agencies related to the prior Nature-based Approach (NBA) utilizing concrete planter technologies, the Proponents have revised the proposed design to eliminate the use of concrete planters and to incorporate a wider range of NBA along the riverfront. Proposed NBA include cobble nourishment, top-dressing of slopes with compatible sediments and vegetation, robust planting plan consisting of salt-tolerant species and other hardy vegetation types, and other approaches in addition to removal of debris from widespread areas of the Coastal Bank. These approaches are described in detail in Chapter 6, Wetlands and Water Quality. See Attachment C, Project Plans for additional information.
G-6	Based upon feedback from state agencies related to the prior Nature-based Approach (NBA) utilizing concrete planter technologies, the Proponents have revised the proposed design to eliminate the use of concrete planters and to incorporate a wider range of NBA along the riverfront. Proposed NBA include cobble nourishment, top-dressing of slopes with compatible sediments and vegetation, robust planting plan consisting of salt-tolerant species and other hardy vegetation types, and other approaches in addition to removal of debris from widespread areas of the Coastal Bank. These approaches are described in detail in Chapter 6, Wetlands and Water Quality. See Attachment C, Project Plans for additional information
G-7	The access ramps to Island End Park have been redesigned to incorporate a pile-supported ramp foundation rather than solid fill and retaining walls to reduce the impacts to coastal resource areas. See Attachment C, Project Plans for additional information.
G-8	Additional detail has been provided regarding wetlands enhancements, including salt-tolerant plantings and seed mixes list, in Chapter 6, Wetlands and Water Quality. See for See Attachment C, Project Plans for additional information. An Adaptive Management draft plan has been prepared for proposed wetlands enhancements and is provided as Attachment F, Wetlands Delineation Report, Attachment I, Salt Marsh Restoration Plan, and Attachment J Invasive Species Adaptive Management Plan.
G-9	The Project has been further revised to propose replication of salt marsh, as described in Attachment I Salt Marsh Wetland Replication Plan.

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS
OFFICE OF COASTAL ZONE MANAGEMENT
100 Cambridge Street, Suite 900, Boston, MA 02114

MEMORANDUM

TO:	Rebecca Tepper, Secretary, EEA
ATTN:	Eva Vaughn, MEPA Office
FROM:	Lisa Berry Engler, Director, CZM
DATE:	April 7, 2023
RE:	EEA- 16667, Island End River; Chelsea and Everett

The Massachusetts Office of Coastal Zone Management (CZM) has completed its review of the above-referenced Expanded Environmental Notification Form noticed in the *Environmental Monitor* dated February 24, 2023, and recommends the development of an Environmental Impact Report (EIR) to better assess the environmental impacts of the proposed project and to ensure that they have been appropriately minimized.

Project Description

The Cities of Chelsea and Everett propose to construct a coastal storm surge barrier, storm surge control facility, riverfront nature-based solutions, and related amenities at the Island End River in the Cities of Chelsea and Everett. The approximately 9.5-acre project site is currently composed of a mix of commercial and industrial uses and supporting roadway and utility infrastructure. The existing banks of the river are highly degraded by legacy industrial uses and are comprised of hardened slope stabilization measures and littered with debris. The proposed project includes an approximately 4,640 linear-foot storm surge barrier, an approximately 2,900 square-foot (sf) underground storm surge control facility, approximately 50,000 sf of nature-based solutions along the riverfront, and associated wetland and public access improvements along the Island End River.

Project Comments

Climate Resiliency

Since the original design, the proposed flood barrier has been moved landward of the high tide line along the majority of the project site length. This improvement to the project will reduce the impacts of the vertical wall on fronting coastal resource areas. There is one area west of the culverts that remains in close proximity to Mean High Water (MHW). Based on the information provided in the plans, it appears this area could be shifted landward so it is also located landward of the high tide line. A-1

Based on the Resource Area Impact Plans in the EENF, the proposed project includes placing stone sills and concrete planters on the coastal bank, coastal beach, and in the intertidal area. Placing planters in those areas will have permanent adverse impacts on those resource areas by decreasing their storm damage protection and flood control functions. The existing coastal beach has a sloping granular surface that naturally dissipates energy associated with floodwater and storms. The proposed solid structures will increase scour and erosion around them, resulting in changes to the form of the beach. Currently, the coastal banks are eroding, providing sediment to the fronting beaches. The EENF identifies some of the erosion on the east and west banks of the river, as well as around the stormwater outfall. The proposed sills and concrete planters will cause scour, making stabilization of the site more difficult. Several of the alternatives identified in the Supplemental Information, dated March 24, 2023, involve structural toe stabilization and vegetation within the coastal beach and intertidal areas. Since the proposed structural components would have adverse effects on the beneficial A-2

functions of the coastal beach and coastal bank, other options with fewer impacts should be identified to achieve the project goals. These include removing debris from the coastal beach to improve the aesthetics, and top-dressing these areas with clean, compatible sediments, which will improve storm damage protection and flood control functions as well as habitat.

To address the erosion along the coastal banks, the EIR should include a detailed alternatives analysis of non-structural alternatives for stabilizing bank erosion on the east and west banks, and the area adjacent to the outfall. This analysis should include options to remove the debris and concrete at the top of the slope, regrade the existing scarped coastal bank to a more stable slope (e.g., 3:1), and use of natural fiber blankets and native, salt-tolerant plants with deep root systems to stabilize the soils on the coastal bank. If toe protection is needed, coir rolls could be considered to provide a buffer at the toe while plants become established. More details should be provided regarding the proposed stabilization around the new outfall wing walls, including information on how that stabilization will tie into the adjacent banks without exacerbating erosion. This information should consider including tapering the outfall protection to avoid a blunt end that is more likely to cause end scour. A-3 A-4

The proposed access ramps to the park on the east side of the river appear to be solid fill with retaining walls. To minimize reflection of floodwaters, the proponent should consider an alternative of pile-supported ramps and walkways seaward of the flood barrier. The plans also appear to show riprap seaward of the ramps. The use of pervious surfaces should be employed to help slow floodwaters. Alternatives to the riprap should be included in the EIR. A-5

The project includes the dredging of sediments in the river adjacent to the proposed outfall. Sampling of these sediments should be conducted to determine grain size and possible contamination to inform construction protocols and disposal options. Details for the riprap apron proposed seaward of the headwall should also be provided. A-6

Stormwater

The proponent should expand on the Island End River Storm Surge Control Facility Inspection and Maintenance Schedule provided in the filing and include specific details on an operations and maintenance plan. Continued evaluation of stormwater source reduction and treatment opportunities in the surrounding watershed to improve water quality and habitat in the Island End River and Mystic River should be pursued. A-7 A-8

Salt marsh restoration

The proponent will remove debris to a depth of up to 12 inches in the salt marsh with resulting elevations close to and/or below MHW. That debris removal should be limited to the minimum area necessary for restoration. Situations where the resulting marsh platform will be significantly lower than existing and/or lower than MHW should be avoided in consideration of reduced resiliency of the salt marsh platform to sea level rise and risk of degradation. Seeded and planted areas of the marsh will take time to establish and stabilize the existing sediment of the marsh platform. These areas should be closely monitored post-construction for subsidence and erosion in addition to vegetation establishment. A-9

Areas where seed mixes are proposed for application and areas proposed for direct planting, require additional clarification. RPE-L-102 depicts the use of salt-tolerant seed mix, while RPE-L-103 depicts herbaceous species. Species included in the salt-tolerant seed mix should be specified to evaluate the appropriateness for a tidal application.

The proponent should provide a detailed monitoring and adaptative management plan with a clear monitoring schedule and requirements for reporting to applicable agencies, which specifies monitoring of the restoration actions including invasive species management. The adaptive management plan should detail actions that will be taken if restoration goals are not met within the planned timeframe. A-10

Two sets of 10-foot walkways are depicted at cross sections C and A in plan set 16 RPE-L-102 but are not described in the document. Additional information regarding these walkways should be provided in the EIR. A-11

Designated Port Area

The proponent should demonstrate that the flood control barrier along the DPA shoreline on the Everett side of the project does not diminish the DPA's function or take away potential future use by water-dependent industrial users. The proponent should address the following information in the EIR: A-12

- Identify alternatives for the location of, configuration of, or type of flood barrier along the DPA shoreline which would minimize impacts to the functionality of the DPA. If no other alternatives are feasible, describe why.
- Demonstrate that the proponent has communicated with the existing water-dependent industrial users regarding the equipment they require to access the waterfront and how the proposed flood control barrier may affect ongoing DPA uses.
- Overall narrative explaining how the proposed flood control barrier does not diminish the DPA's purpose and current use.

Federal Consistency

The list of permits included in the EENF did not include CZM federal consistency review. Since this project triggers a MEPA review and will require an Individual Permit from the U.S. Army Corps of Engineers, it will also require a federal consistency review. For further information on this process, please contact Robert Boeri, Project Review Coordinator, at robert.boeri@mass.gov or visit the CZM website at https://www.mass.gov/federal-consistency-review-program. A-13

LE/rh/ap/jy

cc: Jill Provencal, MassDEP
Phil DiPietro, MassDEP
Daniel Padien, Waterways Program, MassDEP
Frank Taormina, Waterways Program, MassDEP

The Commonwealth of Massachusetts
Division of Marine Fisheries
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www.mass.gov/marinefisheries

MAURA HEALEY, Governor
KIMBERLEY DRISCOLL, Lt. Governor
REBECCA TEPPER, Secretary
RONALD S. AMIDON, Commissioner
DANIEL J. MCKIERNAN, Director

April 7, 2023

Rebecca Tepper
Executive Office of Energy and Environmental Affairs
Attn: MEPA Office, Eva Vaughan
100 Cambridge Street, suite 900
Boston, Ma 02114

RE: EEA# 16667 Island End River Flood Resilience Project

Dear Secretary Tepper:

The Massachusetts Division of Marine Fisheries (MA DMF) has reviewed the Expanded Environmental Notification Form (EENF) for the flood resilience project, EEA# 16667, located along Island End River in Chelsea and Everett, MA proposed by the Cities of Chelsea and Everett. The proposed project includes the construction of a coastal storm surge barrier, storm surge control facility, and nature-based solutions.

The project proposes impacts to the following marine fisheries resources:

- 1,357 sf of permanent impacts and 252 sf of temporary impacts to subtidal and intertidal area mapped as shellfish habitat by DMF for soft-shell clam (*Mya arenaria*) within shellfish growing areas GBH4.0, classified as Prohibited for shellfish harvest. The shellfish survey at the project site on October 28, 2022 identified the presence of low numbers of live soft-shell clams (*Mya arenaria*) and eastern oyster (*Crassostrea virginica*) present in intertidal areas. The shellfish survey also noted the presence of soft-shell clam, eastern oyster, and blue mussel (*Mytilus edulis*) shells.
- 8,502 sf of permanent impacts and 3,055 sf of temporary impacts to intertidal area mapped as tidal flats by the MA DEP Wetlands Conservancy Program.
- 12,585 sf of permanent impacts and 4,902 sf of temporary impacts to subtidal area mapped as essential habitat for the spawning and early development of winter flounder (*Pseudopleuronectes americanus*) by DMF. These impacts include the dredging of 1,438 cy of material anticipated to be disposed in an upland area offsite.
- 22,812 sf of temporary impacts to salt marsh. Creation of 800 sf of new salt marsh.

The Proponents are requesting a Single Environmental Impact Report. Based on the information provided in the EENF, we offer the following recommendations and comments:

- Mitigation may be required for temporary and permanent impacts to subtidal areas and tidal flats. B-1

- We recommend all work in intertidal areas be sequenced to occur in the dry (i.e. during low tide) and sediments be stabilized prior to the return of the water and all work in subtidal areas be sequenced to occur in the dry behind cofferdams to minimize turbidity impacts. B-2

- A time of year restriction (TOY) may be needed for in-water silt-producing work to minimize impact to winter flounder and shellfish resources from February 15 to September 30 of any given year. More about time of year restrictions can be found on our website under Time of Year Restriction Guidelines Appendix A and B 2015 Revisions. http://www.mass.gov/eea/agencies/dfg/dmf/programs-and-projects/technical-review.html [1]. B-3

- We concur with the proposed adaptive management approach to the installation, maintenance, and monitoring the Nature-based Solutions components of the project. We recommend a detailed monitoring plan and explicit success criteria be developed as part of this adaptive management plan. We request copies of all monitoring reports be provided to MA DMF. B-4

Thank you for considering our comments. If you have questions about this review, please email Forest Schenck at Forest.Schenck@mass.gov.

Sincerely,

Daniel J. McKiernan
Director

DM/fs/sd

cc.
C. Jacek, USACE
R. Boeri, MA CZM
K. Shaw, NMFS
E. Reiner, EPA
R. Joyce, MA DMF
K. Moniz, Fort Point Associates, Inc.

References:
[1] Evans, NT, KH Ford, BC Chase and JJ Sheppard (2011). Recommended Time of Year Restrictions (TOYs) for Coastal Alteration Projects to Protect Marine Fisheries Resources in Massachusetts. Technical Report DMF TR-47.

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection
100 Cambridge Street 9th Floor Boston, MA 02114 • 617-292-5500

Maura T. Healey
Governor

Kimberley Driscoll
Lieutenant Governor

Rebecca L. Tepper
Secretary

Bonnie Heiple
Commissioner

Memorandum

To: Eva Vaughan, MEPA Unit

From: Susan You, Waterways Regulation Program, MassDEP/Boston

cc: Daniel Padien, Program Chief, MassDEP/Boston

Re: Chapter 91 Waterways Regulation Program Comments on the Island End River Flood Resilience Project, Cities of Chelsea and Everett, EENF EEA #16667

Date: April 5, 2023

The Department of Environmental Protection Waterways Regulation Program (the "Department") has reviewed the above referenced Expanded Environmental Notification Form (EENF) (EEA #16667), submitted by Fort Point Associates, Inc. on behalf of the City of Chelsea Department of Housing and Community Development (the "Proponent") for the Island End River Flood Resilience Project, partially located within Filled and Flowed Tidelands of the Mystic River at Beacham Street and Market Street in the Cities of Chelsea and Everett (the "project site"). The proposed project includes the construction of an approximately 4,640-linear foot flood barrier in the forms of vegetated berms, concrete walls, and flood gates, an approximately 2,900-square foot underground Storm Surge Control Facility, approximately 50,000 square feet of nature-based solutions along the riverfront, associated wetland habitat restoration, a 940 linear-foot elevated boardwalk and sidewalk, and will include 14,464 square feet of improvement dredging. Portions of the project site are located within the Mystic River Designated Port Area.

Water Dependency:

This project appears to be a water-dependent use project pursuant to 310 CMR 9.12(2)(a)4, 9, 11, and 12, and 13. However, in order to be eligible for licensing within a Designated Port Area (DPA), water-dependent use projects involving installation of fill and/or structures must either be water-dependent industrial (WDI) uses, or otherwise comply with the standards at 310 CMR 9.32(2)(b). It is recommended that the Proponent provide supporting documentation as to whether the scopes

of work that appear water-dependent pursuant to 310 CMR 9.12(2)(a)11 and 12 may be determined by the Department to also meet the standard for water-dependent industrial use at 310 CMR 9.12(2)(b)7., by being associated with the operation of a Designated Port Area. C-1

Chapter 91 Jurisdiction:
The project site includes Filled and Flowed Tidelands, which are subject to Chapter 91 jurisdiction pursuant to 310 CMR 9.04. A portion of the project site within Chapter 91 jurisdiction is also located within the boundaries of the Mystic River DPA, and subject to all regulatory standards applicable to DPAs as set forth at 310 CMR 9.00.

Chapter 91 Comments:
Based on a review of the EENF, the Department finds that the portions of the proposed project located within Chapter 91 jurisdiction require a Waterways License and Permit pursuant to 310 CMR 9.05(2)(b) and 9.05(1)(a).

Based on a review of property assessors' data, there are multiple owners of properties within the project site. The Proponent is advised that the Chapter 91 application form will be required to be signed by all landowners within the project site, unless other evidence of legal authority to submit an application for the project site is provided. C-2 It is recommended that the Proponent coordinate with the Department as early as possible to discuss this regulatory standard, which is required to be satisfied in order for the Department to initiate the Chapter 91 application review.

Projects eligible for licensing outside of a DPA and within a DPA are required to comply with the standards for categorical restrictions at 310 CMR 9.32(1)(a) and (b), respectively. Based on the Department's preliminary review, certain components of the work proposed outside of the DPA appear to comply with the referenced standards. However, the information submitted with the EENF does not include adequate documentation that the work subject to Chapter 91 within the DPA complies with the categorical restrictions at 310 CMR 9.32. C-3 The Environmental Impact Report should address project compliance with the referenced standards for all project elements subject to Chapter 91 proposed outside and within the DPA.

The EENF discusses the project's compliance with the standards at 310 CMR 9.35. The Department's comprehensive review will occur during licensing; however, certain statements that were included should be clarified in the Environmental Impact Report (EIR). In the section relating to compliance with 310 CMR 9.35(3)(b) as it relates to private tidelands, the EENF states, "*There will also be several breaks along the western side of the IER within the DPA, which will allow pedestrian and vehicular access to the edge of the water. The water will be accessible to the public 24 hours per day, 7 days per week unless there are emergency or construction activities that warrant its temporary closure or restricted access.*" It is important to note that 310 CMR 9.36(5)(b) requires that reasonable arrangements shall be made to prevent commitments of space or facilities that would significantly discourage present or future water-dependent-industrial activity on the project site or elsewhere in the DPA. The EIR should include a site plan that specifies the proposed locations for all pedestrian and/or vehicular access locations, the property

address, Chapter 91 license number and licensed uses at the property, and documentation by the individual operators at each property where public access is proposed that adequately ensures such access will not interfere with their operations. Although the Department will consider any proposed public access sites within the DPA during its review of the Chapter 91 application, the Proponent is hereby advised that the locations and/or unrestricted access described in the EENF may not comply with the applicable Chapter 91 standards and may require relocation, elimination, and/or restrictions on the timing and frequency of use. C-4

The project proposes the installation of fill and structures along the shoreline which are intended to provide flood protection, enhancement of natural resources and improvement to public access. The Department acknowledges the value of this proposed project and these goals. However, certain design features appear to result in potential impacts to the functionality of the DPA. As discussed with the Proponent at the meeting with Department staff on March 15, 2023, the EENF does not sufficiently demonstrate that the project will avoid significant interference with current or future WDI uses in the DPA. C-5

The EENF includes conclusory statements that the project will not impact the DPA use such as, "*…the project will not interfere with the function or purpose of the DPA*" but does not include sufficient documentation to substantiate those statements. The EIR should include site-specific details relating to the operations and use of current WDI uses at each property, contemplate potential future WDI uses at each property, including any sites where there are not currently WDI uses. In addition, the Proponent should demonstrate that they have communicated with the existing WDI users regarding the equipment required to access the waterfront and how the proposed flood control barrier may affect ongoing WDI uses within the DPA. This is specifically relevant with respect to project compliance with the standards at 310 CMR 9.36(3), (4), and (5). C-6

The Proponent should address the standards referenced above, specifically as they relate to the portion of the proposed project that will be located at 145 and 147 Market Street, where it appears to eliminate any potential future WDI use of those properties. In the event that the project is determined to not comply with the standards at 310 CMR 9.36, the Proponent would need to identify alternatives for the location, configuration and/or type of flood barrier to be installed along the DPA shoreline which would avoid, minimize and/or mitigate impacts to the functionality of the DPA. C-7

The Department looks forward to continued coordination with the Proponent to provide any necessary guidance relating to the regulatory standards applicable to the project as they prepare the EIR and Chapter 91 application. It is recommended that the Proponent coordinate with the Department to schedule a meeting to further discuss the information being requested, prior to any subsequent MEPA filing or submittal of a Chapter 91 application.

If you have any questions regarding the Department's comments, please contact me at susan.you@mass.gov or at (857) 972-5638.

From:	Maguire, Thomas (DEP)
To:	Vaughan, Eva (EEA)
Cc:	Rhodes, Lisa (DEP); Provencal, Jill (DEP); DiPietro, Philip (DEP); Evans, N.Tay (DEP); Hilgeman, David (DEP); Wu, Christina Y (DEP)
Subject:	MEPA, EENF, EOEA #16667 – Island End River Flood Resilience Project - Chelsea, Everett
Date:	Thursday, April 6, 2023 6:00:38 PM

Please accept these comments on behalf of the Massachusetts Department of Enviornmental Protection Wetlands Program to supplement our comment letter dated April 5, 2023.

Catchment Area: The EENF indicates the catchment area is 200 acres. MassDEP believes it is much larger (378 acres to 1,110 acres) based on review of the urban drainage system and topographic divides. If the Storm Surge Control Facility proposed to be constructed in this tidal stream was sized based only using a 200-acre catchment area, it will be undersized. Potentially, this could cause increased pluvial flooding in the neighborhoods, if the tide gates in the Storm Surge Control Facility are closed at the same time it is raining. The provisions to prevent backflow to the Beacham Street drainage system do not address this issue. Basically, when it is raining or there is snow melt, the runoff will have nowhere to drain when those gates are closed, the vault and pipes do not provide sufficient storage, so stormwater will surcharge backwards through the drainage system, flooding the streets and possibly basements. D-1

FLOODWAY: Potentially there may have been a floodway established by FEMA in the Island End River in Everett. The proponent needs to determine whether a FEMA designated floodway exists, and if so, conduct a no rise flood analysis. D-2

LSCSF or BLSF: Proper delineation of resource areas that are subject to flooding is essential. It appears the Everett side of the Island End River may be BLSF and the Chelsea side LSCSF. The proponent is directed to investigate this further, to determine which Performance Standards should be applied to the proposed construction. D-3

Thomas Maguire
Senior Wetlands Resiliency Coordinator
Massachusetts Department of Enviornmental Protection
Wetlands Program
100 Cambridge Street
Boston MA 02114

EEA Number – 16667
Project Name – Island End River Flood Resilience Project
Document – EENF
Comments by – Stephanie Condakes Torski on behalf of Auction Nominee Trust, which owns the property at 155 Market Street in Everett. ("The Property")
Reference – pg 76 of EENF shows 155 Market St. ("The Property")

I am writing to inform you that based on the information contained in the recently submitted Expanded Environmental Notification Form ("EENF"), the Trust does not support the IER Flood Resilience Project ("Project") in its current form. The short and long-term impacts to 155 Market Street ("The Property") are simply unacceptable. The Property is being asked to uniquely bear the brunt of this Project for the benefit of the greater Everett and Chelsea communities, without receiving an equal benefit in return. E-1

The Property does not experience flooding and sits between 1 foot and 4 feet above sea level. It has never experienced any flooding effects during storm surges nor during king tides. The topography of 155 Market St. provides a natural flood barrier and will continue to do so for at least 50 years given global warming projections. Hence, there are no discernable benefits to The Property from this Project.

The EENF makes it clear that the Project renders the Property unusable for ordinary business operations for months – if not years – during construction. Nothing in the proposed Project purports to compensate the Trust for the loss of use. Furthermore, the Property is leased out to numerous tenants for their food warehousing and distribution businesses. How are these tenants supposed to carry out their business during the months or years that 155 Market Street becomes functionally unusable for their purposes? The Trust has leases with its tenants and has legal obligations to them. The Project ignores these issues entirely.

From my review of the EENT, 155 Market Street is the only property being asked to carry this uncompensated, intrusive burden. As stated on page 1-13 of the EENT Project Summary: "Access to #155 Market Street will be impacted during construction, causing entrance on the east side to be inaccessible. The loading dock in the back of #155 Market Street will also be inaccessible during construction of the east portion of the storm surge barrier. The storm surge barrier wall will be constructed at #155 Market Street first, in order to reconstruct the entrances and loading docks, to allow those to be opened back up for operational use. This phase of the construction will require the parking lot on the south to be accessed only using the entrance from #95 Behen Street. Once the storm surge barrier at #155 Market Street is completed, the north parking lot will be reopened, and the south entrance will be closed for the next phase of construction."

Beyond the short-term impacts which render the Project unworkable, the design and long-term impacts on the Property are similarly unacceptable. The proposed wall permanently negates access to the water along the northeast end of the Property. It also unacceptably

encroaches on space used and needed for existing business operations, including impairing the ability of trucks and tractor trailers to safely maneuver around the Property.

In short, this Project is much more of a burden to 155 Market Street than to any other impacted owner. The Trust is being asked to suffer uncompensated temporary and permanent impacts, both financially and with regard to loss of use, which are simply unacceptable.

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April 7, 2023 Via email: Eva.Vaughan@mass.gov

Ms. Rebecca Tepper, Secretary
Massachusetts Environmental Policy Act (MEPA) Office
100 Cambridge Street, 9th Floor
Boston, MA 02114

Attn: Eva Vaughn

Re: Island End River Flood Resilience Project Expanded Environmental Notification Form

Dear Ms. Vaughn,

Boston Harbor Now respectfully submits the following comments on the *Island End River (IER) Flood Resilience Project Expanded Environmental Notification Form* prepared by the Cities of Chelsea and Everett. Boston Harbor Now staff has been following this project and have most recently attended the March 14, 2023 MEPA Public Meeting and reviewed the Supplemental Information Packet.

As longtime stewards of the Harborwalk in and around Boston, Boston Harbor Now is committed to ensuring that the coastline changes built today are designed for a more resilient and inclusive future. We use the term "Harborwalk 2.0" to capture the aspirations of this work to ensure the waterfront is accessible and welcoming; is prepared for the coastal impacts of climate change; and centers equity and inclusion in the development of its design, construction, and programming. An accessible waterfront should have connections between the community and the water as well as numerous activation strategies to serve all residents. A resilient waterfront includes a variety of climate adaptation strategies to protect and serve Chelsea and Everett at a district scale. To center equity in waterfront design is to focus on strategies that make the waterfront feel safe and inclusive through lighting, multi-lingual signage, full ADA accommodations, and the elimination of features that make users feel unwelcome or excluded.

The IER Flood Resilience Project is an impressive collaboration between the City of Everett and City of Chelsea to build climate adaptation and flood protection measures that can meet the needs of a variety of stakeholders. We applaud the inter-municipal collaboration that generated and will fund this proposal as well as the thoughtful design considerations for future waterfront park goers, water-dependent industrial uses, and ecosystem improvements. As the proponent moves forward with their designs, we

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hope they continue to prioritize their partnership with community organizations to ensure that the stewardship program and coordinated stakeholder engagement is continued along with the advancement of nature-based approaches (NBAs) that provide flood risk reduction and other co-benefits.

F-1

Inter-Municipal Collaboration

This proposal has the unique challenge of needing to balance the needs and requirements of two different municipalities and competing land uses. Despite these complications, the project is stronger for the mixed and matched flood strategies used to address these divergent needs. Flood resilience on the Chelsea side is geared towards improving the human experience. The Chelsea side of the site is surrounded primarily by commercial uses and is home to Island End Park, a small park along the IER that affords visitors a place to relax and look out at the water. Here, NBAs and wetland enhancements are paired with resilient riverwalk amenities and finishings on the Chelsea side to create an engaging visitor experience that the public can enjoy.

The Everett waterfront is home to the New England Produce Center and other water-dependent industrial uses. This side of the project is located within a Designated Port Area (DPA), so the proposed interventions are designed around the operations of the working waterfront businesses in the DPA. The proponent has opted for concrete storm surge barrier walls with passive and active storm surge barrier gates along the whole Everett side of the site, while also installing some NBAs along a smaller portion where feasible. The Everett alignment is designed to prevent overland storm surge flooding while allowing water-dependent industrial operations to continue to function.

While the tailored strategies for each side of the site are impressive, the two municipalities' successful coordination is perhaps the most laudable aspect. Thanks to both cities' coordinated efforts, the varied adaptation strategies are properly tied together to ensure district-wide flood protection. The two cities' efforts to coordinate will also ensure that construction and phasing minimize the risk of channelization that might otherwise have occurred if the cities each proposed their own flood measures.

Community Engagement through Nature-Based Approaches

As co-leaders of the Stone Living Lab and advocates of multi-benefit coastal adaptation strategies we are encouraged to see NBAs incorporated into the

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site's flood resilience strategies. NBAs can mimic naturally occurring shorelines, help restore ecosystems, reduce flood risk, and provide a host of other co-benefits, including improved suitability for public access. We appreciate that this project leverages its NBAs to help foster community connection to the waterfront. The IER proposal references a strong partnership with MyRWA, GreenRoots, and the City of Everett's Mayor's Youth Employment Intern program. This program proposes that NBAs will provide community members with environmental education and stewardship opportunities that will empower community advocates to help implement and maintain the NBAs by contributing to planting, nest-building, and plant management. We believe this unique programmatic model fosters connections between the community and the natural environment, and we will monitor it in the hopes that it can l be replicated effectively with other resilience projects.

We highlight these design elements because potential permitting challenges faced by eliminating the proposed planters and phragmites removal could jeopardize the community's involvement in this project. As described in the filing, the community's stewardship opportunity seems to hinge upon a hybrid system of planters to introduce vegetation would not survive the soils on site that have been degraded by urban uses. While alternatives have been offered to the original planter proposal, we believe the long term community engagement afforded by the inclusion of NBAs is an important benefit. We would support proposed alternatives if they were still able to ensure the community stewardship program will be able to move forward. Similarly, we see the removal of phragmites and return to native plantings as an educational opportunity for the community and best practice in ecological restoration. We would like to see both aspects of the project maintained; however, if changes are necessary during the ongoing permitting process, we hope the proponent will coordinate with their community partners to find an acceptable alternative.

F-2

We appreciate the opportunity to comment on this project and look forward to following its progress toward implementation. We would be happy to speak with you or the proponent further if there are additional questions.

Sincerely,

Kathy Abbott
President and CEO
Boston Harbor Now

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

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Rebecca L. Tepper
Secretary

Bonnie Heiple
Commissioner

April 7, 2023

Rebecca L. Tepper, Secretary
Executive Office of
Energy & Environmental Affairs
100 Cambridge Street
Boston MA, 02114

RE: Everett, Chelsea
Island End River Flood Resilience Project
EEA # 16667

Attn: MEPA Unit

Dear Secretary Tepper:

The Massachusetts Department of Environmental Protection Northeast Regional Office (MassDEP-NERO) has reviewed the Expanded Environmental Notification Form (EENF) for the proposed Island End River Flood Resilience Project in Everett and Chelsea. MassDEP provides the following comments.

Wetlands

An Expanded Environmental Notification Form_(EENF) has been filed with EOEA on behalf of the Cities of Chelsea and Everett for the construction of a flood barrier, Storm Surge Control Facility, salt marsh restoration, bank restoration and an associated Riverwalk. The goal of the project is to provide flood protection and resiliency to the low-lying areas of Chelsea and Everett, while providing an opportunity for the community to engage in the natural resources of the Island End River (IER). MassDEP has completed its review of the EENF and recommends the development of an Environmental Impact Report (EIR) to explore alternatives reducing the environmental impacts projected by the EENF.

The project proposes impacts to Land Subject to Coastal Storm Flowage (LSCSF), Bordering Vegetated Wetlands (BVW), Land Under the Ocean, Salt Marsh, Land Containing Shellfish, Coastal Beach, and Coastal Bank.

The project proposes the following temporary and permanent impacts to resource areas: i) 346,510 square feet (sf) of LSCSF with 211,496 sf permanent impacts and 125,014 temporary; ii) 967 feet of Coastal Bank with 759 permanent and 208 temporary; iii) 22,812 sf of temporary impacts to Salt Marsh; iv) 1609 sf of Land Containing Shellfish with 1,357 sf permanent and 252 temporary; v) 11,557 sf of Coastal Beach with 8,502 permanent and 3,055 temporary; vi) 7,377 sf of BVW with 1,656 sf permanent and 5,718 temporary and vii) 22,707sf of Riverfront Area with 7,226 permanent and 7226 temporary. There are no permanent impacts to Salt Marsh proposed as part of this project.

The proposed work in BVW includes an area of 5,718 SF of temporary impacts including proposed *Spartina Alterniflora* plugs and native salt tolerant seed mix plantings. The Project will replicate the 1,650 SF of BVW lost with a 2,674 SF area adjacent to the Island End Park and #359 Beacham Street property.

The project includes the construction of a storm surge flood barrier wall, measuring 4,640 lf, on the west side of the IER abutting Market Street. The project was responsive to agency comments during the MEPA process for the since-withdrawn ENF for the project under EOEA #16363, which encouraged moving the barrier wall landward from the High Tide Line (HTL) and Bank, and removal of berms that were proposed landward of it. The proposed boardwalk has also been moved landward of the flood barrier in response to agency comments. A portion of the flood barrier wall remains located below the HTL and on Coastal Bank. Alternatives should be explored in the EIR to move the wall completely landward of the Coastal Bank and HTL. G-1

The proposal includes construction of a 2,900 sf Storm Surge Control Facility (SSCF). Dredging and constructing the SSCF outfall will temporarily impact 4,902 SF and permanently impact 12,585 SF of the Land Under Ocean within the Designated Port Area (DPA). This impact area includes 1,438 cubic yards of material to be dredged, which will be disposed of at either a Confined Disposal Facility or an off-site landfill depending on final sediment sampling and analysis results. The SSCF is designed to maintain the existing hydrologic connection and allow for uninterrupted tidal flows in typical conditions. The SSCF gates will only close when coastal storm event surge conditions exceed the current HTL elevation and will reopen when the IER water elevation drops below Elevation 7.0 NAVD88. Details should be developed regarding the extent and type of rip rap proposed downstream, or seaward, of the headwall to the IER. While the EENF includes an inspection and maintenance schedule for the SSCF, a more detailed operations and maintenance plan should be developed in the EIR. The O and M plan should identify any other criteria and the projected frequency with which the tide gate will be opened and closed. G-2 The projected frequency of operation of the tide gate can limit salinity upstream and impact existing and restored upstream resource areas. Include who will be responsible for the long-term operations and maintenance. A more comprehensive discussion and evaluation of the relationship between the SSCF and the recently daylighted and expanded portion of the upstream Market Street culvert should be developed, in conjunction with an evaluation of further opportunities in the upgradient watershed to treat and detain stormwater. G-3

Stormwater design calculations and plans should be submitted to confirm storage capacity of the stormwater surge facility to demonstrate that a closed tide gate will not increase interior flooding. A joint probability analysis should be included assessing interior drainage of the 100-year, 24-hour storm when the tide gate is closed. When the tide gate is closed, the resource areas adjacent to the upstream portions of the IER effectively function as Bordering Land Subject to Flooding (BLSF). A Letter of Map Amendment should be with FEMA for all associated floodplain elevation amendments that will occur due to the installation of the flood wall and operation of the tidal gate in accordance with the O and M Plan to be submitted. G-4

The shoreline area of the IER downstream of the culverts is classified as Coastal Beach and Coastal Bank. The Coastal Banks are eroding and provide sediment to the Coastal Beach downgradient or downstream of them and are therefore significant to the protected interests of flooding and storm damage prevention, as is the Coastal Beach itself. Both banks of the IER are eroding, as are the areas around the existing stormwater outfalls. The EENF proposes the installation of concrete planters lined with wood and stone sills on the Coastal Bank, Coastal Beach, and in the intertidal zone. This amounts to effectively hardening the surfaces of these coastal resource areas, causing adverse impacts to them by decreasing their ability to provide storm damage protection and flood control functions. The sills and concrete planters will cause scour and erosion, adversely impacting the protected functions of the coastal resource areas, changing the form and volume of the Coastal Beach, and making stabilization of the Coastal Bank and Coastal Beach of the IER more problematic. G-5 This concern, as raised at the MEPA site visit by MassDEP, resulted in the development of a supplemental submission by the applicant dated March 24, 2023, showing other options for shoreline treatments. All of the presented alternatives incorporate structural toe stabilization and hard structural components on the Coastal Bank and Coastal Beach to facilitate supplemental vegetation plantings within the Coastal Beach and intertidal areas. These proposed structural components all appear to have projected adverse effects on the protected functions of Coastal Beach and Coastal Bank. While debris removal from the Coastal Banks and Coastal Beach of the IER is encouraged, the toe stabilization and hard structural solutions proposed to facilitate vegetation of the Coastal Banks and Coastal Beach of the IER that currently provides storm damage protection and flood control functions is not allowable under the Regulations. The adverse effects of these alternative shoreline treatments are the principal reason for MassDEP's recommendation that the project file an EIR.

The EIR should include an alternatives analysis focusing on stabilizing the erosion on Coastal Banks and outfall of the IER, with emphasis on non-structural measures. Alternatives should include options to remove the debris on the Coastal Bank and Coastal Beach, regrading of the Coastal Bank to a gentler and stable 3:1 slope, and incorporation of more natural solutions to stabilize the regraded Coastal Bank. G-6 Such nature-based solutions include fiber blankets, coir rolls at the toe of slope, and native, salt-tolerant plantings to stabilize the Coastal Bank soils. Stabilization around the new outfall wing walls should be refined to include information on how the wingwall stabilization will tie into the banks of the IER without causing or increasing erosion.

As discussed at the site visit, the proposed access ramps to the park on the east side of the IER have been designed as solid fill with retaining walls and should be redesigned as pile-supported ramps and walkways because they are seaward of the flood barrier; and, as currently G-7

designed would cause wave reflection and refraction. The riprap shown adjacent to the ramps should be eliminated to the extent practicable, with alternatives included in the EIR.

The EENF proposes enhancement of the existing salt marsh south of the existing boardwalk by removing debris and trash removal to depths of approximately 12 inches. This will result in elevations of the restored marsh near and below MHW. The proposed elevations should be refined to ensure the marsh will become reestablished and that portions of it at the lowest proposed elevations do not become mudflat due to proposed elevations being too low in conjunction with projected sea level rise. The proposed monitoring plan should include observation for these possible effects on the salt marsh restoration area. As stated in MassDEP's original comments to the withdrawn ENF, species included in the salt-tolerant seed mix should be specified and refined to ensure vigor for this intertidal use. G-8

At the site visit, MassDEP commented on the possible difficulty of replicating the approximately 1,650 square foot BVW area under and adjacent to the boardwalk, and adjacent to the salt marsh. Given the hydrology of this portion of the project, it may be possible to replicate the lost BVW more easily as salt marsh. To accomplish this regulatorily, the proponent would have to file for this portion of the larger project as a separate Ecological Restoration Limited Project [see the eligibility criteria in 310 CMR 10.24(8)]. G-9

The project will require Orders of Conditions issued by the Cities of Chelsea and Everett for impacts to wetland resource areas. The project will also require a Section 401 Water Quality Certification for impacts to salt marsh and greater than 5000 sf of impacts, including temporary impacts, to BVW.

The MassDEP appreciates the opportunity to comment on this proposed project. Please contact Kristin.Divris@mass.gov at (508) 887-0021 for further information on wetlands issues. If you have any general questions regarding these comments, please contact me at John.D.Viola@mass.gov or at (857) 276-3161.

Sincerely,

John D. Viola
Deputy Regional Director

cc: Brona Simon, Massachusetts Historical Commission,
Eric Worrall, Kristin Divris, Jill Provencal, MassDEP-NERO

Attachment C

PROJECT PLANS

Island End River Flood Resilience Program
City of Chelsea, MA / City of Everett, MA

Appendix C: Project Plans

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4	RPE-C-102	LAYOUT AND MATERIALS PLAN - 2 (STA. 94+50 - 100+00)	RESILIENCE PROVISIONS EAST
5	SSCF-C-101	PHASE 1 CONSTRUCTION CONCEPTUAL PLAN	STORM SURGE CONTROL FACILITY
6	SSCF-C-102	PHASE 2 CONSTRUCTION CONCEPTUAL PLAN	STORM SURGE CONTROL FACILITY
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9	RPW-C-102	LAYOUT AND MATERIALS PLAN - 2 (STA. 104+25 - 108+75)	RESILIENCE PROVISIONS WEST
10	RPW-C-103	LAYOUT AND MATERIALS PLAN - 3 (STA. 108+75 - 116+25)	RESILIENCE PROVISIONS WEST
11	RPW-C-104	LAYOUT AND MATERIALS PLAN - 4 (STA. 116+25 - 120+50)	RESILIENCE PROVISIONS WEST
12	RPW-C-105	LAYOUT AND MATERIALS PLAN - 5 (STA. 120+50 - 126+00)	RESILIENCE PROVISIONS WEST
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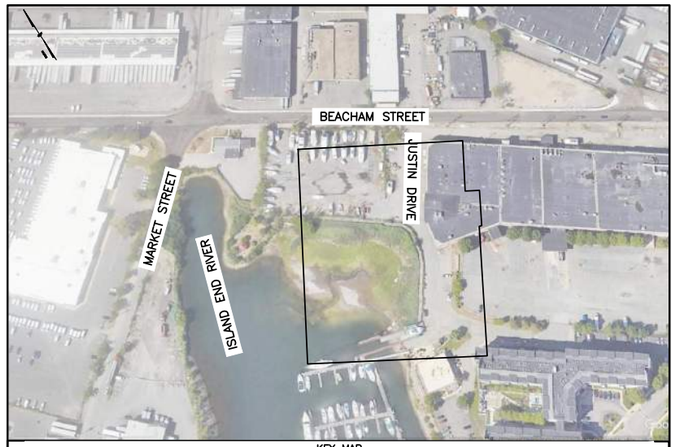
25	RPW-ES-103	EROSION AND SEDIMENT CONTROL PLAN - 3 (STA. 112+50 - 117+75)	RESILIENCE PROVISIONS WEST
26	RPW-ES-104	EROSION AND SEDIMENT CONTROL PLAN - 4 (STA. 117+75 - 122+00)	RESILIENCE PROVISIONS WEST
27	RPW-ES-105	EROSION AND SEDIMENT CONTROL PLAN - 5 (STA. 122+00 - 127+50)	RESILIENCE PROVISIONS WEST
28	RPW-ES-106	EROSION AND SEDIMENT CONTROL PLAN - 6 (STA. 127+50 - 133+75)	RESILIENCE PROVISIONS WEST
29	RPW-ES-107	EROSION AND SEDIMENT CONTROL PLAN - 7 (STA. 133+75 - 135+81)	RESILIENCE PROVISIONS WEST

Appendix C: Project Plans

Page	Sheet No.	Drawing Title	Location
30	RPE-S-201	STRUCTURAL ELEVATION - 1	RESILIENCE PROVISIONS EAST
31	RPE-S-202	STRUCTURAL ELEVATION - 2	RESILIENCE PROVISIONS EAST
32	RPE-S-203	STRUCTURAL ELEVATION - 3	RESILIENCE PROVISIONS EAST
33	SSCF-C-301	HEADWALL SECTIONS	STORM SURGE CONTROL FACILITY
34	SSCF-C-302	CONTROL STRUCTURE SECTION	STORM SURGE CONTROL FACILITY
35	NBA-L-302	PLANTING SECTIONS - 2	NATURE-BASED APPROACHES
36	RPW-S-301	STRUCTURAL SECTIONS	RESILIENCE PROVISIONS WEST



KEY MAP
SCALE: 1"=150'

LEGEND

- PROPERTY LINE
- MATCH LINE
- PEDESTRIAN EASEMENT
- BITUMINOUS CONCRETE PAVEMENT
- CEMENT CONCRETE PAVEMENT
- PLANTING AREA, SEE PLANTING PLAN
- SHEET PILE WALL WITH FORM FINISHED CAP WITH ARCHITECTURAL FINISH CONCRETE CAP
- CIP CONCRETE RETAINING WALL
- CORTEN STEEL RETAINING WALL
- EXPANSION JOINT (EJ)
- SCORE JOINT (EJ)
- GUARDRAIL
- WOOD GUARDRAIL
- BVCL FENCE
- PEDESTRIAN LIGHT
- BIKE RACKS ON CONCRETE PAD
- BENCH

20 10 0 20 40
SCALE: 1"=20'

MATCH LINE SEE SHEET RPE-C-102

DAMAGED HYDRANT, OPERATING STEM VISIBLE

100-FT BUFFER TO BVW

100-FT BUFFER TO SALT MARSH

100-FT BUFFER TO COASTAL BANK

2 LZ503 8' HT. BVCL FENCE ON CONCRETE MOW CURB

3 LZ505 PROPOSED LANDSCAPED BERM PLANTING AREA, SEE PLANTING PLANS

LARGE STONE BLOCKS, SIZE VARY

DOUBLE DOOR SWING GATE

33-FT WIDE ACCESS EASEMENT

JUSTIN DRIVE

N4083

8.23

7.37

MATCH EXISTING GRADE

LOADING BAY 3

LOADING BAY 2

LOADING BAY 1

WESTBROOK PARTNERS
N/F JDC 65R OWNER LLC
100 JUSTIN DRIVE

RTNs: 3-20973

ELECT. EASEMENT

TURN-AROUND AREA

CPT-5A

CPT-5

SALT MARSH

14-FT PEDESTRIAN ACCESS EASEMENT

4 LZ501 BENCH ON CONCRETE PAD

SHEETPILE WALL WITH FORM FINISHED CONCRETE CAP

HIGHEST HIGH TIDE (EL. 6.5)

6 LZ505 8" CEMENT CONCRETE WALKWAY, TYP.

N/F CITY OF CHELSEA

GUARDRAIL AT CONCRETE RETAINING WALL

4 LZ502 2 LZ502

6 LZ505 6" CEMENT CONCRETE WALKWAY, TYP.

9.14

GRASS AREA SLOPED TO MATCH EXISTING GRADE

MATCH EXISTING GRADE

ELECT. EASEMENT
BOLLARDS

PROPOSED EDGE OF PAVEMENT

LIGHT FIXTURE

WESTBROOK PARTNERS
N/F JDC 65R OWNER LLC
100 JUSTIN DRIVE

CONC BAY: 33.0'Lx1
SLAB THICKNE

PARKING LOT E

25-FT RIVERFRONT AREA

100-FT BUFFER TO COASTAL BEACH/TIDAL FLAT

WATER

MEAN HIGH WATER (EL 4.33)

SALT MARSH

6 LZ502 SHEETPILE WALL WITH FORM FINISHED CONCRETE CAP, WITH GUARDRAIL, TYP.

HIGHEST HIGH TIDE LINE (EL. 6.5)

STA 91+04

7 LZ502 12-INCH BAND OF SCOUR RESISTANT GROUND COVER AGGREGATE SIZED 2-6-INCHES

RTNs:
3-13541
3-13542

UTILITY COVER WITH CMP RISER, 66" TO T.O.W. NO VISIBLE PIPE

STA 91+14

2 LZ502 CONCRETE RETAINING WALL WITH GUARDRAIL

5 LZ505 VERTICAL GRANITE CURB, TYP. BOTTOM OF CURB

6 LZ505 8" CEMENT CONCRETE WALKWAY, TYP.

TWO-TIER WOOD RET. WALLS (36" HEIGHT)

GRASS AREA WITH MIN. 5% SLOPE TOWARDS PAVEMENT. SEE DETAIL 2/ LZ505

PROPOSED EDGE OF PAVEMENT

STONE BLOCKS (EXACT SIZE VARY)

MATCH EXISTING CONC. CURB

COASTAL BANK

REBUILD CONCRETE BOAT LAUNCH RAMPS TO SPECIFIED GRADES

APPROX. LOCATION OF TRANSITION TO STEEL BOAT LAUNCH RAILS

MATCH EXISTING GRADE

STEEL BOAT LAUNCH RAILS

APPROX. LOCATION OF TRANSITION TO STEEL BOAT LAUNCH RAILS

100-YR FLOOD LINE

CB

N/F DEVELOPMENT AND MARKET GROUP
305 COMMANDANTS WAY

STORAGE SHED

MATCH LINE SEE SHEET RPE-C-102

Project:
ISLAND END RIVER FLOOD RESILIENCE PROVISIONS EAST

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants:

Revisions:

No.	Date	Description

Seal:

Issued For:

PROGRESS PRINT

Scale:	AS NOTED
Date:	NOVEMBER 2023
Drawn By:	FD
Reviewed By:	BK
Approved By:	BWA
W&S Project No.:	-
W&S File No.:	

Drawing Title:

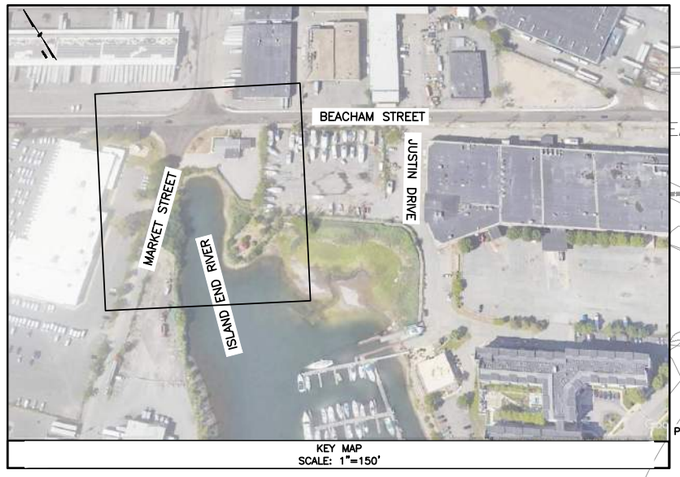
LAYOUT AND MATERIALS PLAN - 1 (STA. 91+11 - 94+50)

Sheet Number:

RPE-C-101

Rev: 1.0 Date: 11/2023

I:\wse23\civil\05\Project\MS4\Permit\Island End River Award\CAD\dwg\RPE-C-101 - Layout and Materials + Resource Section Views.dwg



KEY MAP
SCALE: 1"=150'

LEGEND

- PROPERTY LINE
- MATCH LINE
- PEDESTRIAN EASEMENT
- BITUMINOUS CONCRETE PAVEMENT
- CEMENT CONCRETE PAVEMENT
- PLANTING AREA, SEE PLANTING PLAN
- SHEET PILE WALL WITH FORM FINISHED CAP WITH ARCHITECTURAL FINISH CONCRETE CAP
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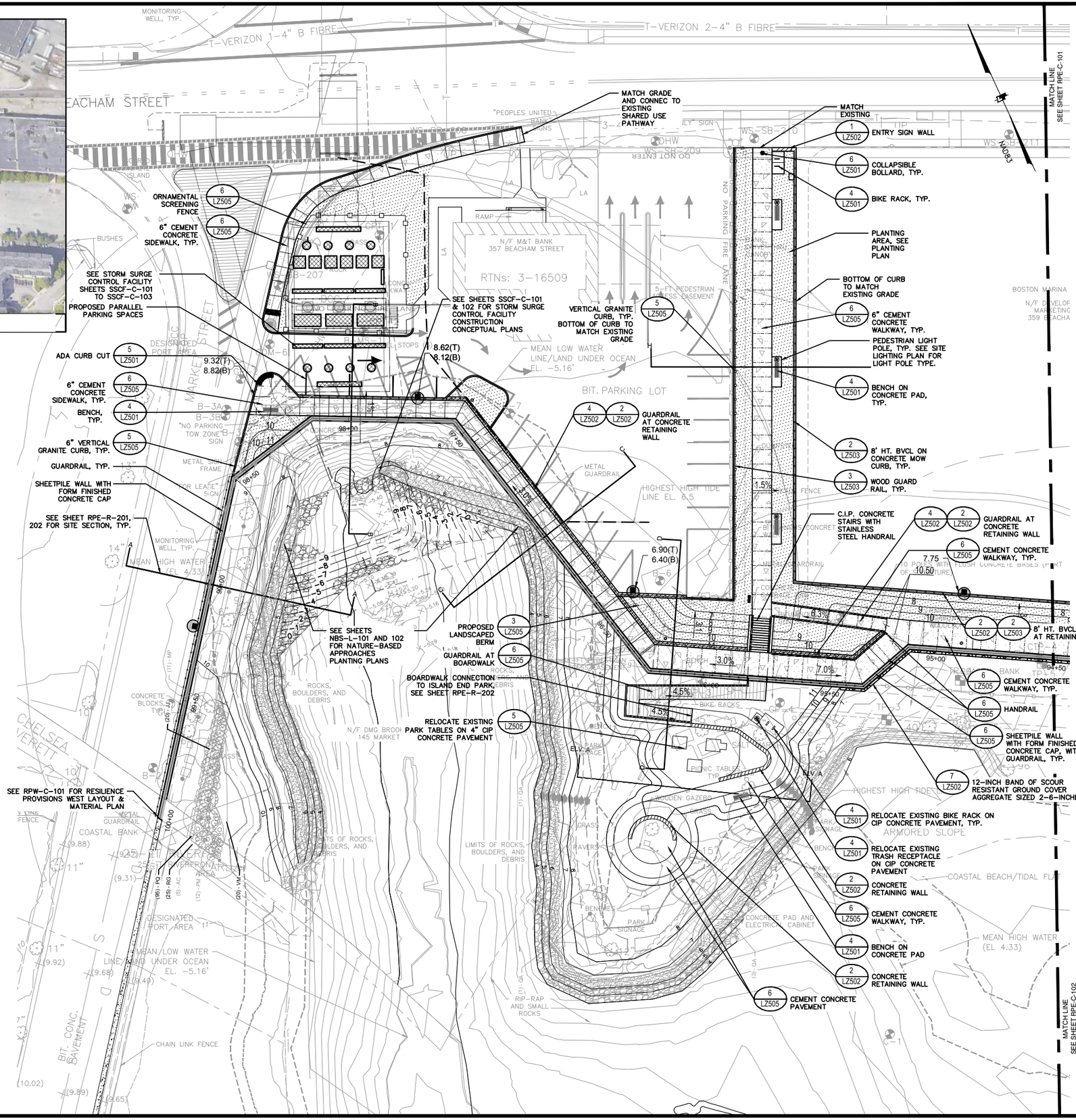
- WOOD GUARDRAIL
- BVCL FENCE
- PEDESTRIAN LIGHT
- BIKE RACKS ON CONCRETE PAD
- BENCH
- NATURE BASED SOLUTION

20 10 0 20 40
SCALE: 1"=20'



Project:
ISLAND END RIVER FLOOD RESILIENCE PROVISIONS EAST

Weston & Sampson
Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants:

Revisions:

No.	Date	Description

Seal:

Issued For:

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Scale:	AS NOTED
Date:	NOVEMBER 2023
Drawn By:	FD
Reviewed By:	BK
Approved By:	BWA
W&S Project No.:	-
W&S File No.:	

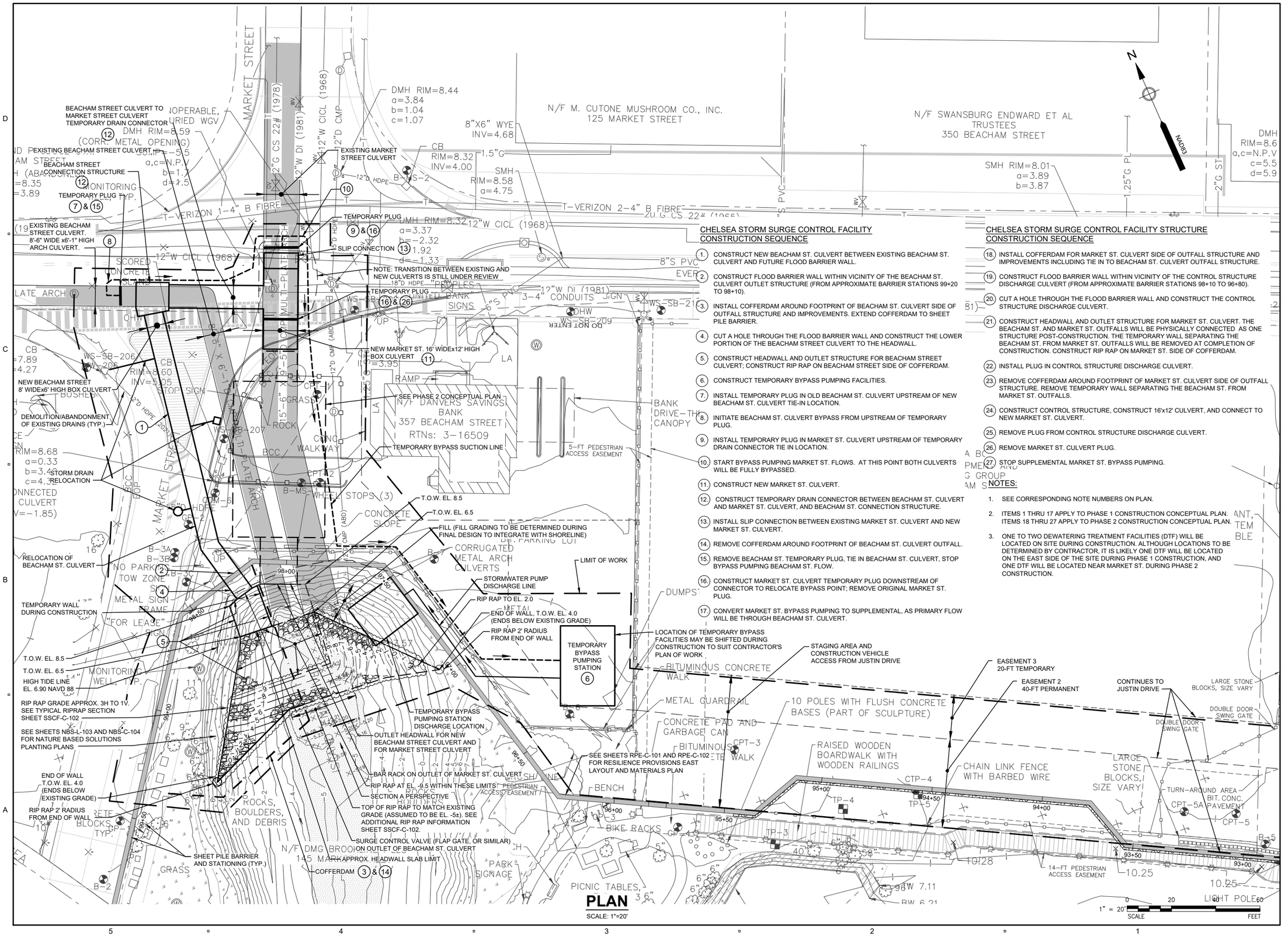
Drawing Title:

LAYOUT AND MATERIALS PLAN - 2 (STA. 94+50 - 100+00)

Sheet Number:

RPE-C-102

Rev. 15 Date: 11/2023



PLAN

SCALE: 1"=20'

CHELSEA STORM SURGE CONTROL FACILITY CONSTRUCTION SEQUENCE

1. CONSTRUCT NEW BEACHAM ST. CULVERT BETWEEN EXISTING BEACHAM ST. CULVERT AND FUTURE FLOOD BARRIER WALL.
2. CONSTRUCT FLOOD BARRIER WALL WITHIN VICINITY OF THE BEACHAM ST. CULVERT OUTLET STRUCTURE (FROM APPROXIMATE BARRIER STATIONS 99+20 TO 98+10).
3. INSTALL COFFERDAM AROUND FOOTPRINT OF BEACHAM ST. CULVERT SIDE OF OUTFALL STRUCTURE AND IMPROVEMENTS. EXTEND COFFERDAM TO SHEET PILE BARRIER.
4. CUT A HOLE THROUGH THE FLOOD BARRIER WALL AND CONSTRUCT THE LOWER PORTION OF THE BEACHAM STREET CULVERT TO THE HEADWALL.
5. CONSTRUCT HEADWALL AND OUTLET STRUCTURE FOR BEACHAM STREET CULVERT; CONSTRUCT RIP RAP ON BEACHAM STREET SIDE OF COFFERDAM.
6. CONSTRUCT TEMPORARY BYPASS PUMPING FACILITIES.
7. INSTALL TEMPORARY PLUG IN OLD BEACHAM ST. CULVERT UPSTREAM OF NEW BEACHAM ST. CULVERT TIE-IN LOCATION.
8. INITIATE BEACHAM ST. CULVERT BYPASS FROM UPSTREAM OF TEMPORARY PLUG.
9. INSTALL TEMPORARY PLUG IN MARKET ST. CULVERT UPSTREAM OF TEMPORARY DRAIN CONNECTOR TIE IN LOCATION.
10. START BYPASS PUMPING MARKET ST. FLOWS. AT THIS POINT BOTH CULVERTS WILL BE FULLY BYPASSED.
11. CONSTRUCT NEW MARKET ST. CULVERT.
12. CONSTRUCT TEMPORARY DRAIN CONNECTOR BETWEEN BEACHAM ST. CULVERT AND MARKET ST. CULVERT, AND BEACHAM ST. CONNECTION STRUCTURE.
13. INSTALL SLIP CONNECTION BETWEEN EXISTING MARKET ST. CULVERT AND NEW MARKET ST. CULVERT.
14. REMOVE COFFERDAM AROUND FOOTPRINT OF BEACHAM ST. CULVERT OUTFALL.
15. REMOVE BEACHAM ST. TEMPORARY PLUG, TIE IN BEACHAM ST. CULVERT, STOP BYPASS PUMPING BEACHAM ST. FLOW.
16. CONSTRUCT MARKET ST. CULVERT TEMPORARY PLUG DOWNSTREAM OF CONNECTOR TO RELOCATE BYPASS POINT; REMOVE ORIGINAL MARKET ST. PLUG.
17. CONVERT MARKET ST. BYPASS PUMPING TO SUPPLEMENTAL, AS PRIMARY FLOW WILL BE THROUGH BEACHAM ST. CULVERT.

CHELSEA STORM SURGE CONTROL FACILITY STRUCTURE CONSTRUCTION SEQUENCE

18. INSTALL COFFERDAM FOR MARKET ST. CULVERT SIDE OF OUTFALL STRUCTURE AND IMPROVEMENTS INCLUDING TIE IN TO BEACHAM ST. CULVERT OUTFALL STRUCTURE.
19. CONSTRUCT FLOOD BARRIER WALL WITHIN VICINITY OF THE CONTROL STRUCTURE DISCHARGE CULVERT (FROM APPROXIMATE BARRIER STATIONS 98+10 TO 96+80).
20. CUT A HOLE THROUGH THE FLOOD BARRIER WALL AND CONSTRUCT THE CONTROL STRUCTURE DISCHARGE CULVERT.
21. CONSTRUCT HEADWALL AND OUTLET STRUCTURE FOR MARKET ST. CULVERT. THE BEACHAM ST. AND MARKET ST. OUTFALLS WILL BE PHYSICALLY CONNECTED AS ONE STRUCTURE POST-CONSTRUCTION. THE TEMPORARY WALL SEPARATING THE BEACHAM ST. FROM MARKET ST. OUTFALLS WILL BE REMOVED AT COMPLETION OF CONSTRUCTION. CONSTRUCT RIP RAP ON MARKET ST. SIDE OF COFFERDAM.
22. INSTALL PLUG IN CONTROL STRUCTURE DISCHARGE CULVERT.
23. REMOVE COFFERDAM AROUND FOOTPRINT OF MARKET ST. CULVERT SIDE OF OUTFALL STRUCTURE. REMOVE TEMPORARY WALL SEPARATING THE BEACHAM ST. FROM MARKET ST. OUTFALLS.
24. CONSTRUCT CONTROL STRUCTURE, CONSTRUCT 16'x12' CULVERT, AND CONNECT TO NEW MARKET ST. CULVERT.
25. REMOVE PLUG FROM CONTROL STRUCTURE DISCHARGE CULVERT.
26. REMOVE MARKET ST. CULVERT PLUG.
27. STOP SUPPLEMENTAL MARKET ST. BYPASS PUMPING.

NOTES:

1. SEE CORRESPONDING NOTE NUMBERS ON PLAN.
2. ITEMS 1 THRU 17 APPLY TO PHASE 1 CONSTRUCTION CONCEPTUAL PLAN. ITEMS 18 THRU 27 APPLY TO PHASE 2 CONSTRUCTION CONCEPTUAL PLAN.
3. ONE TO TWO DEWATERING TREATMENT FACILITIES (DTF) WILL BE LOCATED ON SITE DURING CONSTRUCTION. ALTHOUGH LOCATIONS TO BE DETERMINED BY CONTRACTOR, IT IS LIKELY ONE DTF WILL BE LOCATED ON THE EAST SIDE OF THE SITE DURING PHASE 1 CONSTRUCTION, AND ONE DTF WILL BE LOCATED NEAR MARKET ST. DURING PHASE 2 CONSTRUCTION.

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LAST UPDATE: Friday, November 3, 2023 9:33:53 AM
PLOT DATE: Friday, November 3, 2023 9:46:41 AM

AECOM

PROJECT

ISLAND END RIVER RESILIENCY PROJECT
STORM SURGE CONTROL FACILITY

CLIENT

CITY OF CHELSEA, MA
500 BROADWAY
CHELSEA, MA 02150

CONSULTANT

AECOM TECHNICAL SERVICES, INC.
250 APOLLO DRIVE
CHELMSFORD, MA 01824
PHONE: (978) 905-2100
www.aecom.com

REGISTRATION

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NOTE: This document is preliminary only and is not intended for any purpose except review and comment by the owner and its agents.

ISSUE/REVISION

I/R	DATE	DESCRIPTION

PROJECT NUMBER

60669652

Designed By:	M. MESERVE
Drawn By:	M. THIBODEAU
Dept Check:	C. BENZIGER
Proj Check:	T. HARRISON
Date:	DECEMBER 2022
Scale:	AS NOTED

DISCIPLINE

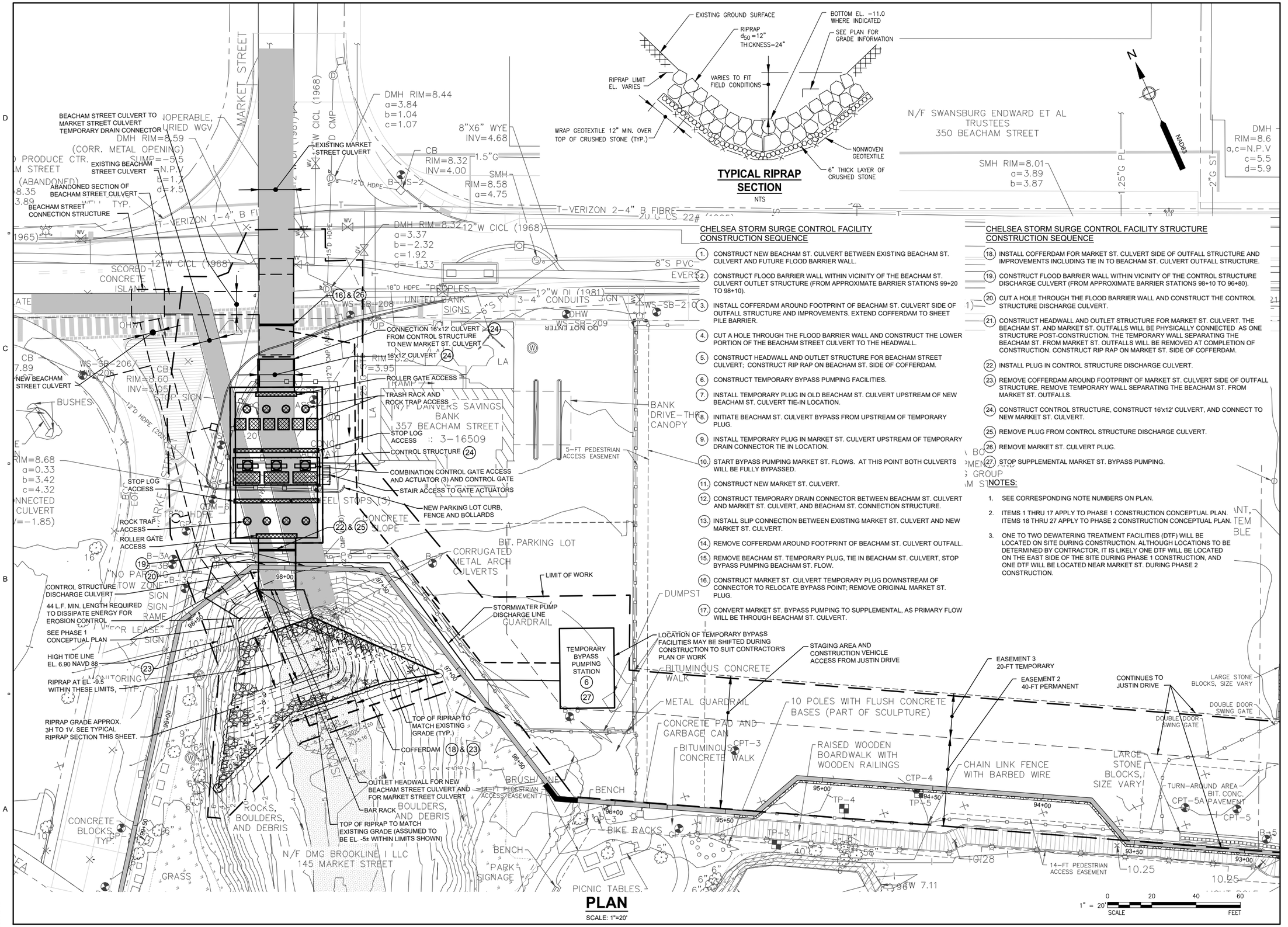
CIVIL

SHEET TITLE

PHASE 1 CONSTRUCTION CONCEPTUAL PLAN

SHEET NUMBER

SSCF-C-101



TYPICAL RIPRAP SECTION

NTS

PLAN

SCALE: 1"=20'

CHELSEA STORM SURGE CONTROL FACILITY CONSTRUCTION SEQUENCE

1. CONSTRUCT NEW BEACHAM ST. CULVERT BETWEEN EXISTING BEACHAM ST. CULVERT AND FUTURE FLOOD BARRIER WALL.
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AECOM

PROJECT

ISLAND END RIVER RESILIENCY PROJECT STORM SURGE CONTROL FACILITY

CLIENT

CITY OF CHELSEA, MA
500 BROADWAY
CHELSEA, MA 02150

CONSULTANT

AECOM TECHNICAL SERVICES, INC.
250 APOLLO DRIVE
CHELMSFORD, MA 01824
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www.aecom.com

REGISTRATION

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ISSUE/REVISION

I/R	DATE	DESCRIPTION

PROJECT NUMBER

60669652

Designed By:	M. MESERVE
Drawn By:	M. THIBODEAU
Dept Check:	C. BENZIGER
Proj Check:	T. HARRISON
Date:	DECEMBER 2022
Scale:	AS NOTED

DISCIPLINE

CIVIL

SHEET TITLE

PHASE 2 CONSTRUCTION CONCEPTUAL PLAN

SHEET NUMBER

SSCF-C-102

PATH/FILENAME: L:\DCS\PROJECTS\WTR\60669652_ISLANDENDRIVER\900_CAD_GIS\910_CAD\20-SHEETS\C00 C-102.DWG
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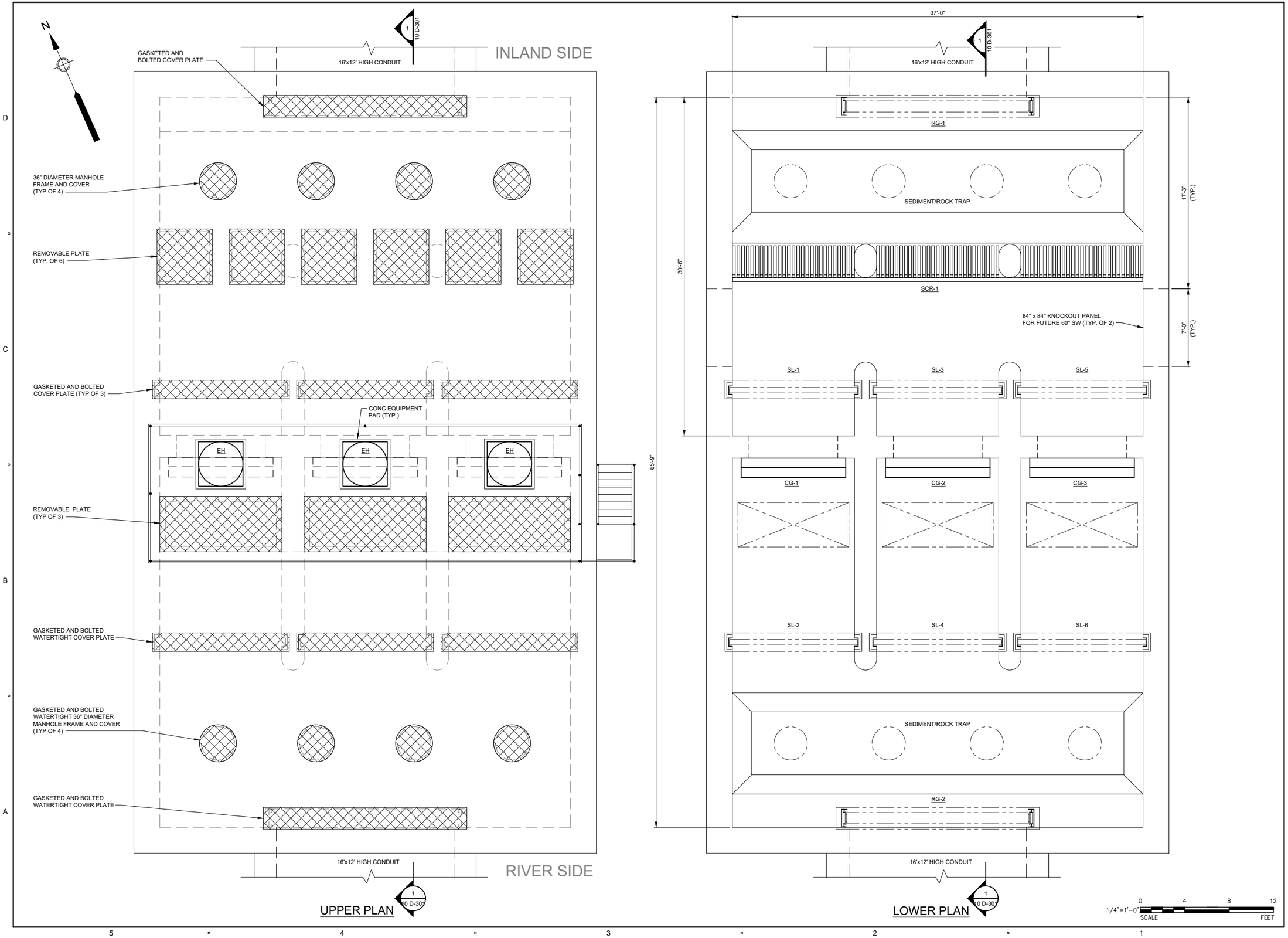

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LAST UPDATE: Wednesday, June 28, 2023 7:34:35 AM
PLOT DATE: Friday, October 13, 2023 1:25:19 PM

AECOM

PROJECT

ISLAND END RIVER RESILIENCY PROJECT STORM SURGE CONTROL FACILITY

CLIENT

CITY OF CHELSEA, MA
500 BROADWAY
CHELSEA, MA 02150

CONSULTANT

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PROJECT NUMBER

60669652

Designed By:	P.M.
Drawn By:	M.B.
Dept Check:	K.B.
Proj Check:	T. HARRISON
Date:	DECEMBER 2022
Scale:	AS SHOWN

DISCIPLINE

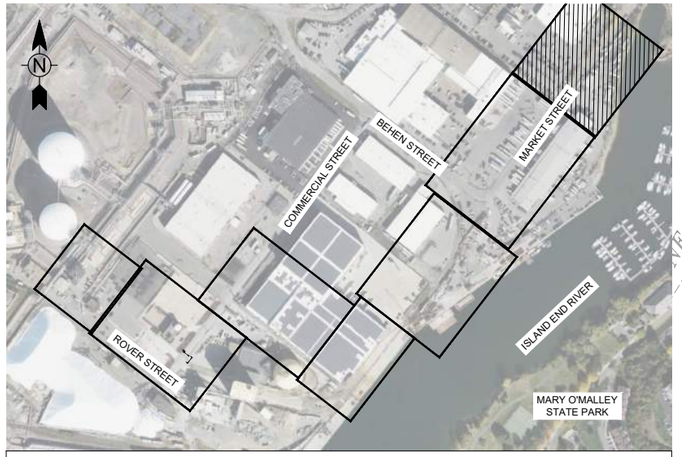
MECHANICAL PROCESS

SHEET TITLE

CONTROL STRUCTURE PLANS

SHEET NUMBER

SSCF-C-103



KEY MAP
SCALE: 1"=300'

MATCHLINE A-A

MAINTAIN AND PROTECT EXISTING GATE

MATCH EX. GRADE

EXIST. DRIVEWAY

MAINTAIN AND PROTECT WATER METER

EXISTING DRIVEWAY

PROP. CONCRETE FOOTING

MAINTAIN AND PROTECT EXISTING OH ELECTRIC POLE

MAINTAIN AND PROTECT AS MANY TREES AS PRACTICABLE

MAINTAIN AND PROTECT EXISTING FENCE

PROP. GUARD RAIL, TYP.

SEE SHEET RPE-C-102 FOR RESILIENCE PROVISIONS EAST LAYOUT & MATERIAL PLAN - 2

MARKET ST

PROP. GUTTER LINE

PROPOSED 7' HIGH, 40' WIDE SLIDING FLOOD GATE

EX. FENCE

REGRADE AND REPAVE W/ FULL DEPTH ASPHALT PAVEMENT

SAWCUT LIMIT AND LIMIT OF EXCAVATION, TYP.

PROP. CONCRETE FLOOD BARRIER

PROPERTY LINE

CHAIN LINK FENCE

100-YEAR FLOODPLAIN

104+00 103+00 102+00 101+00 100+00

40'

N/F UNITED STATES POSTAL SERVICE 12731/79 LOT 8A-2 PLAN No. 1318 OF 1974 #138 MARKET STREET [H0-15-000010]

N/F THE COMMONWEALTH OF MASSACHUSETTS

MIDDLESEX COUNTY

SUFFOLK COUNTY

EVERETT CHELSEA

ZONE X* ZONE AE

ZONE X

155 MARKET ST

U.S. PIERHEAD AND BULKHEAD LINE OF JULY 31, 1920

MIGRATION BARRIER WALL (APPROX. LOCATION) (BELOW GRADE)

HAYBALE AND SILT FENCE STAKE

DPA

LIMITS OF ROCKS, BOULDERS AND DEBRIS

ISLAND END RIVER

SCALE: 1"=20'

TETRA TECH
www.tetratech.com
498 7TH AVENUE, 15TH FLOOR
NEW YORK, NY 10018
PHONE: (646) 576-4034

MARK	DATE	DESCRIPTION	BY

CITY OF EVERETT

ISLAND END RIVER FLOOD PROVISIONS WEST

LAYOUT AND MATERIALS PLAN - 1
(STA. 100+00 - 104+25)

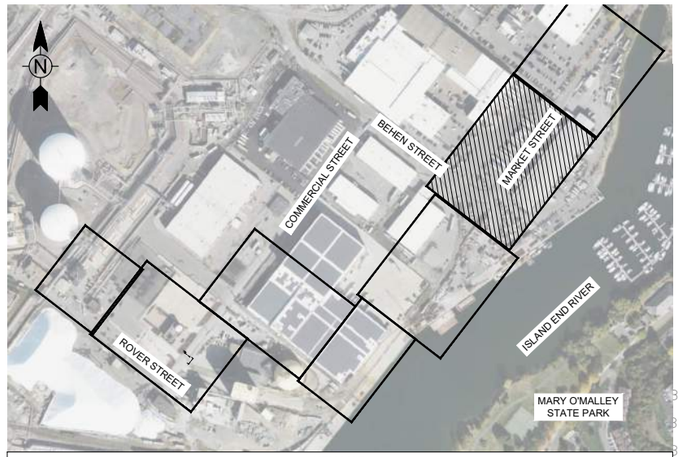
PROJ:	200-01291-22002
DESN:	TC
DRWN:	TC
CHKD:	AR

RPW-C-101

Bar Measures 1 inch, otherwise drawing not to scale

10/23/2023 5:21:16 PM - O:\PROJECTS\NEW YORK\01291\200-01291-22002\CAD\SHEETFILES\C-101 LAYOUT AND MATERIALS PLAN.DWG - CHEN, TOLA

NOTES:
1. ELECTRIC SERVICE TO BE MAINTAINED DURING CONSTRUCTION. COORDINATE WITH NATIONAL GRID TO ENSURE CONTINUED SERVICE TO PROPERTIES DURING CONSTRUCTION.



KEY MAP
SCALE: 1"=300'

MATCHLINE B–B

MATCHLINE A–A

BEHEN ST

MARKET ST

ZONE X
ZONE X*
ZONE AE

PROP. GUARDRAIL, TYP.
REPLACE FULL DEPTH ASPHALT
REPLACE EXIST. CATCH BASIN WITH NEW MANHOLE STRUCTURE WITH PROP. BACKFLOW PREVENTER
PROP. ROAD CENTERLINE
PROP. DRAINAGE LINE, TYP.
PROP. CONCRETE FOOTING
PROP. CATCH BASIN, TYP.
MAINTAIN AND PROTECT EXISTING HYDRANT AND WATER GAUGE
100-YEAR FLOODPLAIN
SAWCUT LIMITS, TYP.
PROP. GUARDRAIL, TYP.
EX. UTILITY POLE, MAINTAIN ELECTRIC SERVICE TO 155 MARKET ST., COORDINATE WITH NATIONAL GRID
REGRADE AND REPAVE W/ FULL DEPTH ASPHALT PAVEMENT
MAINTAIN AND PROTECT EXISTING FENCE
MATCH EX. GRADE
MAINTAIN AND PROTECT EXISTING WATER MAIN
MAINTAIN AND PROTECT EXISTING OH ELECTRIC POLE, TYP.
MAINTAIN AND PROTECT EXISTING GATE
MAINTAIN AND PROTECT EXISTING OH ELECTRIC POLE
MAINTAIN AND PROTECT EXISTING HYDRANT AND WATER GAUGE
REMOVE EXISTING CATCH BASINS
MAINTAIN AND PROTECT EXISTING WATER LINE AND SERVICE
PROP. TRENCH DRAIN, TYP.
TIE PROP. TRENCH DRAIN INTO EX. MANHOLE
PROP. BACKFLOW PREVENTER
CONCRETE FLOOD BARRIER (SEE STRUCTURAL SHEETS FOR DETAILS)
PROPOSED 7' HIGH, 40' WIDE SLIDING FLOOD GATE
PROPOSED 7' HIGH, 30' WIDE SLIDING FLOOD GATE
COORDINATE WITH NATIONAL GRID TO DE-ENERGIZE OH ELECTRIC DURING CONSTRUCTION, SEE NOTE 1.
MAINTAIN AND PROTECT EXISTING DRAINAGE LINE
PROPERTY LINE
LIMIT OF CONSTRUCTION SUPPLIES
CHAIN LINK FENCE
42" PROPOSED 20' WIDE DRAINAGE EASEMENT
42" IPS (BY REC)
26" IPS (BY REC)
DMH RIM=8.05'
DMH RIM=8.31'
DMH RIM=8.13'
CB RIM=8.23
30'
40'
109+00
110+00
108+00
107+00
106+00
105+00

0 20 40
SCALE: 1"=20'

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MARK	DATE	DESCRIPTION	BY

CITY OF EVERETT
ISLAND END RIVER FLOOD PROVISIONS WEST

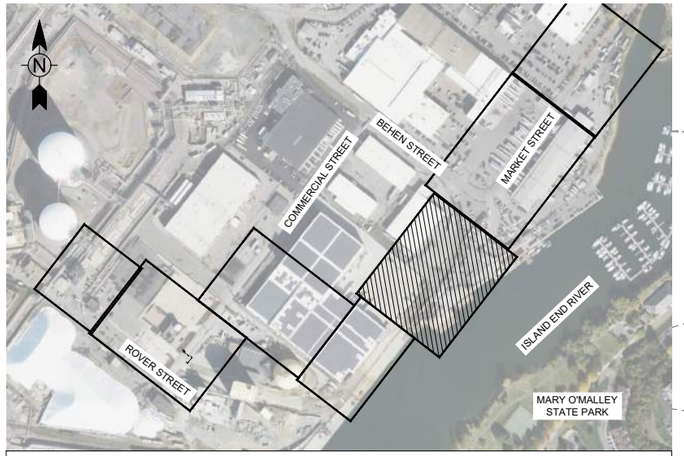
LAYOUT AND MATERIALS PLAN - 2
(STA. 104+25 - 108+75)

PROJ:	200-01291-22002
DESN:	TC
DRWN:	TC
CHKD:	AR

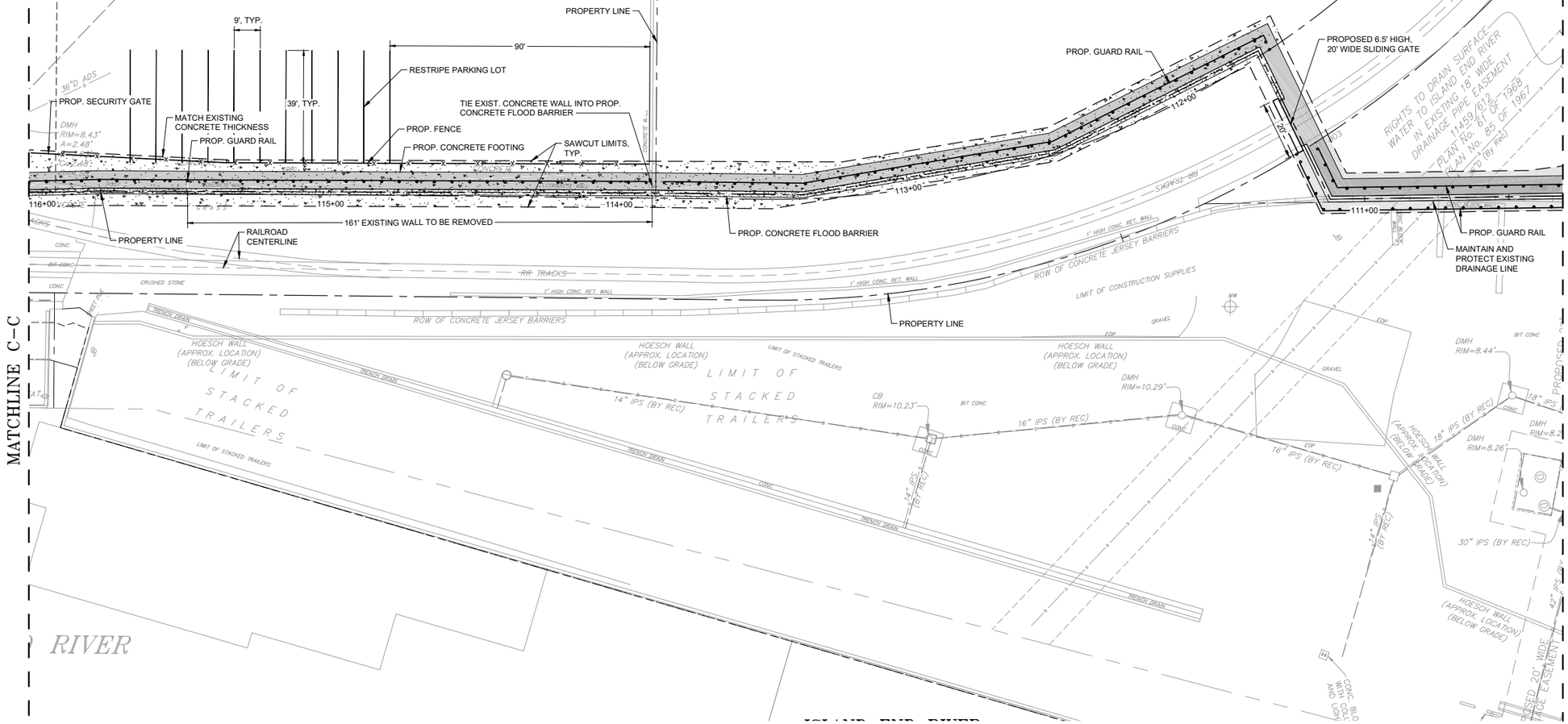
RPW-C-102

Bar Measures 1 inch, otherwise drawing not to scale

10/23/2023 5:22:33 PM - O:\PROJECTS\NEW YORK\01291\200-01291-22002\CAD\SHEETFILES\C-101 LAYOUT AND MATERIALS PLAN.DWG - CHEN, TOLA



KEY MAP
SCALE: 1"=300'



0 20 40
SCALE: 1"=20'

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MARK	DATE	DESCRIPTION	BY

CITY OF EVERETT
ISLAND END RIVER FLOOD PROVISIONS WEST

LAYOUT AND MATERIALS PLAN - 3
(STA. 108+75 - 116+25)

PROJ:	200-01291-22002
DESN:	TC
DRWN:	TC
CHKD:	AR

RPW-C-103

Bar Measures 1 inch, otherwise drawing not to scale

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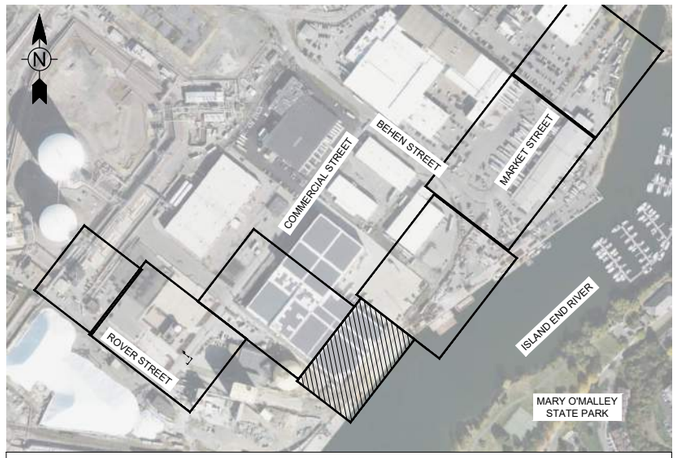

KEY MAP
SCALE: 1"=300'

MATCHLINE D–D

ZONE X*
ZONE AE

100-YEAR FLOODPLAIN

SAW CUT LIMITS

PROP. GUARD RAIL

MAINTAIN AND PROTECT EXISTING UTILITY POLE

RECONSTRUCT STAIRS ALONG BUILDING

RECONSTRUCT EXISTING SWALE

RELOCATE EXIST. MANHOLE, INSTALL BACKFLOW PREVENTER

REPLACE FULL DEPTH ASPHALT

PROPERTY LINE, TYP.

EXTENTS OF EXISTING PIER

PROP. MANHOLE

RECONSTRUCT CONCRETE LOADING RAMP

1 STORY CONC BLOCK E BLDG

60 COMMERCIAL ST

PROP. CONCRETE FOOTING

REPLACE FULL DEPTH CONCRETE

PROP. BACKFLOW PREVENTER

PROP. MANHOLE

PROP. GUARD RAIL

RAILROAD CENTERLINE, TYP.

PROP. CONCRETE FLOOD BARRIER

MAINTAIN AND PROTECT EXISTING MANHOLE

PROP. FENCE

MAINTAIN AND PROTECT EXISTING RAILROAD TRACKS

MAINTAIN AND PROTECT EXISTING CATCH BASIN

SAWCUT CONCRETE, LIMITS OF EXCAVATION

PROPOSED 7' HIGH, 56' WIDE SLIDING GATE

PROP. 60' WIDE SECURITY GATE

PROP. BACKFLOW PREVENTER

POST W/LIFE RING

CRACK LINES

MATCHLINE C–C

0 20 40
SCALE: 1"=20'

MARK	DATE	DESCRIPTION	BY

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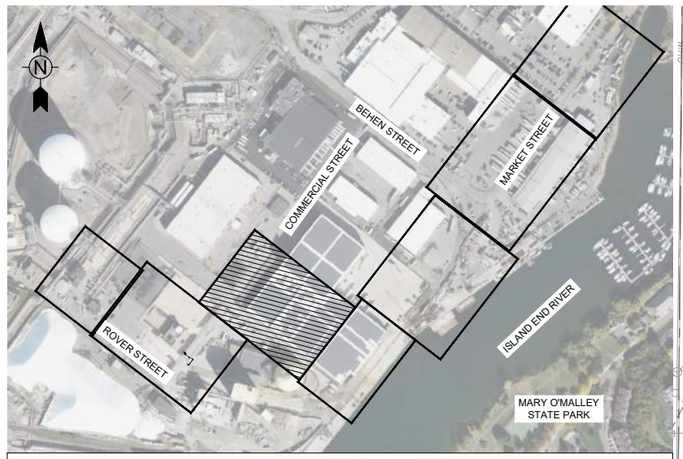
CITY OF EVERETT
ISLAND END RIVER FLOOD PROVISIONS WEST

LAYOUT AND MATERIALS PLAN - 4
(STA. 116+25 - 120+50)

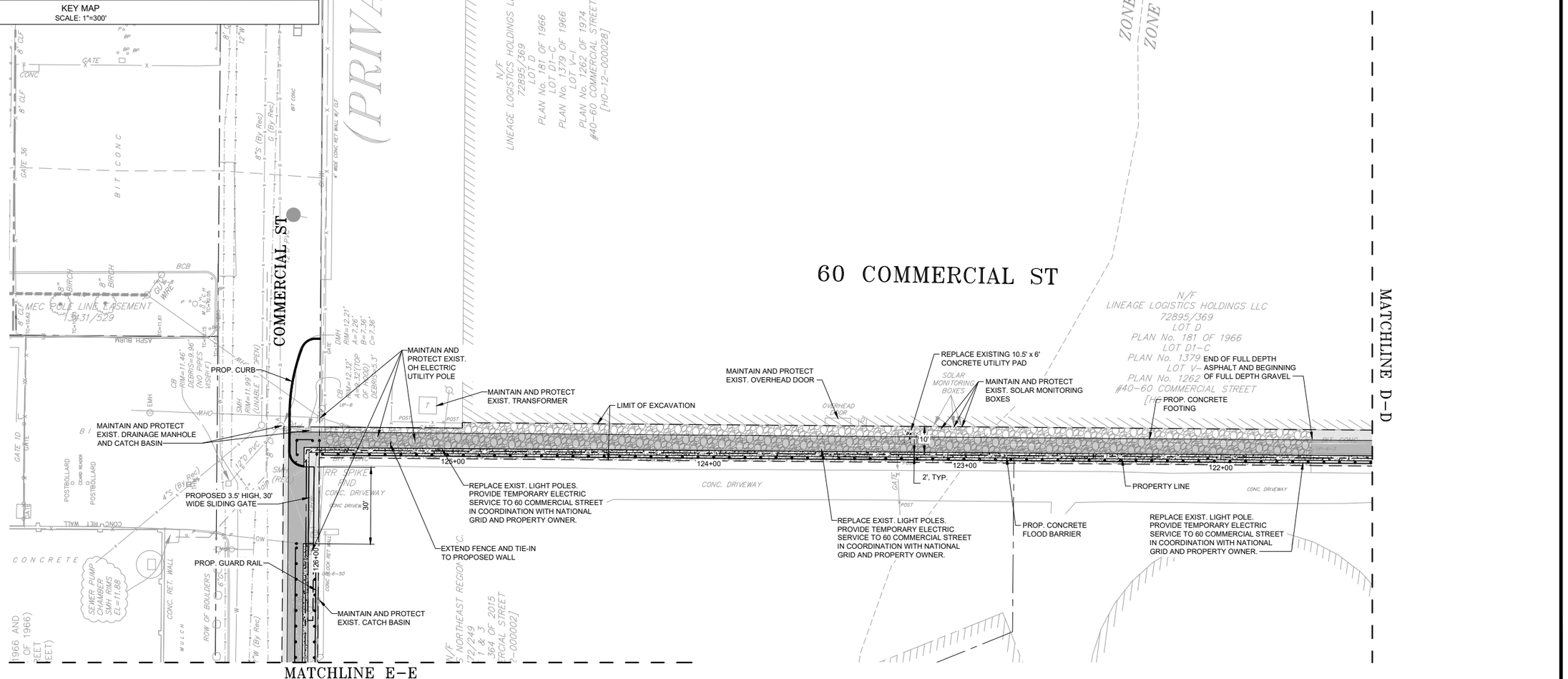
PROJ:	200-01291-22002
DESN:	TC
DRWN:	TC
CHKD:	AR

RPW-C-104

Bar Measures 1 inch, otherwise drawing not to scale



KEY MAP
SCALE: 1"=300'



SCALE: 1"=20'

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MARK	DATE	DESCRIPTION	BY

CITY OF EVERETT

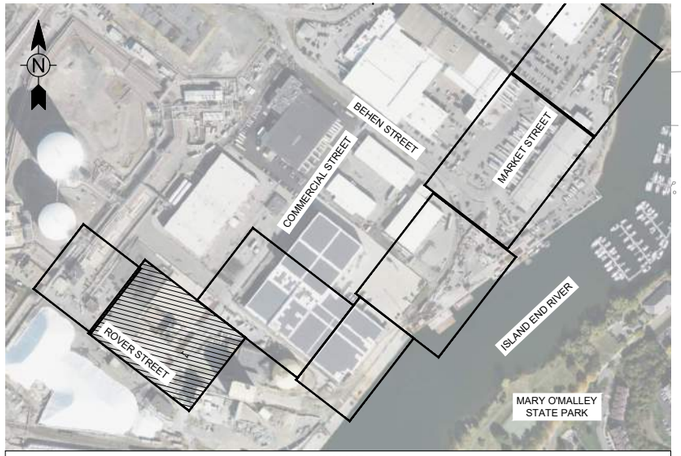
ISLAND END RIVER FLOOD PROVISIONS WEST

LAYOUT AND MATERIALS PLAN - 5 (STA. 120+50 - 126+00)

PROJ:	200-01291-22002
DESN:	TC
DRWN:	TC
CHKD:	AR

RPW-C-105

Bar Measures 1 inch, otherwise drawing not to scale



KEY MAP
SCALE: 1"=300'

MATCHLINE E-E

MATCHLINE F-F

SAWCUT LIMITS, TYP.
PROPOSED 3.5' HIGH, 30' WIDE SLIDING GATE
PROP. GUARD RAIL
PROP. CONCRETE FOOTING
RESET EXIST. LIGHT POLE ON NEW CONCRETE FOUNDATION
REPLACE FULL DEPTH ASPHALT
PROP. GUARD RAIL
PROP. CONCRETE FLOOD BARRIER
EXIST. PRESSURIZED GAS LINE. COORDINATE WITH DISTRIGAS AND GAS PROVIDER FOR PROTECTION OR RELOCATION.
RECONSTRUCT CURB TO TIE-IN AT BARRIER WALL
PROP. 3' HIGH, 27' WIDE FLOAT UP FLOOD GATE
MAINTAIN EXIST. GRADE, REPLACE MULCH AND LANDSCAPING IN KIND
MATCH EXIST. GRADE
PROP. CURB
RELOCATE EXIST. GAS AND WATER LINES. COORDINATE RELOCATION WITH UTILITY OWNERS.
EXTEND CONC RET. WALL
PROP. UNDERDRAIN
REGRADE TO SLOPE TOWARDS ROVER STREET AND COVER WITH MULCH
MAINTAIN AND PROTECT EXIST. SAN. SEWER MANHOLE
EXIST. EDGE OF ASPHALT
RELOCATE EXIST. OH ELECTRIC UTILITY POLE
MATCH EXIST. GRADE
RECONSTRUCT CURB TO TIE-IN AT BARRIER WALL
SAW CUT LIMITS
PROP. CATCH BASIN
MAINTAIN AND PROTECT EXIST. GAS GAUGE
PROP. CONCRETE FLOOD BARRIER
PROP. GUARD RAIL
SAW CUT LIMITS
MAINTAIN AND PROTECT EXISTING GUARD SHACK
PROP. STORM MANHOLE
PROPERTY LINE

VISITOR CENTER
BRICK PLAZA
LANDSCAPED AREA
TRENCH DRAIN
CONC. RET. WALL
CONC. RAMP
BIT CONC
CONCRETE
GATE TH
VEHICLE GATE
GUARD SHACK
N/F CIMENT QUEBEC INC. 65772/206 LOT 2 PLAN No. 364 OF 2015 #100 COMMERCIAL STREET [H0-12-00000A]
N/F AGGREGATE INDUSTRIES 657 LOT PLAN No. #80 COMM [H0-12

127+00
128+00
129+00
130+00
131+00
132+00
133+00

SCALE: 1"=20'

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MARK	DATE	DESCRIPTION	BY

CITY OF EVERETT

ISLAND END RIVER FLOOD PROVISIONS WEST

LAYOUT AND MATERIALS PLAN - 6
(STA. 127+50 - 133+75)

PROJ:	200-01291-22002
DESN:	TC
DRWN:	TC
CHKD:	AR

RPW-C-106

Bar Measures 1 inch, otherwise drawing not to scale

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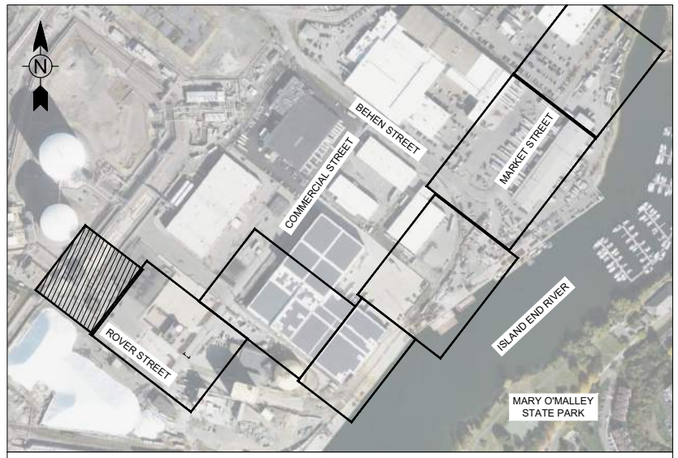
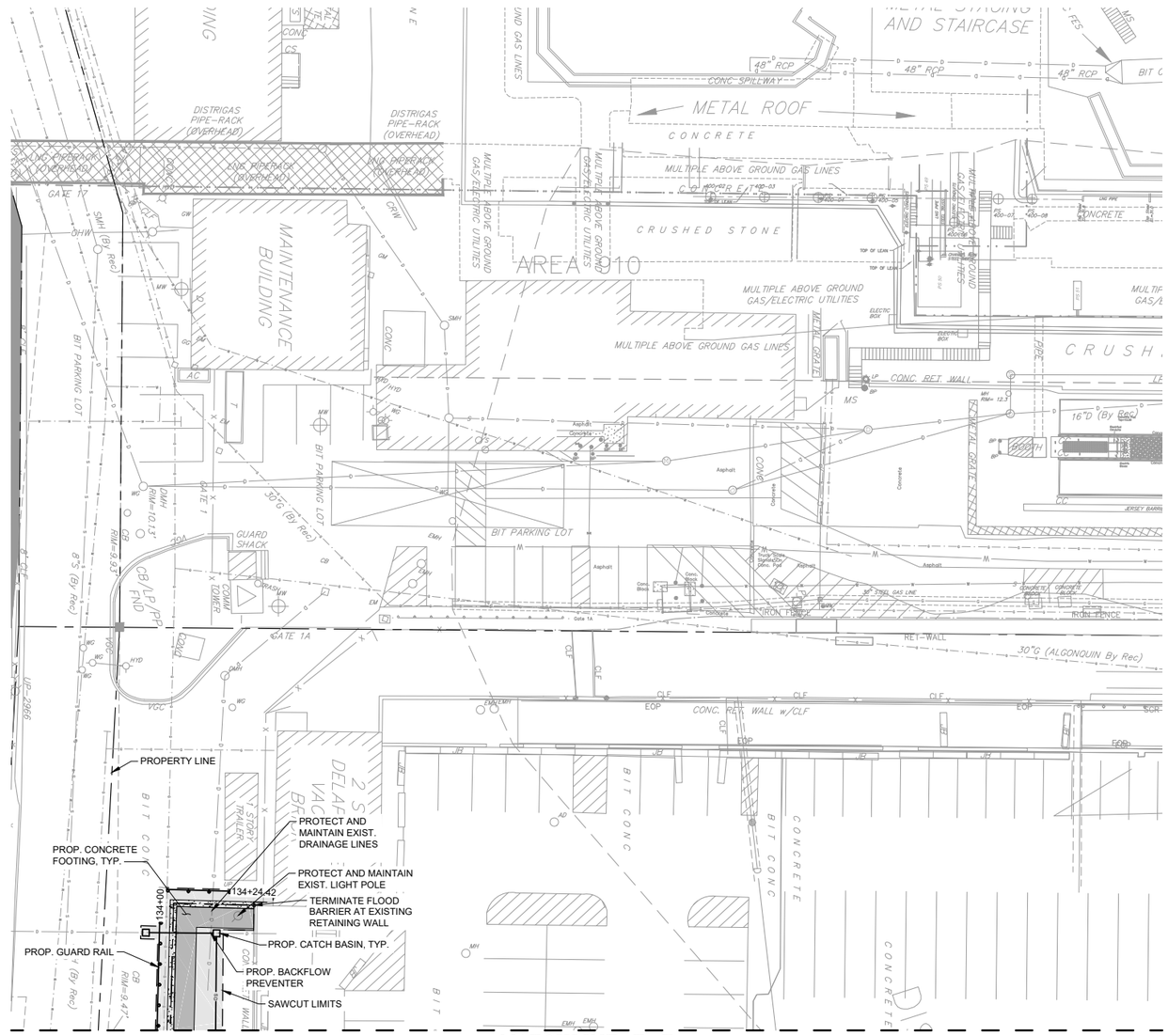


KEY MAP
SCALE: 1"=300'



MATCHLINE F-F

0 20 40
SCALE: 1"=20'

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MARK	DATE	DESCRIPTION	BY

CITY OF EVERETT

ISLAND END RIVER FLOOD PROVISIONS WEST

LAYOUT AND MATERIALS PLAN - 7
(STA. 133+75 - 137+09)

PROJ:	200-01291-22002
DESN:	TC
DRWN:	TC
CHKD:	AR

RPW-C-107

Bar Measures 1 inch, otherwise drawing not to scale

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KEY MAP
SCALE: 1"=150'

TREE SCHEDULE

ABRV.	QTY	BOTANICAL NAME	COMMON NAME	SIZE
AA	2	AMELANCHIER ARBOREA	SERVICEBERRY	2-3" CAL.
BA	3	BETULA ALLEGHANIENSIS	YELLOW BIRCH	2-3" CAL.
BL	4	BETULA LENTA	SWEET BIRCH	2-3" CAL.
GD	1	GYMNOCLADUS DIOICUS	KENTUCKY COFFEE TREE	2.5-3" CAL.
PO	5	PLATANUS OCCIDENTALIS	LONDON PLANE TREE	2.5-3" CAL.
PS	1	PRUNUS SEROTINA	BLACK CHERRY	2-3" CAL.
TA	2	TILIA AMERICANA	LINDEN	2-2.5" CAL.

SHRUB SCHEDULE

ABRV.	QTY	BOTANICAL NAME	COMMON NAME	SIZE
HV	1	HAMAMELIS VIRGINIANA	WITCH HAZEL	3 GAL.
IV	3	ILEX VERTICILLATE	WINTERBERRY HOLLY	3 GAL.
LB	2	LINDERA BENZOIN	SPICEBUSH	3 GAL.
VC	3	VACCINIUM CORYMBOSUM	HIGHBUSH BLUEBERRY	3 GAL.
VR	3	VIBURNUM DENTATUM	ARROWWOOD VIBURNUM	2 GAL.

SEED MIX 1- SEED MIX TYPE

COMMON NAME	BOTANICAL NAME
XXX	XXX
XXX	XXX
XXX	XXX

SEED MIX 2- SEED MIX TYPE

COMMON NAME	BOTANICAL NAME
XXX	XXX
XXX	XXX
XXX	XXX

LEGEND

- PROPERTY LINE
- MATCH LINE
- PEDETRIAN EASEMENT
- LOAM & SEED
- PROPOSED TREES
- PROPOSED SHRUBS

4 LZ504 SHRUB PLANTING, TYP.
1 LZ504 LOAM AND SEED, TYP.
6 LZ504 TREE STAKING AND PLANTING, TYP.
3 LZ504 GROUNDCOVER PLANTING, TYP.
7 LZ504 HERBACEOUS PLANTING ON SLOPE, TYP.
LOAM AND SEED, TYP. 1 LZ504
LOAM AND SEED, TYP. 1 LZ504

SEE SHEETS NBS-L-101 AND 102 FOR NATURE-BASED APPROACHES PLANTING PLANS

SEE RPW-C-101 FOR RESILIENCE PROVISIONS WEST LAYOUT & MATERIAL PLAN

LANDSCAPED SLOPE WITH RETAINING BEDS

SCALE 1"=30'-0"

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Project:
ISLAND END RIVER FLOOD RESILIENCE PROVISIONS EAST

Consultants:

Revisions:

No.	Date	Description

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Date:	NOVEMBER 2023
Drawn By:	LC, FD
Reviewed By:	BK
Approved By:	BK
W&S Project No.:	-
W&S File No.:	

Drawing Title:
PLANTING PLAN - 1

Sheet Number:
RPE-L-101

Rev. 1.5 Date: 11/2023

KEY MAP
SCALE: 1"=150'

LEGEND

VEGETATION/SOIL PROPOSED

PLUG PLANTINGS WITH A MIX OF SALTGRASS (DISTICHLIS SPICATA) AND SALT MARSH HAY (SPARTINA PATENS). SEED WITH NATIVE SALT TOLDERANT SEED MIX ONLY IF ABOVE HIGHEST HIGH TIDE LINE

SPARTINA ALTERNIFLORA PLUGS

DISTICHLIS SPICATA, SPARTINA PATENS, SPARTINA ALTERNIFLORA

VEGETATION/SOIL EXISTING

DISTICHLIS SPICATA

DISTICHLIS SPICATA/ SPARTINA ALTERNIFLORA

SPARTINA ALTERNIFLORA

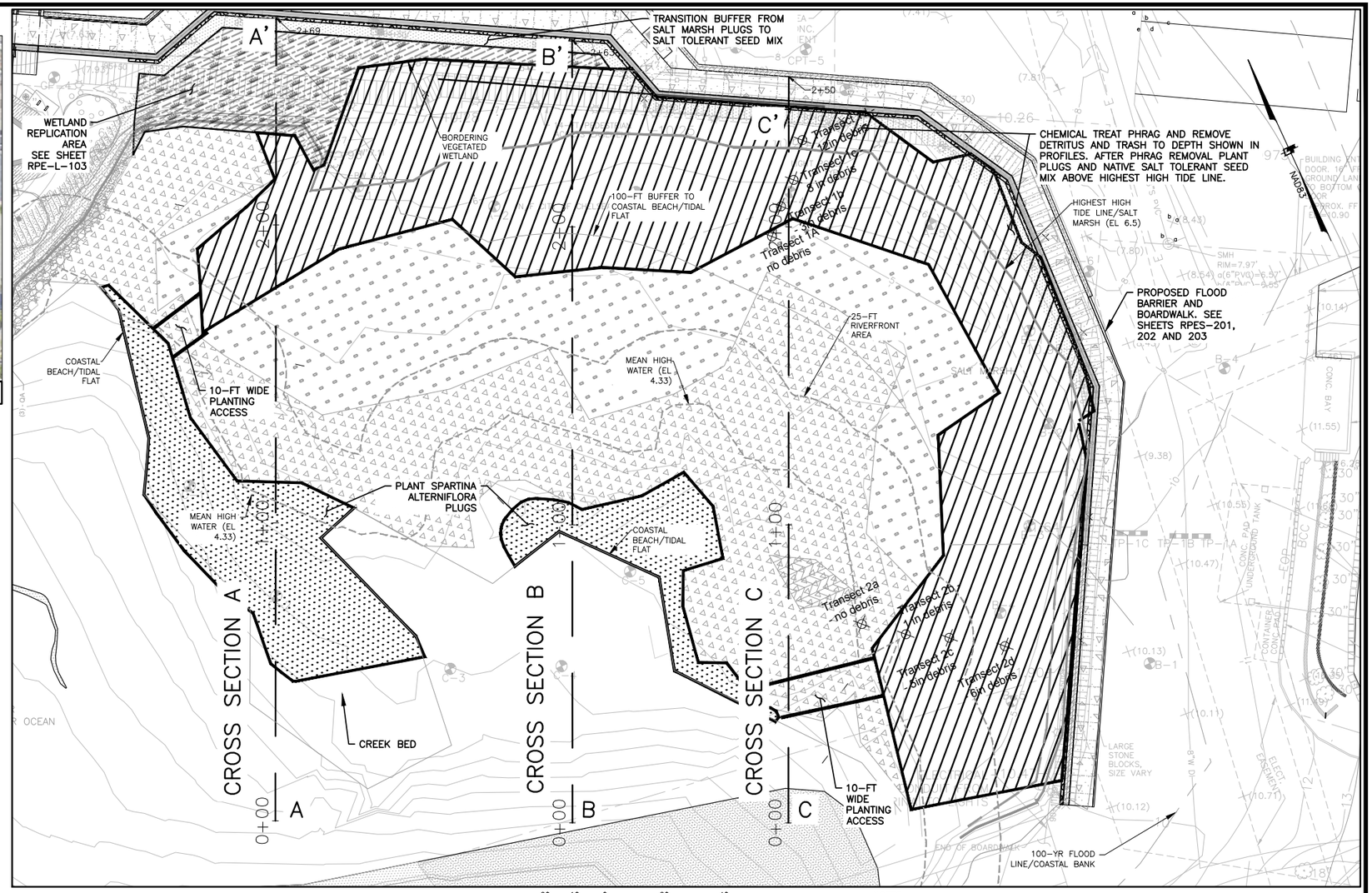
CREEK CENTER

GRAVEL OVER MUCK

MUCK

LOAM AND ORGANIC MATTER

FIBRIC ORGANIC MATTER



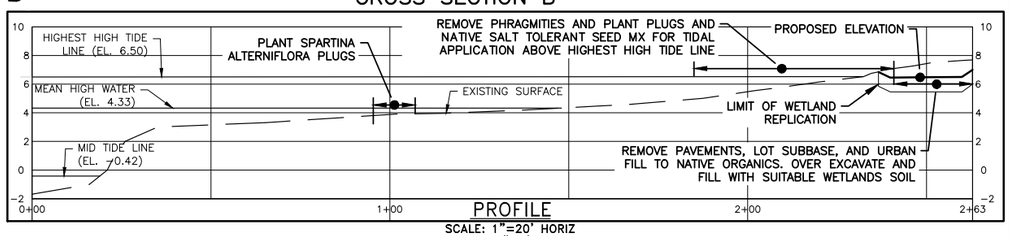
SCALE: 1"=20'

NOTES:

1. IMPROVEMENT WORK WILL OCCUR "IN THE DRY" DURING LOW TIDE CONDITIONS

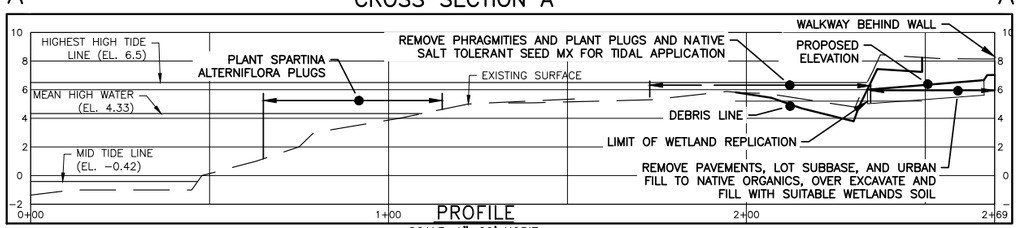
Debris Depths			
Point ID	Existing Surface Elevation (ft)	Depth (in) of Trash Removal	Proposed Elevation (ft)
1a	5.47	0	5.47
1b	5.61	3	5.36
1c	6.04	8	5.37
1d	6.67	12	5.67
2a	4.5	0	4.5
2b	4.54	1	4.46
2c	4.7	5	4.28
2d	4.86	6	4.36

B — CROSS SECTION B — B'



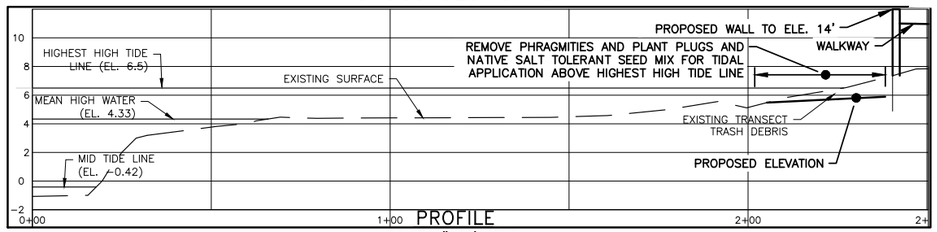
SCALE: 1"=20' HORIZ
1"=5' VERT

A — CROSS SECTION A — A'



SCALE: 1"=20' HORIZ
1"=5' VERT

C — CROSS SECTION C — C'



SCALE: 1"=20' HORIZ
1"=5' VERT

Project:
ISLAND END RIVER FLOOD RESILIENCE PROVISIONS EAST

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Drawn By:	CFW
Reviewed By:	TPC
Approved By:	BWA
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W&S File No.:	

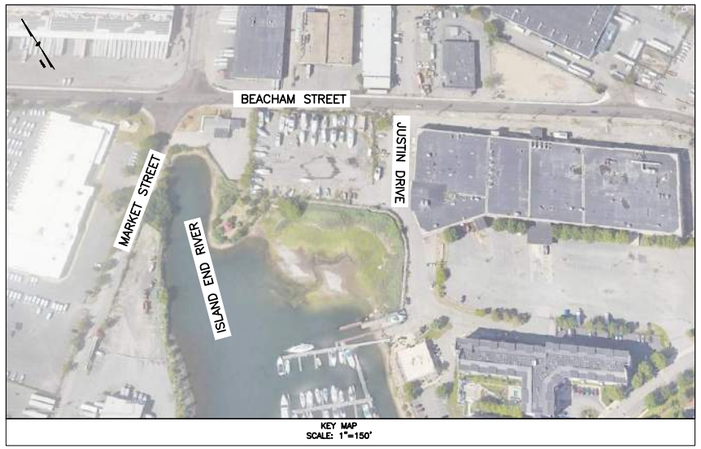
Drawing Title:

PLANTING PLAN - 2

Sheet Number:

RPE-L-102

Rev: 1.8 Date: 11/2023

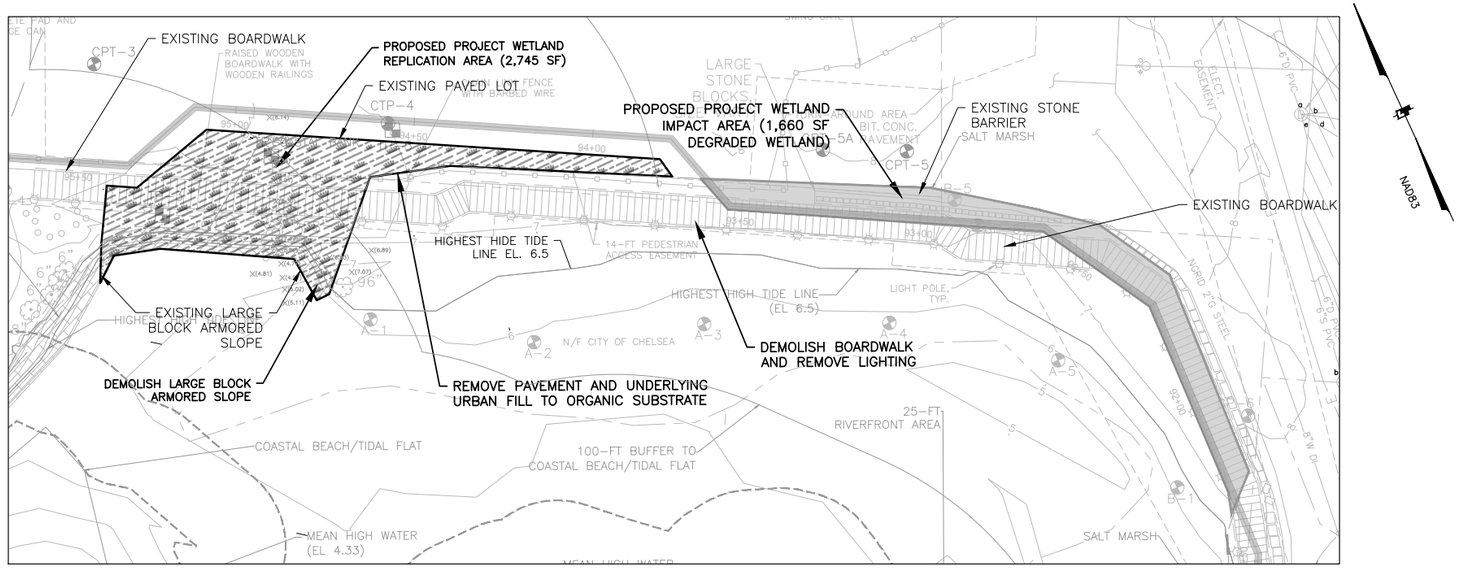


LEGEND:

= PROPOSED SALT MARSH REPLICATION

= PROPOSED SALT MARSH IMPACT AREA

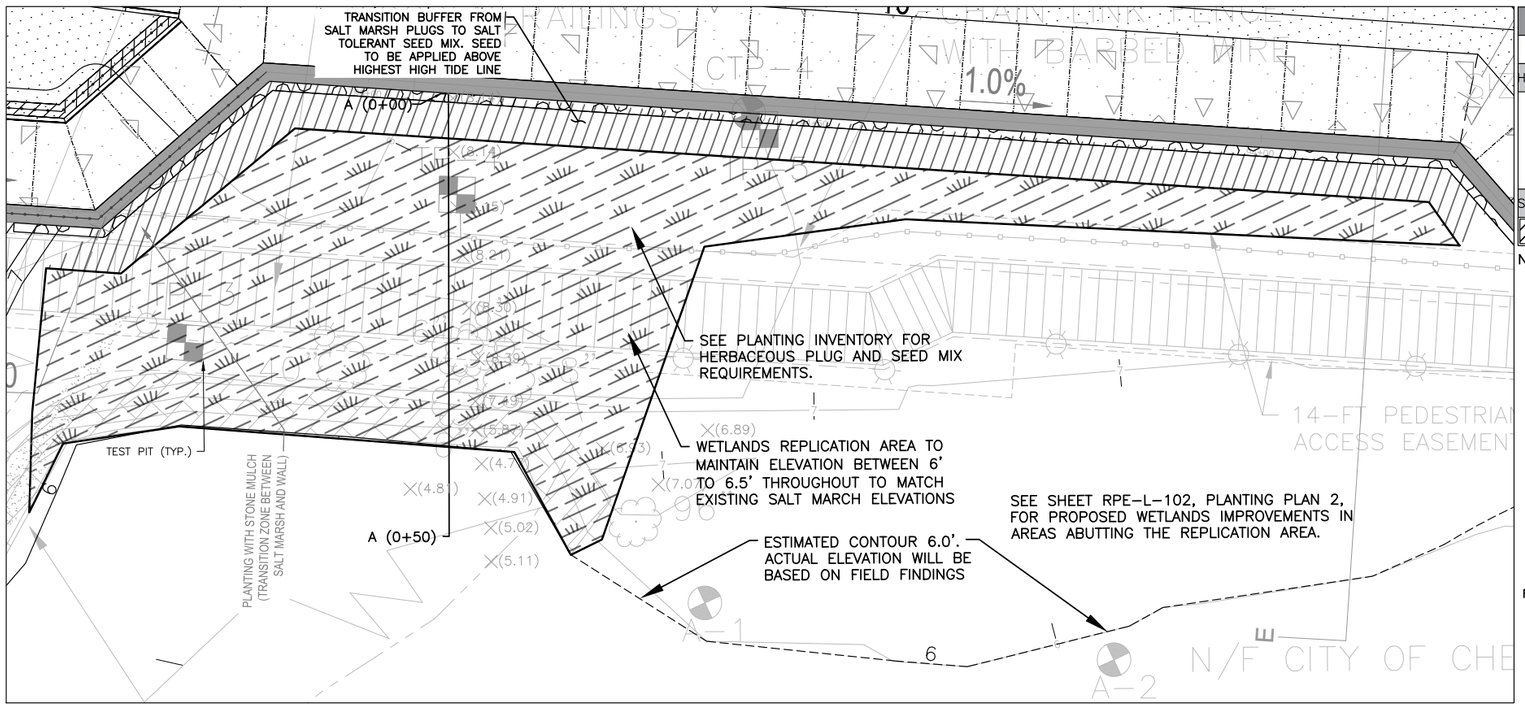
= PROPOSED SALT TOLERANT SEED MIX



EXISTING CONDITIONS AND DEMOLITION PLAN

SEE SHEET RPE-R-101 RESOURCE AREA IMPACT PLAN FOR RESOURCE BOUNDARIES AND WETLANDS FLAGS

SEE SHEET RPE-L-102, PLANTING PLAN-2, FOR EXISTING CONDITIONS IN AREAS ABUTTING THE REPLICATION AREA.

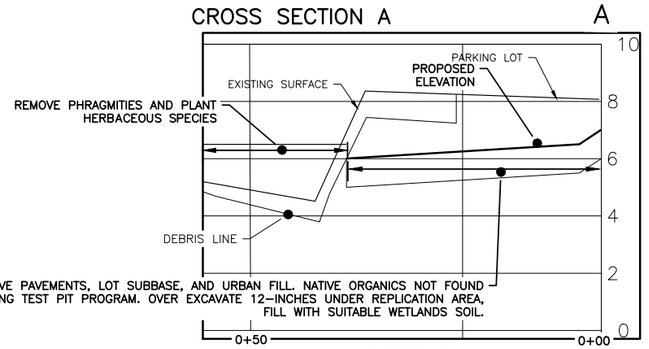


WETLAND REPLICATION PLAN

Planting Inventory						
Symbol	Type	Latin Name	Common Name	Quantity	Size	Spacing
HERBACEOUS						
	DS	Distichlis Spicata	Saltgrass	230	Plug	2'-0" O.C.
	SP	Spartina Patens	Saltmarsh Hay	230	Plug	2'-0" O.C.
	SA	Spartina Alterniflora	Smooth Cordgrass	230	Plug	2'-0" O.C.
SEED						
	New England Coastal Salt Tolerant Grass Mix for Tidal Application - New England Wetland Plants, Inc.					1 lb./1250 sq. ft.

NOTE: SPECIES SHOULD BE PLANTED IN AN ALTERNATING PATTERN ACROSS THE PROPOSED PLANTING AREA.

CROSS SECTION A



PROFILE

SCALE: 1"=10' HORIZ
1"=2.5' VERT

Project:
ISLAND END RIVER FLOOD RESILIENCE PROVISIONS EAST

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Consultants:

Revisions:

No.	Date	Description

Seal:

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Drawn By:	CFW
Reviewed By:	TPC
Approved By:	LES
W&S Project No.:	-
W&S File No.:	

Drawing Title:
PLANTING PLAN - 3

Sheet Number:
RPE-L-103

Rev: 1.8 Date: 11/2023

PLANTING NOTES:

1. PLANT MATERIAL SHALL CONFORM TO THE GUIDELINES ESTABLISHED BY THE "AMERICAN STANDARD FOR NURSERY STOCK" PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN, LATEST EDITION. PLANTINGS MAY ALSO INCLUDE BARE ROOT AND LIVE STAKE PLANTINGS WHERE FEASIBLE AND DESIRABLE PER PLANTING CONDITIONS
2. PROVIDE ORGANIC WEED FREE PLANTING MEDIUM PER SPECIFICATIONS
3. PROVIDE SPECIFIED COURSE SAND FILL FOR TOP DRESSING TIDAL PLANTINGS
4. ALL PLANTS ARE SUBJECT TO THE APPROVAL OF ENVIRONMENTAL SCIENTIST BEFORE, DURING, AND AFTER INSTALLATION.
5. PLANTING WILL BE CONDUCTED WITH OVERSIGHT BY AN ENVIRONMENTAL SCIENTIST AND PLANTS WILL BE SPACED AND GROUPED AS DIRECTED. CONTRACTOR SHALL PROVIDE CLEAN WATER, HOSES AND ALL NECESSARY EQUIPMENT FOR WATERING ASSOCIATED WITH THE PLANTING AND SEEDING OPERATIONS AND TEMPORARY IRRIGATION DURING THE ESTABLISHMENT PERIOD.
6. ANY PLANT MATERIAL WHICH DIES, TURNS BROWN, OR DEFOLIATES (PRIOR TO TOTAL ACCEPTANCE OF THE WORK) SHALL BE REPLACED WITH MATERIAL APPROVED BY THE ENVIRONMENTAL SCIENTIST.
7. THE CONTRACTOR SHALL COMPLETELY GUARANTEE ALL PLANT MATERIAL FOR A PERIOD OF ONE (1) YEAR BEGINNING ON THE DATE OF ACCEPTANCE. CONTRACTOR SHALL REQUEST REVIEW AND FORMAL NOTICE OF ACCEPTANCE IN WRITING. THE CONTRACTOR SHALL MAKE ALL REPLACEMENTS AT THE BEGINNING OF THE FOLLOWING GROWING SEASON. PLANTINGS BELOW TOP OF BANK MUST BE COMPLETED BEFORE JULY 1..
8. REPLACEMENT SCHEDULE AND CONTENT FOR UPLAND PLANTINGS MAY BE ADJUSTED BY MUTUAL AGREEMENT BASED ON PLANTING SEASON AND AVAILABILITY, AS APPROVED BY THE OWNER.
9. THE CONTRACTOR SHALL PROVIDE A TEMPORARY IRRIGATION SYSTEM TO REMAIN IN OPERATION FOR THE FIRST THREE GROWING SEASONS AT A MINIMUM TO ENSURE ESTABLISHMENT AND AS NEEDED TO LIMIT DROUGHT DAMAGE.
10. LIVING SHORELINE PLANTING REQUIRES ADAPTIVE MANAGEMENT BY THE OWNER; INCLUDING SUBSEQUENT ROUNDS OF SUPPLEMENTAL PLANTING, INVASIVE SPECIES CONTROL, IRRIGATION, WASTE REMOVAL, HABITAT FEATURE MANAGEMENT, AND SOIL MONITORING. SEE MANAGEMENT PLAN AND GUIDE.

PLANT SCHEDULE

TREES	QTY	BOTANICAL / COMMON NAME	CONT	SIZE	REMARKS
AC	5	AMELANCHIER CANADENSIS CANADIAN SERVICEBERRY	5 GAL		
BD	5	BETULA DELTOIDES GREY BIRCH	5 GAL		
PO	5	PLATANUS OCCIDENTALIS AMERICAN SYCAMORE	15 GAL	2"CAL	
PH	2	POPULUS DELTOIDES EASTERN COTTONWOOD	5 GAL	1.5"CAL	
QA	5	QUERCUS ALBA WHITE OAK	15 GAL	2"CAL	

SHRUBS	QTY	BOTANICAL / COMMON NAME	CONT	SIZE	NOTES
MP	11	MYRICA PENSYLVANICA	1 GAL		
PM	22	PRUNUS MARITIMA	2 GAL		

SHRUB AREAS	QTY	BOTANICAL / COMMON NAME	CONT		
JJ	25	JUNIPERUS COMMUNIS COMMON JUNIPER	1 GAL	42" o.c.	
PQ	135	PARTHENOCISSUS QUINQUEFOLIA	1 GAL	36" o.c.	
RG	25	RHUS AROMATICA	1 GAL	36" o.c.	
VM	20	VACCINIUM MACROCARPON AMERICAN CRANBERRY	1 GAL	30" o.c.	

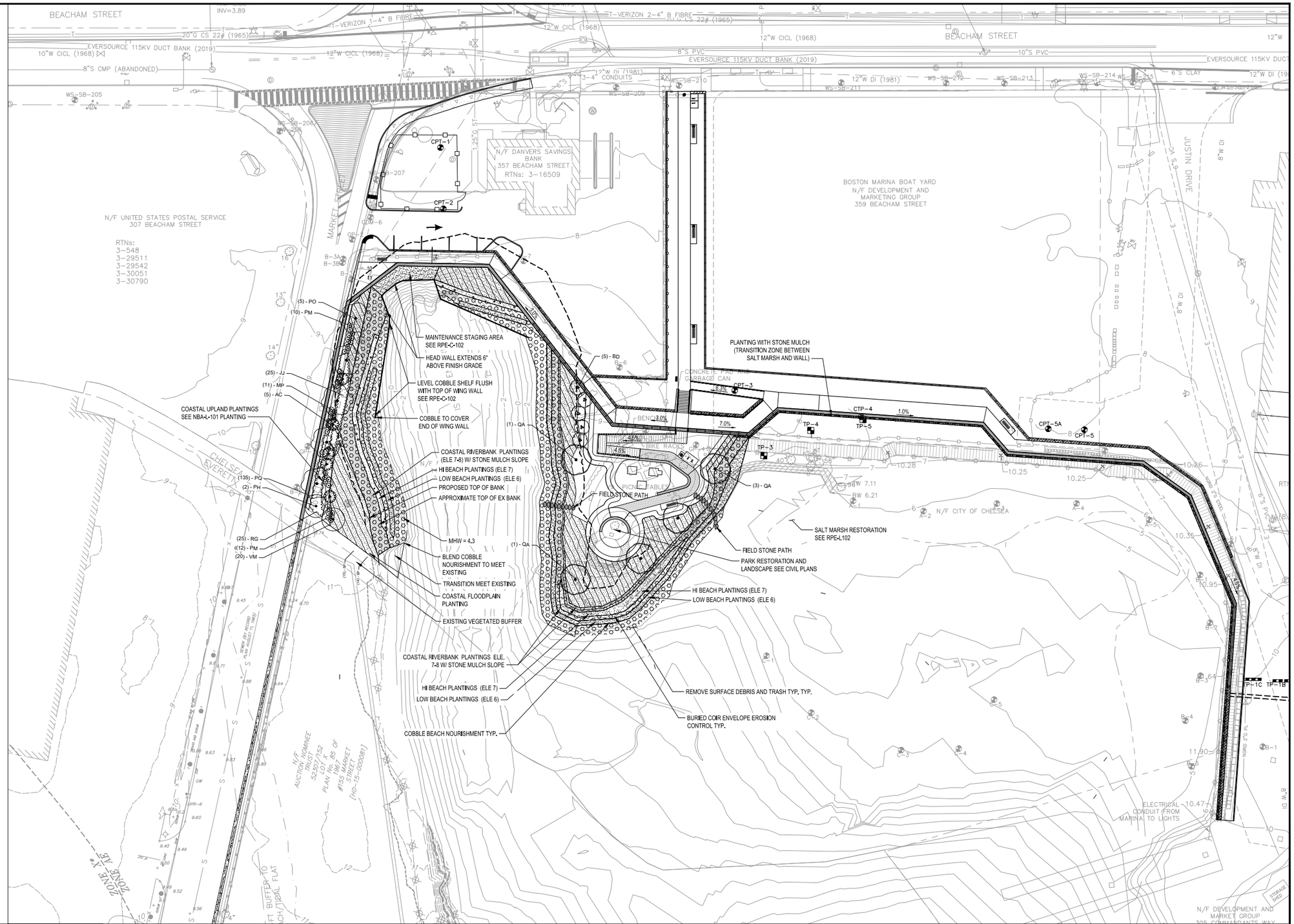
GROUND COVERS	QTY	BOTANICAL / COMMON NAME	CONT	SIZE
	5,750	COASTAL FLOOD PAIN MIX 8+	PLUG & SEED	18" o.c.
	4,000	HI BEACH MIX ELE. 7+	CULM & PLUG	36" o.c.
	1,700	LOW BEACH MIX ELE. 6+/-	PLUG	12" o.c.

SEED AND PLUG MIX
FINAL LIST BASED ON AVAILABILITY
MODIFIED AND AMENDED ANNUALLY DURING ESTABLISHMENT PER ADAPTIVE MANAGEMENT

SHELTERED COASTAL PLAIN (SEED PLUG CULM)
"AMMOPHILA BREVILIGULATA AMERICAN BEACHGRASS"
"SOLIDAGO SEMPERVIRENS SEASIDE GOLDENROD"
"SALICORNIA VIRGINICA PICKLEWEED"
"ANDROPOGON GERARDII BIG BLUESTEM"
"ASCLEPIAS TUBEROSA BUTTERFLY MILKWEED"
"ASTER LONACTIS STIF LEAVED ASTER"
"COREOPSIS MAJOR GREAT TICKSEED"
"DESCHAMPSIA FLEXUOSA WAVY HAIR GRASS"
"EURYBIA SPECTABILIS EASTERN SHOWY ASTER"
"LATHYRUS JAPONICUS MARITIMUS BEACH PEA"
"LEYMUS MOLLIS AMERICAN DUNEGRASS"
"PANICUM AMARUM BITTER PANICGRASS"
"SCHIZACHYRIUM SCOPARIUM LITTLE BLUESTEM"
"SYMPHYOTRICHUM PILOSUM FROST ASTER"

HI BEACH MIX (PLUGS)
70%"SPARTINA PATENS SALTMEADOW CORDGRASS"
30% OTHER
"SALICORNIA DEPRESSA VIRGINIA GLASSWORT"
"SALICORNIA VIRGINICA PICKLEWEED"
"IVA FRUTCTESCENS MARSH ELDER"
"JUNCUS GERARDII SALTMARSH RUSH"
"DISTICHLIS SPICATA SALTGRASS"
"LIMONIUM CAROLINIANUM CAROLINA SEA LAVENDER"
"CAKILE EDENTULA AMERICAN SEAROCKET"
"HONCKENYA PEPLOIDES SEABEACH SANDWORT"

LOW BEACH (PLUGS)
80% "SPARTINA ALTERNIFLORA SALT MARSH GRASS"
20%"SPARTINA PATENS SALTMEADOW CORDGRASS"



Legend

- COBBLE BEACH NOURISHMENT/ STABILIZATION
- COASTAL RIVERBANK PLANTED WITH COBBLE MULCH
- COSTAL BEACH (LOW, HI) PLANTING
- COSTAL FLOODPLAIN PLANTING SALT FLOOD TOLERANT UPLAND PLANTINGS

Mass EOEA

Island End River

PLANTING PLAN

Everett & Chelsea, MA

SCALE: 1" = 30'
0 15 30 60 FEET

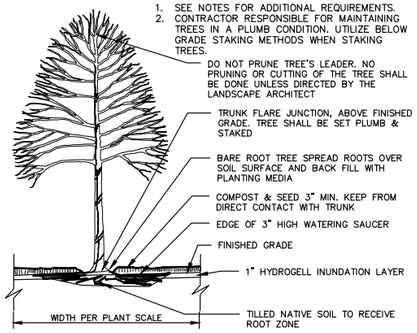
SHEET - NBA-L-101
DEIR

BSC GROUP
803 Summer Street
Boston, Massachusetts
02127
617 896 4300

DATE: 10 / 26 / 2023
FILE AT: \\bscboston\wor\Projects-WOR\B056105\...

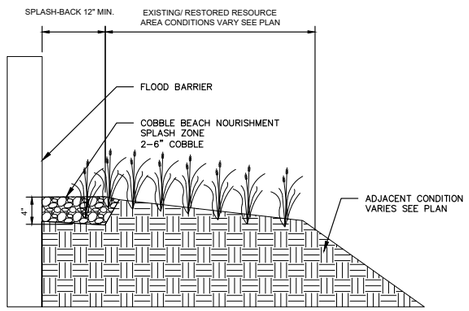
NOTES:

1. SEE NOTES FOR ADDITIONAL REQUIREMENTS.
2. CONTRACTOR RESPONSIBLE FOR MAINTAINING TREES IN A PLUMB CONDITION. UTILIZE BELOW GRADE STAKING METHODS WHEN STAKING TREES.



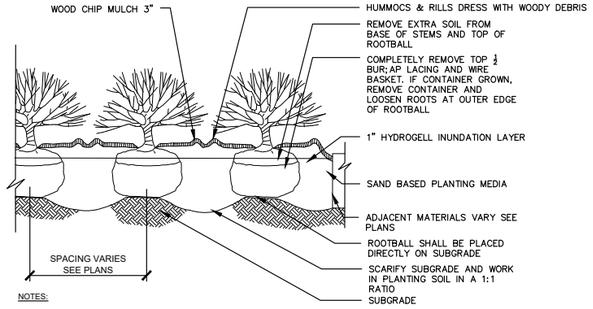
BARE ROOT PLANTING

SCALE: NONE



PLANTING STONE MULCH TRANSITION ZONE

SCALE: NONE

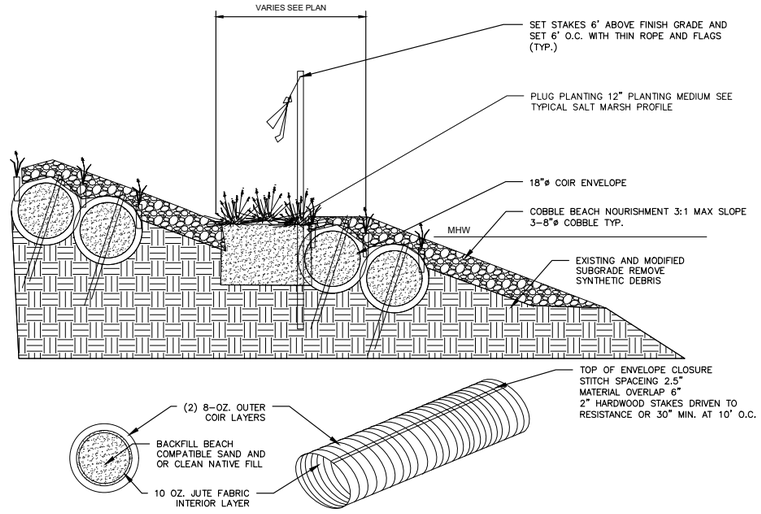


NOTES:

1. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
2. NO PRUNING OR CUTTING UNLESS DIRECTED BY THE LANDSCAPE ARCHITECT.
3. SAUCER SHALL BE FLOODED TWICE DURING THE FIRST 24 HOURS AFTER PLANTING.
4. REMOVE ALL CONTAINERS OR SYNTHETIC WRAPPINGS

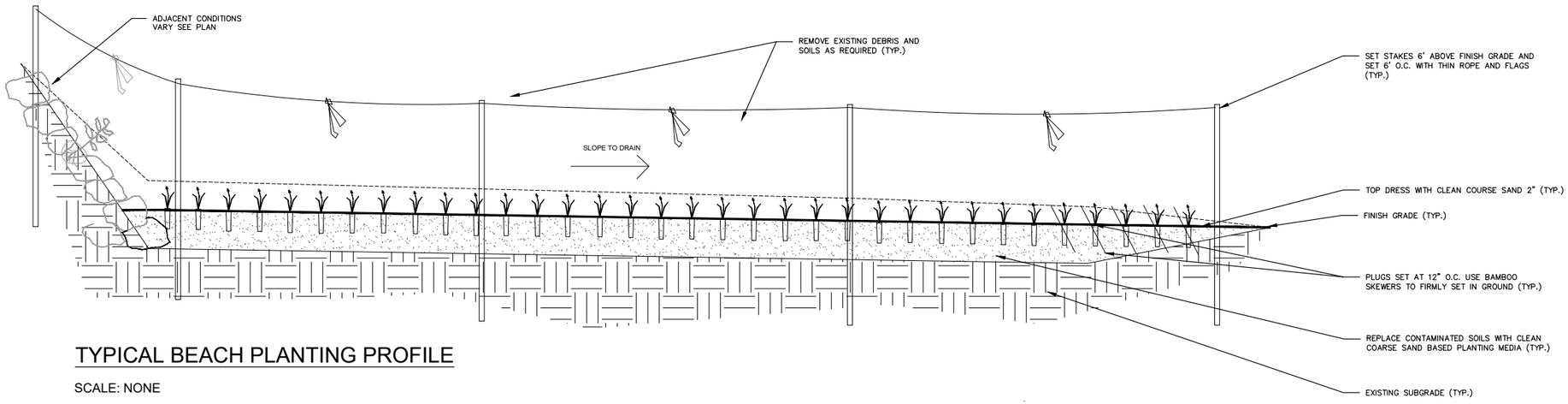
SHRUB/ TREE COASTAL REPLICATION PLANTING DETAIL

SCALE: NONE



COIR ENVELOPE AND COBBLE BEACH

SCALE: NONE



TYPICAL BEACH PLANTING PROFILE

SCALE: NONE

Island End River

PLANTING DETAILS

Everett & Chelsea, MA

Mass EOEA

SHEET - NBA-L-102
DEIR

FEET

BSC GROUP
803 Summer Street
Boston, Massachusetts
02127
617 896 4300

DATE: 10 / 26 / 2023
FILE AT: \\bscbos\wor\Projects-WOR\B956105\...

KEY MAP
SCALE: 1"=150'

EXISTING BEACHAM STREET CULVERT. 8'-6" WIDE x6'-1" HIGH ARCH CULVERT.

EXISTING BEACHAM STREET CULVERT

DRAIN CONNECTOR

EXISTING MARKET STREET CULVERT

TIMBER SUPPORT (TYP.)

TIMBER SUPPORT (TYP.)

NEW BEACHAM STREET 8' WIDEx6' HIGH BOX CULVERT

STEEL H-PILE SUPPORT (TYP.)

TIMBER SUPPORT (TYP.)

MARKET ST. CULVERT DOWNSTREAM CONNECTION STUB (16' WIDEx12' HIGH BOX CULVERT)

T.O.W. EL. 8.5

T.O.W. EL. 6.5

STEEL H-PILE SUPPORT (TYP.)

STEEL PILE SUPPORT (TYP.)

OUTLET HEADWALL FOR NEW BEACHAM STREET CULVERT AND FOR MARKET STREET CULVERT

SHEET PILE BARRIER (TYP.)

N/F M. CUTONE MUSHROOM CO., INC.
125 MARKET STREET

N/F SWANSBURG ENDWARD ET AL TRUSTEES
350 BEACHAM STREET

N/F M&T BANK
357 BEACHAM STREET

N/F DMG BROOKLINE I LLC
145 MARKET STREET

BEACHAM STREET

MARKET STREET

BOSTON MARINA BOAT YARD
N/F DEVELOPMENT AND MARKETING GROUP
359 BEACHAM STREET

BIT. PARKING LOT

RTNs: 3-16509

WS-SB-206

WS-SB-209

WS-SB-210

WS-SB-211

WS-SB-212

WS-SB-213

B-1 B-2 B-3A B-3B B-4 B-5 B-6

CPT-1 CPT-2 CPT-3 CPT-4 CPT-5 CPT-5A

TP-4 TP-5

GP-3 GP-4

DMH RIM=8.44 a=3.84 b=1.04 c=1.07

CB RIM=8.32 INV=4.00

SMH RIM=8.58 a=4.75

DMH RIM=8.37 a=3.37 b=-2.32 c=1.92 d=-1.33

SMH RIM=8.01 a=3.89 b=3.87

CB RIM=7.89 INV=4.27

CB RIM=8.23 INV=3.95

DMH RIM=8.68 a=0.33 b=3.42 c=4.32

8"X6" WYE INV=4.68

12"W CICL (1968)

8"S PVC

10"S PVC

12"W DI (1981) 3-4" CONDUITS ONLY SIGN

EVERSOURCE 115KV DUCT BANK (2019)

T-VERIZON 2-4" B FIBRE

20"G CS 22# (1965)

18"D HDPE

12"D CMP (ABD)

12"D HDPE (20')

12"D CMP

1.5"G

1.25"G PL

2"G ST

PEOPLES UNITED BANK SIGNS

DO NOT ENTER

NO PARKING FIRE LANE

FIRE LANE

RAMP

LA

UP

OHW

W

BANK DRIVE-THRU CANOPY

5-FT PEDESTRIAN ACCESS EASEMENT

26-FT ACCESS EASEMENT

14-FT PEDESTRIAN ACCESS EASEMENT

LIGHT POLE

DAMAGED HYDRANT, OPERATING STEM VISIBLE

CONCRETE SLOPE

CORRUGATED METAL ARCH CULVERTS

DUMPSTER

STOCKADE FENCE

BITUMINOUS CONCRETE WALK

METAL GUARDRAIL

CONCRETE PAD AND GARBAGE CAN

10 POLES WITH FLUSH CONCRETE BASES (PART OF SCULPTURE)

RAISED WOODEN BOARDWALK WITH WOODEN RAILINGS

CHAIN LINK FENCE WITH BARBED WIRE

LARGE STONE BLOCKS, SIZE VARY

DOUBLE DOOR SWING GATE

TURN-AROUND AREA BIT. CONC. PAVEMENT

BENCH

BIKE RACKS

PICNIC TABLES, TYP. OF 3

PARK SIGNAGE

BRUSH LINE

ROCKS, BOULDERS, AND DEBRIS

CONCRETE BLOCKS, TYP.

GRASS

METAL SIGN FRAME

"FOR LEASE" SIGN

"NO PARKING TOW ZONE" SIGN

MONITORING WELL, TYP.

TIMBER STOPS (3)

10.28

10.25

10.25

N

NAD83

PLAN
SCALE: 1"=20'

1" = 20' SCALE 0 20 40 60 FEET

LAST UPDATE: Friday, October 27, 2023 1:05:08 PM
PLOT DATE: Monday, November 6, 2023 3:37:03 PM

Project:
ISLAND END RIVER FLOOD RESILIENCE PROVISIONS EAST

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants:

Revisions:

No.	Date	Description

Seal:

Issued For:

PROGRESS PRINT

Scale:

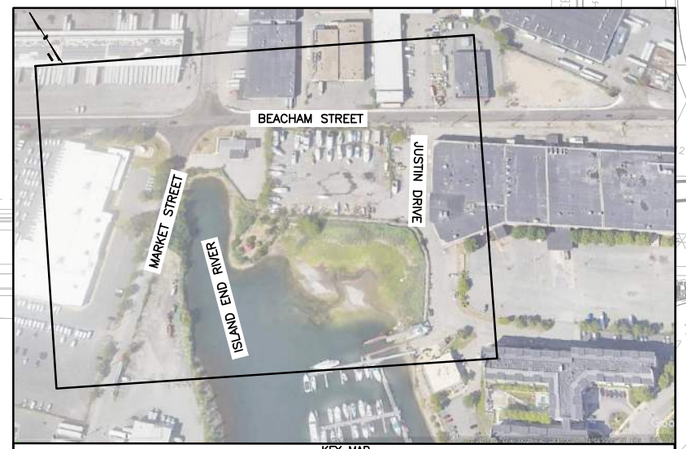
Date:	NOVEMBER 2023
Drawn By:	BDL
Reviewed By:	BDL
Approved By:	SRB
W&S Project No.:	ENG21-0778
W&S File No.:	

Drawing Title:

STRUCTURAL PLAN

Sheet Number:

SSCF-S-101



KEY MAP
SCALE: 1"=150'

COMPOST FILTER TUBE SECTION TO BE ADJUSTED BASED ON PHASE OF WORK

COMPOST FILTER TUBE

COMPOST FILTER TUBE

COFFERDAM PHASE I

COFFERDAM PHASE II

CATCH BASIN PROTECTION (TYP.)

SEE RPW-C-101 FOR RESILIENCE PROVISIONS WEST LAYOUT & MATERIAL PLAN

COMPOST FILTER TUBE

CATCH BASIN PROTECTION (TYP.)

COMPOST FILTER TUBE UNDER BOAT LAUNCH

5-FT PEDESTRIAN ACCESS EASEMENT

26-FT ACCESS EASEMENT

14-FT PEDESTRIAN ACCESS EASEMENT

33-FT WIDE ACCESS EASEMENT

N/F M. CUTONE MUSHROOM CO., INC.
125 MARKET STREET

N/F SWANSBURG ENDWARD ET AL TRUSTEES
350 BEACHAM STREET

N/F CITY OF CHELSEA
380 BEACHAM STREET

N/F M&T BANK
357 BEACHAM STREET

N/F UNITED STATES POSTAL SERVICE
307 BEACHAM STREET

BOSTON MARINA BOAT YARD
N/F DEVELOPMENT AND MARKETING GROUP
359 BEACHAM STREET

N/F DMG BROOKLINE I LLC
145 MARKET STREET

N/F AUCTION NOMINEE TRUST
52307/152
LOT X
PLAN No. 85 OF 1967
#155 MARKET STREET
[40-15-000081]

N/F DEVELOPMENT AND MARKET GROUP
305 COMMANDANTS WAY

N/F CITY OF CHELSEA

WESTBROOK PARTNER
N/F JDC 65R OWNER
100 JUSTIN DRIVE

BEACHAM STREET

JUSTIN DRIVE

MARKET STREET

ISLAND END RIVER

CHELSEA
EVERETT

COMMONWEALTH OF MASSACHUSETTS PARCEL

100-FT BUFFER TO COASTAL BEACH/TIDAL FLAT

100-YR FLOOD LINE

CHAIN LINK FENCE

METAL GUARDRAIL

BIT. CONC. PAVEMENT

EVERSOURCE 115KV DUCT BANK (2019)

12"W CICL (1968)

12"W DI (1981)

8"S PVC

10"S PVC

6"S CI CIPP

8"S CMP

12"D CMP

18"D HDPE

6"S CLAY

8"W DI

LIGHT POLE

DAMAGED HYDRANT, OPERATING STEM VISIBLE

BOLLARD

CONCRETE PAD AND GARBAGE CAN

BENCH

BIKE RACKS

PICNIC TABLES, TYP. OF 3

ELECTRICAL CONDUIT FROM MARINA TO LIGHTS

OUTFALL
INV. OUT=0.21

LARGE STONE BLOCKS, SIZE VARY

DOUBLE DOOR SWING GATE

TURN-AROUND AREA

LIGHT FIXTURE

PARKING LOT EDGE

UTILITY COVER WITH CMP RISER, 66" TO T.O.W. NO VISIBLE PIPE

TWO-TIER WOOD RET. WALLS (36" HEIGHT)

STONE BLOCKS (EXACT SIZE VARY)

CONC. CURB

SCALE: 1"=30'

NAD83

Project:
ISLAND END RIVER FLOOD RESILIENCE PROVISIONS EAST

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants:

Revisions:

No.	Date	Description

Seal:

Issued For:

PROGRESS PRINT

Scale:	AS NOTED
Date:	NOVEMBER 2023
Drawn By:	CFW
Reviewed By:	TPC
Approved By:	BWA
W&S Project No.:	-
W&S File No.:	

Drawing Title:

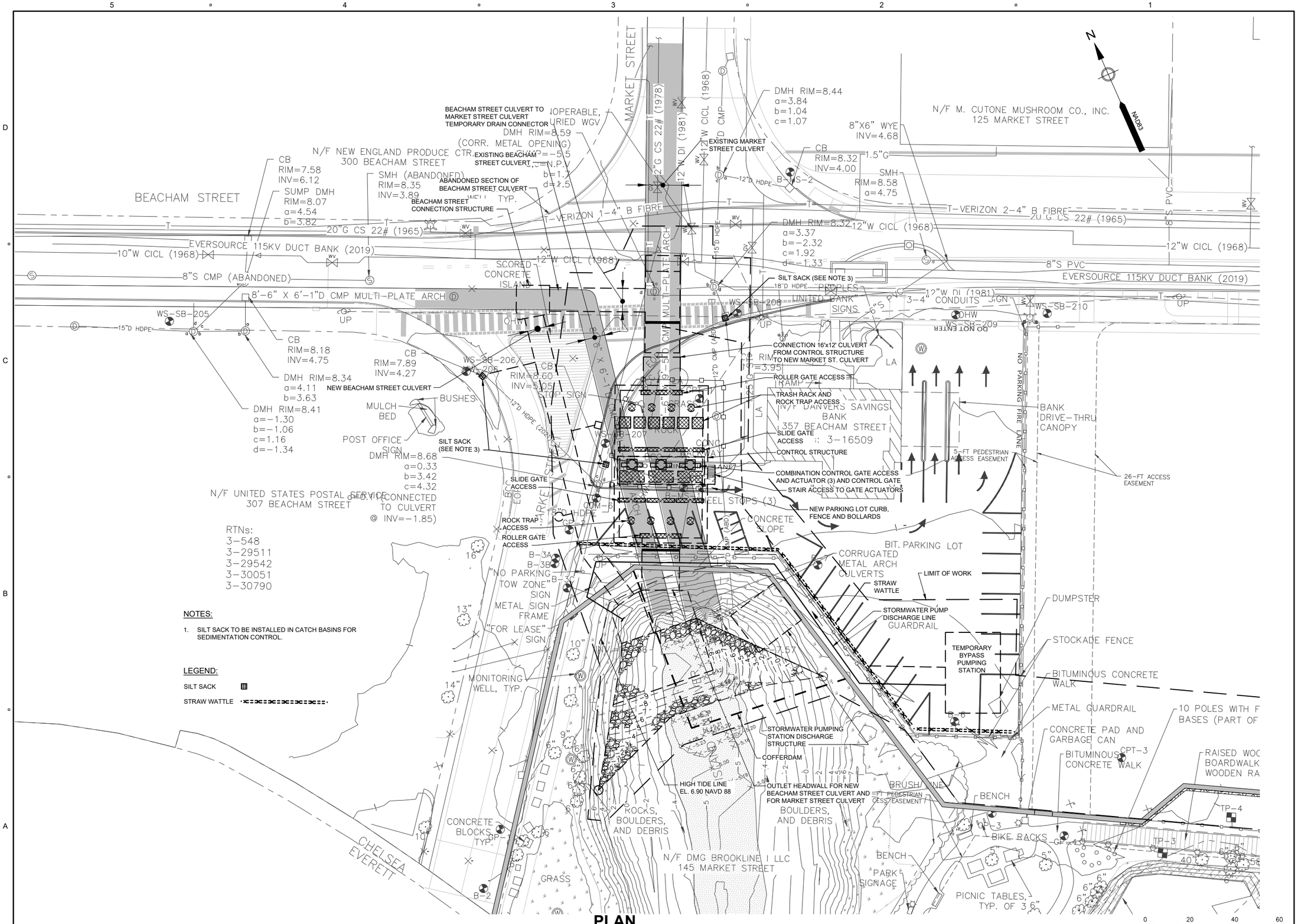
EROSION AND SEDIMENT CONTROL PLAN (STA. 90+11 - 100+00)

Sheet Number:

RPE-ES-101

Rev: 1.8 Date: 11/2023

\\wsch3svr4\RISE\Projects\MA\Everett\Island End River Area\CADD\01_DESIGN\PLOT\02 - Erosion and Sediment Control.dwg



NOTES:

1. SILT SACK TO BE INSTALLED IN CATCH BASINS FOR SEDIMENTATION CONTROL.

LEGEND:

SILT SACK

STRAW WATTLE

PLAN

SCALE: 1"=20'

1" = 20' SCALE 0 20 40 60 FEET

PATH/FILENAME: L:\DCS\PROJECTS\WTR\60669652_ISLANDENDRIVER\600_CAD_GIS\910_CAD\20-SHEETS\C600 C-103.DWG
LAST UPDATE: Friday, October 13, 2023 2:06:52 PM
PLOT DATE: Friday, November 3, 2023 10:07:17 AM

AECOM

PROJECT

ISLAND END RIVER RESILIENCY PROJECT STORM SURGE CONTROL FACILITY

CLIENT

CITY OF CHELSEA, MA
500 BROADWAY
CHELSEA, MA 02150

CONSULTANT

AECOM TECHNICAL SERVICES, INC.
250 APOLLO DRIVE
CHELMSFORD, MA 01824
PHONE: (978) 905-2100
www.aecom.com

REGISTRATION

25% SUBMITTAL
PRELIMINARY COPY

NOTE: This document is preliminary only and is not intended for any purpose except review and comment by the owner and its agents.

ISSUE/REVISION

I/R	DATE	DESCRIPTION

PROJECT NUMBER

60669652

Designed By:	M. MESERVE
Drawn By:	S. NAPOLITANO
Dept Check:	C. BENZIGER
Proj Check:	T. HARRISON
Date:	DECEMBER 2022
Scale:	AS NOTED

DISCIPLINE

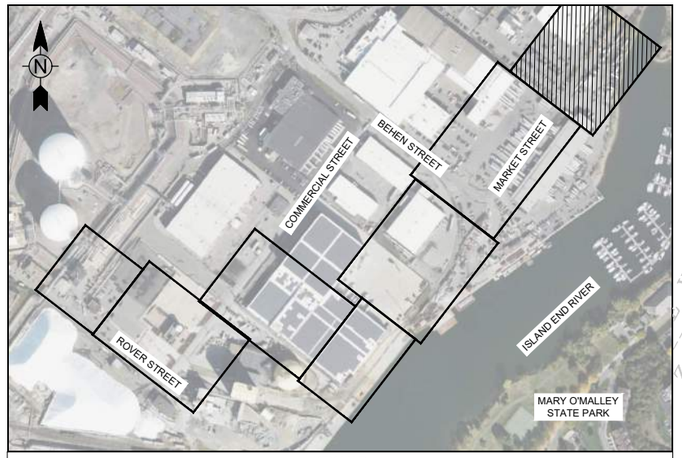
CIVIL

SHEET TITLE

EROSION AND SEDIMENTATION CONTROL

SHEET NUMBER

SSCF-ES-101



KEY MAP
SCALE: 1"=300'

ZONE X
ZONE X*
ZONE X*
ZONE AE

(PUBLIC-40' WIDE)
18972/455, PLAN No. 437 OF 1988

MARKET ST

MATCHLINE A-A

INLET PROTECTION FOR PROPOSED TRENCH DRAINS, TYP.

104+00 103+00 102+00 101+00 100+00

SILT FENCE, TYP.

LIMIT OF DISTURBANCE, TYP.

CONSTRUCTION FENCE, TYP.

100-YEAR FLOODPLAIN

N/F
AUCTION NOMINEE TRUST
52307/152
LOT A
PLAN No. 85 OF 1967
#155 MARKET STREET
[H0-15-000081]

155
MARKET
ST

LOADING DOCK
TOP=9.19
TOF=12.30

JERSEY BARRIERS

DPA

EVERETT
CHELSEA

MIDDLESEX COUNTY

SUFFOLK COUNTY

0 20 40
SCALE: 1"=20'

NOTES:
1. PROVIDE EROSION CONTROL MEASURES IN NEWLY INSTALLED DRAINAGE STRUCTURES UNTIL THE SITE IS STABILIZED.

TETRA TECH
www.tetratech.com
498 7TH AVENUE, 15TH FLOOR
NEW YORK, NY 10018
PHONE: (646) 576-4034

MARK	DATE	DESCRIPTION	BY

CITY OF EVERETT

ISLAND END RIVER FLOOD PROVISIONS WEST

EROSION AND SEDIMENT CONTROL PLAN - 1 (STA. 100+00 - 105+00)

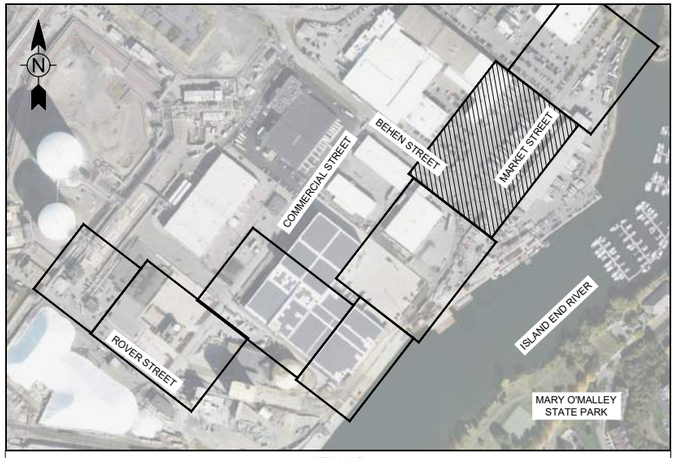
PROJ:	200-01291-22002
DESN:	TC
DRWN:	TC
CHKD:	AR

RPW-ES-101

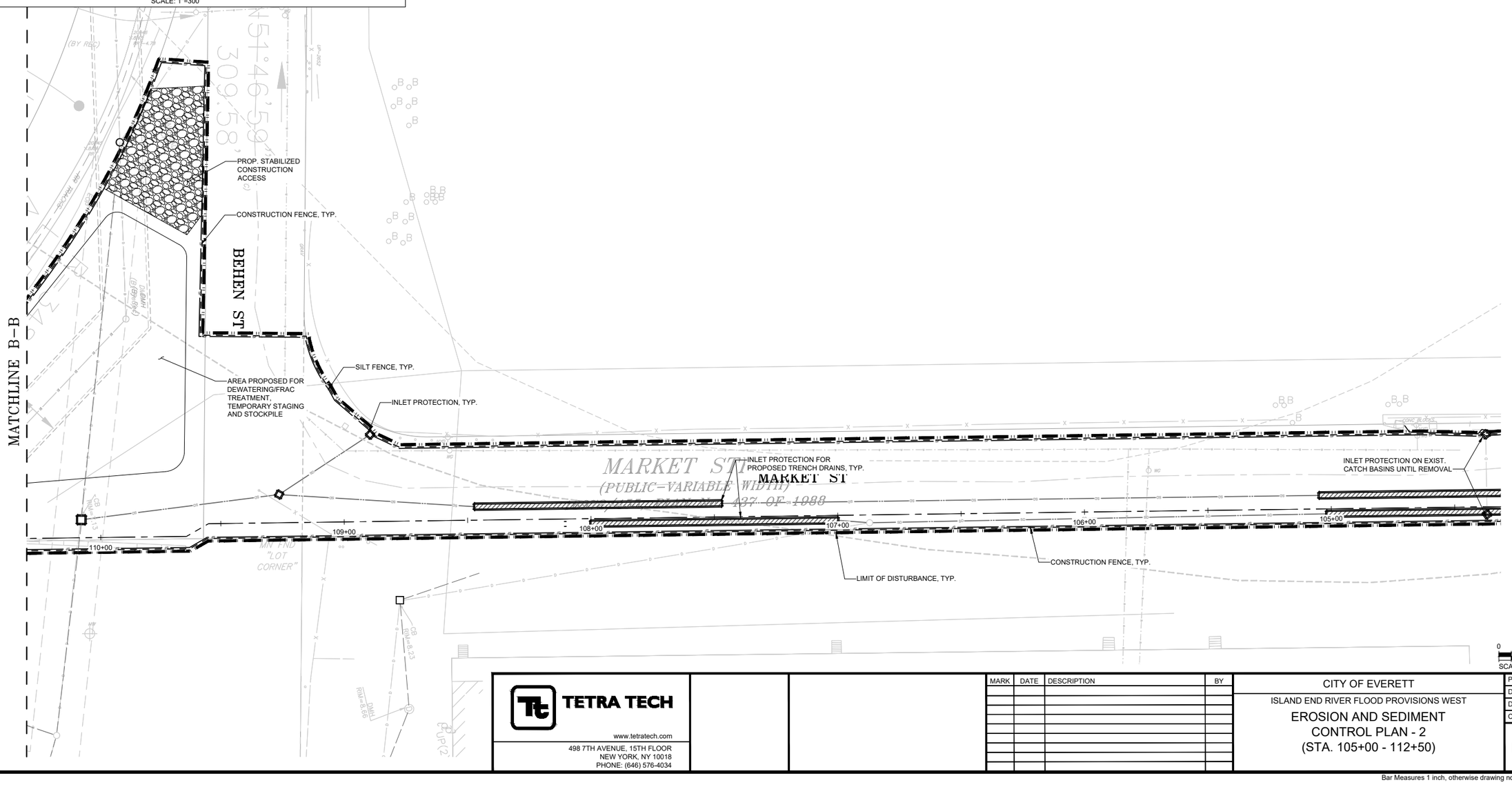
Bar Measures 1 inch, otherwise drawing not to scale

10/23/2023 4:39:54 PM - O:\PROJECTS\NEW YORK\01291\200-01291-22002\CAD\SHEETFILES\C-301 SOIL EROSION AND SEDIMENT CONTROL PLAN.DWG - CHEN, TOLA

NOTES:
1. PROVIDE EROSION CONTROL MEASURES IN NEWLY INSTALLED DRAINAGE STRUCTURES UNTIL THE SITE IS STABILIZED.



KEY MAP
SCALE: 1"=300'



TETRA TECH
www.tetratech.com
498 7TH AVENUE, 15TH FLOOR
NEW YORK, NY 10018
PHONE: (646) 576-4034

MARK	DATE	DESCRIPTION	BY

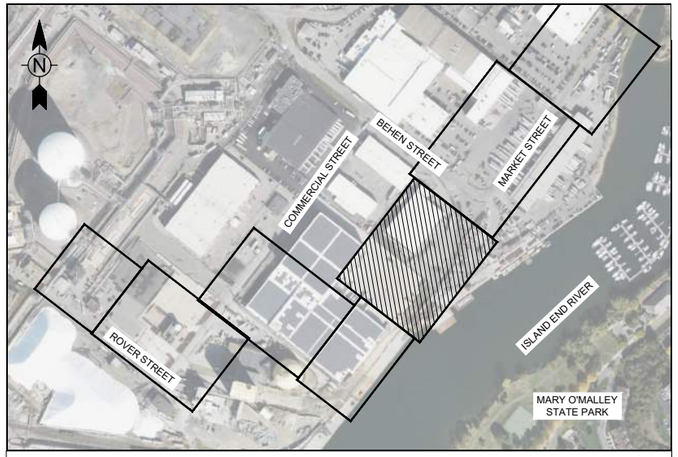
CITY OF EVERETT
ISLAND END RIVER FLOOD PROVISIONS WEST
EROSION AND SEDIMENT CONTROL PLAN - 2
(STA. 105+00 - 112+50)

PROJ:	200-01291-22002
DESN:	TC
DRWN:	TC
CHKD:	AR

RPW-ES-102

Bar Measures 1 inch, otherwise drawing not to scale

NOTES:
1. PROVIDE EROSION CONTROL MEASURES IN NEWLY INSTALLED DRAINAGE STRUCTURES UNTIL THE SITE IS STABILIZED.



KEY MAP
SCALE: 1"=300'

MATCHLINE C–C

MATCHLINE B–B

ZONE X
ZONE AE
ZONE X*
ZONE AE

PROP. TEMPORARY STAGING AND STOCKPILE AREA

CONSTRUCTION FENCE, TYP.

CONSTRUCTION FENCE, TYP.

LIMIT OF DISTURBANCE, TYP.

SILT FENCE, TYP.

116+00 115+00 114+00 113+00 112+00 111+00

RR TRACKS

1' HIGH CONC. RET. WALL

ROW OF CONCRETE JERSEY BARRIERS

ROW OF CONCRETE JERSEY BARRIERS

EDGE OF SEAWALL

EDGE OF SEAWALL

0 20 40
SCALE: 1"=20'

TETRA TECH
www.tetratech.com
498 7TH AVENUE, 15TH FLOOR
NEW YORK, NY 10018
PHONE: (646) 576-4034

MARK	DATE	DESCRIPTION	BY

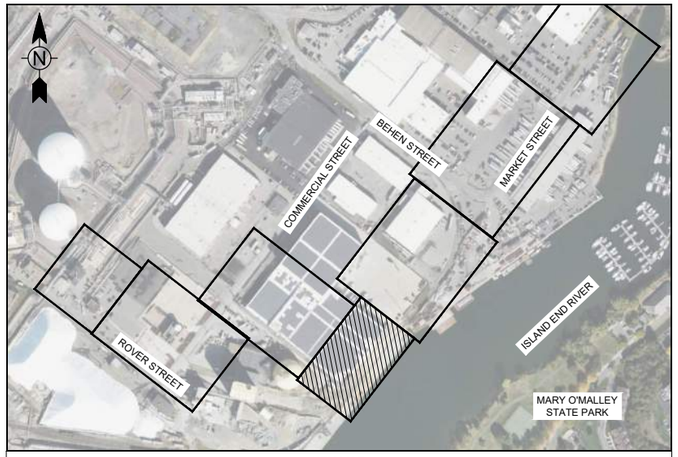
CITY OF EVERETT
ISLAND END RIVER FLOOD PROVISIONS WEST
EROSION AND SEDIMENT CONTROL PLAN - 3
(STA. 112+50 - 117+75)

PROJ:	200-01291-22002
DESN:	TC
DRWN:	TC
CHKD:	AR

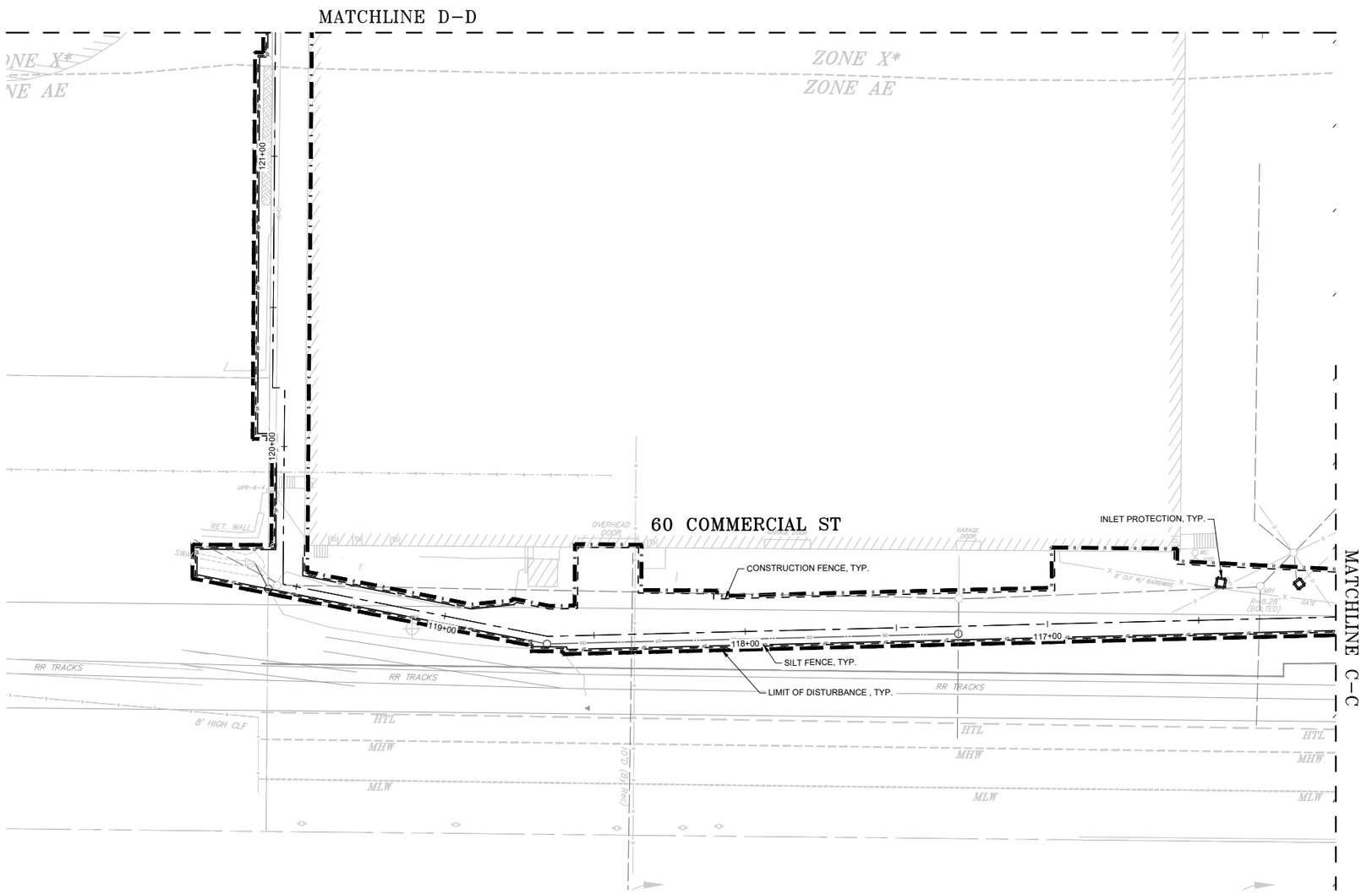
RPW-ES-103

Bar Measures 1 inch, otherwise drawing not to scale

10/23/2023 4:43:00 PM - O:\PROJECTS\NEW YORK\01291\200-01291-22002\CAD\SHEETFILES\C-301 SOIL EROSION AND SEDIMENT CONTROL PLAN.DWG - CHEN, TOLA



KEY MAP
SCALE: 1"=300'



0 20 40
SCALE: 1"=20'

NOTES:
1. PROVIDE EROSION CONTROL MEASURES IN NEWLY INSTALLED DRAINAGE STRUCTURES UNTIL THE SITE IS STABILIZED.

TETRA TECH
www.tetratech.com
498 7TH AVENUE, 15TH FLOOR
NEW YORK, NY 10018
PHONE: (646) 576-4034

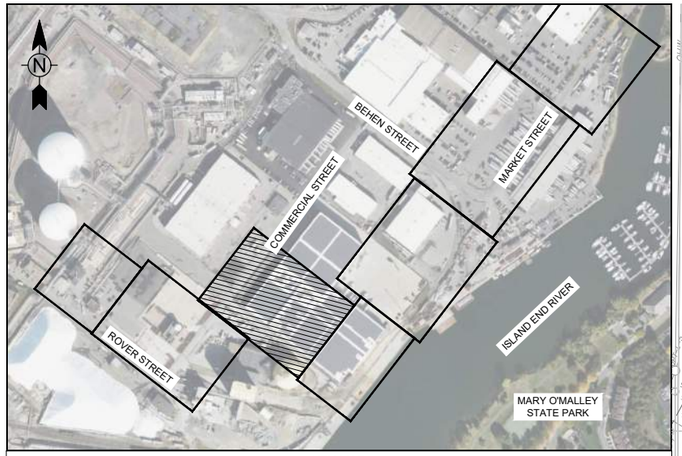
MARK	DATE	DESCRIPTION	BY

CITY OF EVERETT
ISLAND END RIVER FLOOD PROVISIONS WEST
EROSION AND SEDIMENT CONTROL PLAN - 4
(STA. 117+75 - 122+00)

PROJ:	200-01291-22002
DESN:	TC
DRWN:	TC
CHKD:	AR

RPW-ES-104

Bar Measures 1 inch, otherwise drawing not to scale



KEY MAP
SCALE: 1"=300'

COMMERCIAL STREET
(PRIVATE–40' WIDE)

ZONE X
ZONE X*

60 COMMERCIAL ST

COMMERCIAL ST

MATCHLINE D–D

INLET PROTECTION, TYP.

LIMIT OF DISTURBANCE, TYP.

SILT FENCE, TYP.

CONSTRUCTION FENCE, TYP.

PROP. STABILIZED CONSTRUCTION ACCESS

125+00 124+00 123+00 122+00

126+20

MATCHLINE E–E

SCALE: 1"=20'

NOTES:
1. PROVIDE EROSION CONTROL MEASURES IN NEWLY INSTALLED DRAINAGE STRUCTURES UNTIL THE SITE IS STABILIZED.

TETRA TECH
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498 7TH AVENUE, 15TH FLOOR
NEW YORK, NY 10018
PHONE: (646) 576-4034

MARK	DATE	DESCRIPTION	BY

CITY OF EVERETT

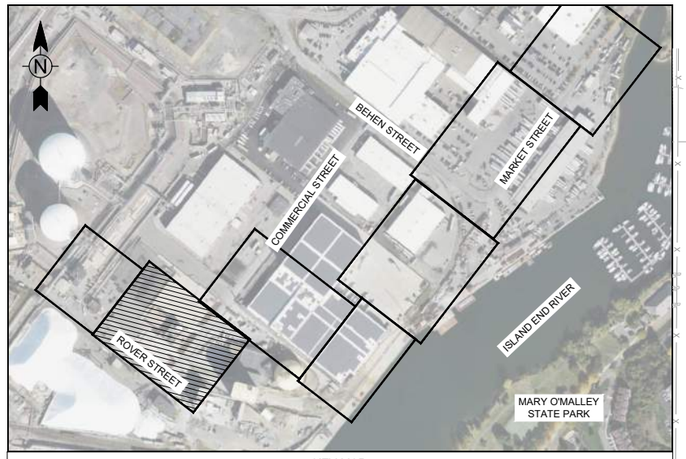
ISLAND END RIVER FLOOD PROVISIONS WEST

EROSION AND SEDIMENT CONTROL PLAN - 5
(STA. 122+00 - 127+50)

PROJ:	200-01291-22002
DESN:	TC
DRWN:	TC
CHKD:	AR

RPW-ES-105

Bar Measures 1 inch, otherwise drawing not to scale



KEY MAP
SCALE: 1"=300'

MATCHLINE E-E

MATCHLINE F-F

CONCRETE
BIT CONC
BRICK PLAZA
VISITOR CENTER
LANDSCAPED AREA
CONC. RET. WALL
CONC. RET. WALL w/CLF
CONC. RAMP
TRENCH DRAIN
BRICK GUARD SHACK
VEHICLE GATE
VEHICLE SCALE
GATE 1G
GATE 1H
973
CB RIM=9.32'
CB RIM=8.85'
CB RIM=9.38' A=6.63'
4'G (By Rec)
12"W (By Rec)
LC (By Rec)
127+00
128+00
129+00
130+00
131+00
132+00
133+00
SILT FENCE, TYP.
CONSTRUCTION FENCE, TYP.
LIMIT OF DISTURBANCE, TYP.
INSTALL EROSION AND SEDIMENT CONTROL MEASURES TO PROTECT DEPLOYABLE BARRIER DRAIN AFTER INSTALLATION UNTIL SITE IS STABILIZED.
INLET PROTECTION
TEMPORARY DEWATERING/FRAC TREATMENT AREA
COMMERCIAL STREET (PRIVATE-40'± WIDE)
N/F CIMENT QUEBEC INC. 65772/206 LOT 2 PLAN No. 364 OF 2015 #100 COMMERCIAL STREET [H0-12-00000A]
N/F AGGREGATE INDUSTRIES 6577 LOT 1 PLAN No. 3 #80 COMMER [H0-12

0 20 40
SCALE: 1"=20'

NOTES:
1. PROVIDE EROSION CONTROL MEASURES IN NEWLY INSTALLED DRAINAGE STRUCTURES UNTIL THE SITE IS STABILIZED.

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498 7TH AVENUE, 15TH FLOOR
NEW YORK, NY 10018
PHONE: (646) 576-4034

MARK	DATE	DESCRIPTION	BY

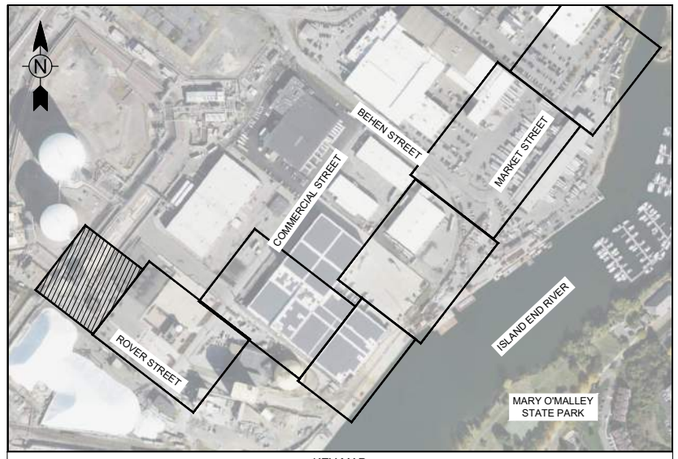
CITY OF EVERETT
ISLAND END RIVER FLOOD PROVISIONS WEST
EROSION AND SEDIMENT CONTROL PLAN - 6
(STA. 127+50 - 133+75)

PROJ:	200-01291-22002
DESN:	TC
DRWN:	TC
CHKD:	AR

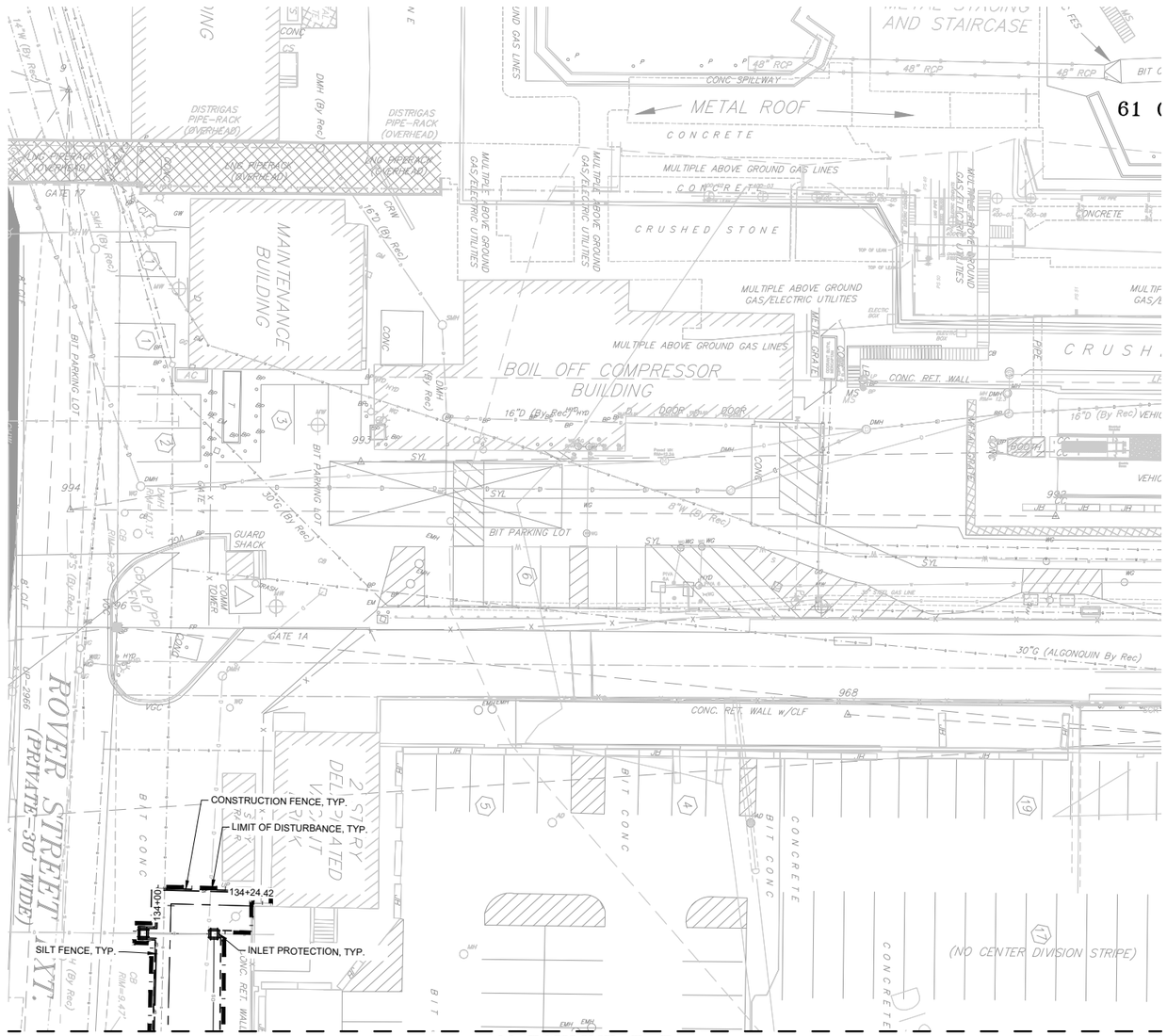
RPW-ES-106

Bar Measures 1 inch, otherwise drawing not to scale

11/6/2023 2:06:37 PM - O:\PROJECTS\NEW YORK\01291\200-01291-22002\CAD\SHEETFILES\C-301 SOIL EROSION AND SEDIMENT CONTROL PLAN.DWG - CHEN, TOLA



KEY MAP
SCALE: 1"=300'



MATCHLINE F–F

0 20 40
SCALE: 1"=20'

NOTES:
1. PROVIDE EROSION CONTROL MEASURES IN NEWLY INSTALLED DRAINAGE STRUCTURES UNTIL THE SITE IS STABILIZED.

TETRA TECH
www.tetratech.com
498 7TH AVENUE, 15TH FLOOR
NEW YORK, NY 10018
PHONE: (646) 576-4034

MARK	DATE	DESCRIPTION	BY

CITY OF EVERETT
ISLAND END RIVER FLOOD PROVISIONS WEST
EROSION AND SEDIMENT CONTROL PLAN - 7
(STA. 133+75 - 135+81))

PROJ:	200-01291-22002
DESN:	TC
DRWN:	TC
CHKD:	AR

RPW-ES-107

Bar Measures 1 inch, otherwise drawing not to scale

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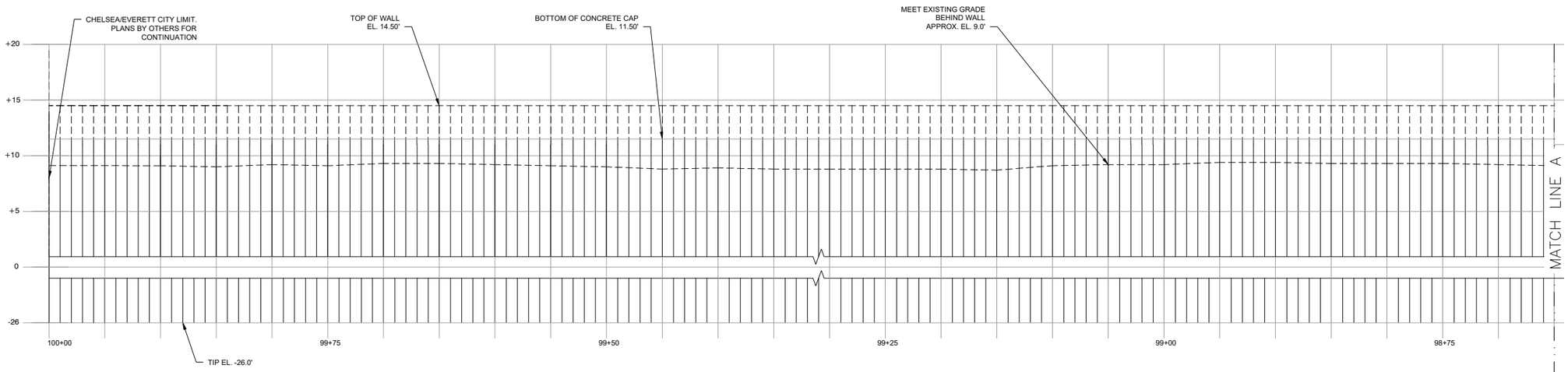
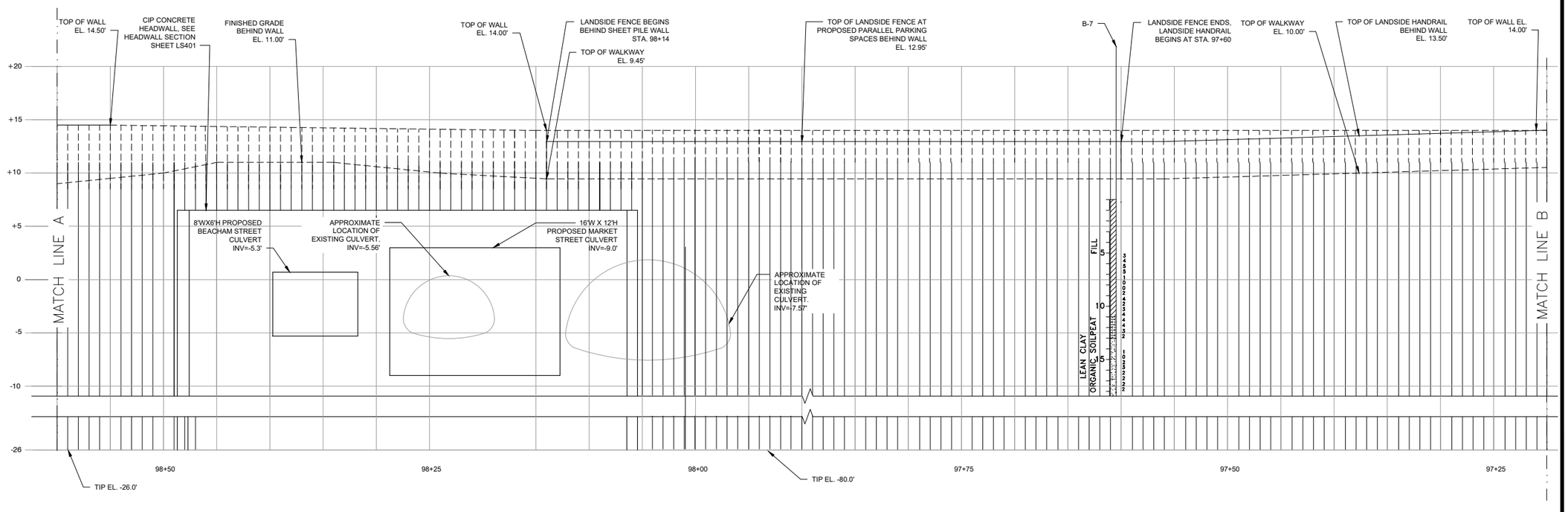


FLOOD WALL DEVELOPED ELEVATION
STA. 100+00 – 98+60

VERTICAL AND HORIZONTAL
SCALE: 1" = 5'–0"



FLOOD WALL DEVELOPED ELEVATION
STA. 98+60 – 97+20

VERTICAL AND HORIZONTAL
SCALE: 1" = 5'–0"

5 2.5 0 5 10
VERTICAL AND HORIZONTAL SCALE: 1"=5'

P:\NE\Everett\Island End River Area\CADD\1_DESIGN\1.07 08 - Structural\Elevations.dwg

Project:
ISLAND END RIVER FLOOD RESILIENCE PROVISIONS EAST

Weston & Sampson
Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants:

Revisions:

No.	Date	Description

Seal:

Issued For:
PRELIMINARY DESIGN

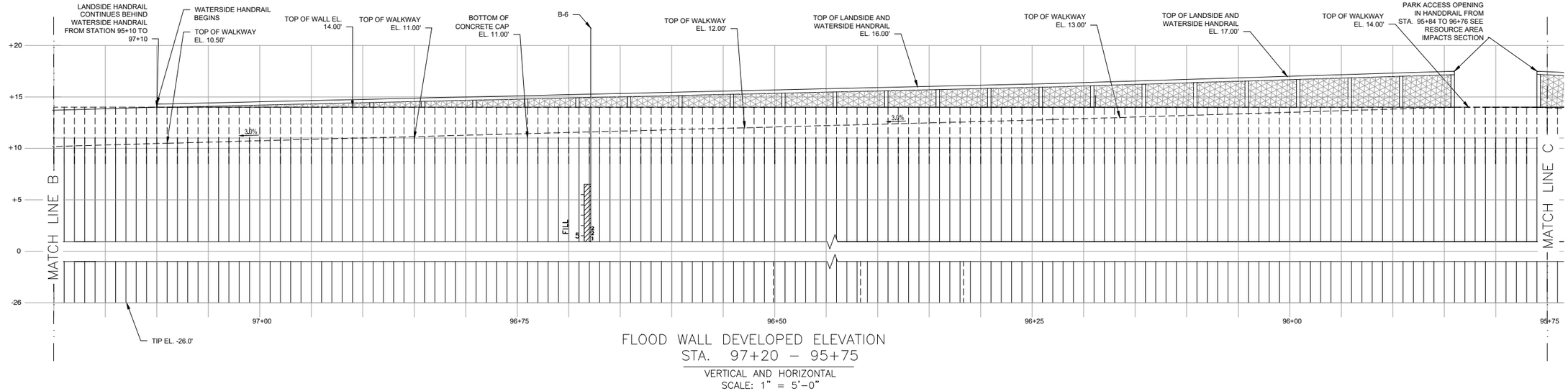
Scale:	AS NOTED
Date:	FEBRUARY 2023
Drawn By:	GN
Reviewed By:	MEA
Approved By:	MEA

W&S Project No.:
W&S File No.:

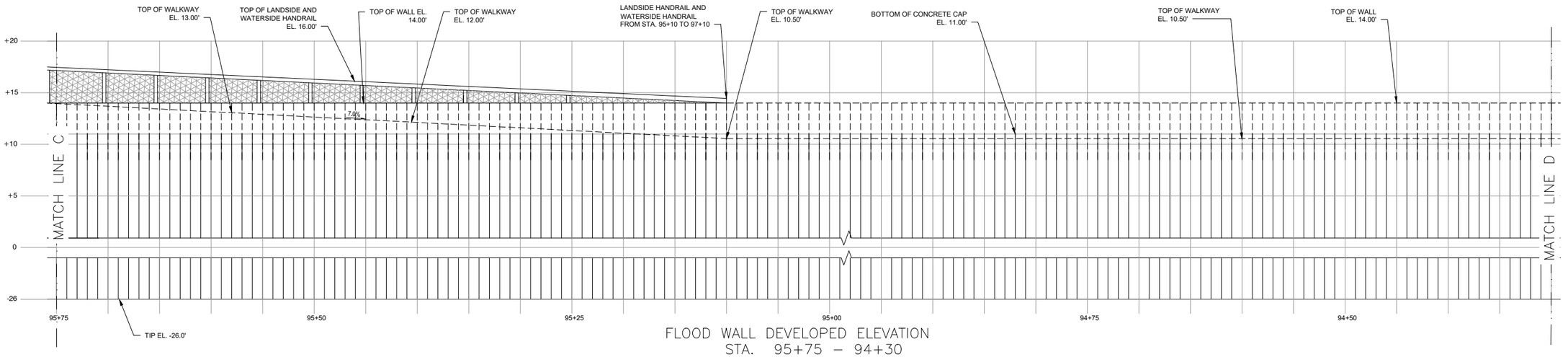
Drawing Title:
STRUCTURAL ELEVATION - 1

Sheet Number:
RPE-S-201

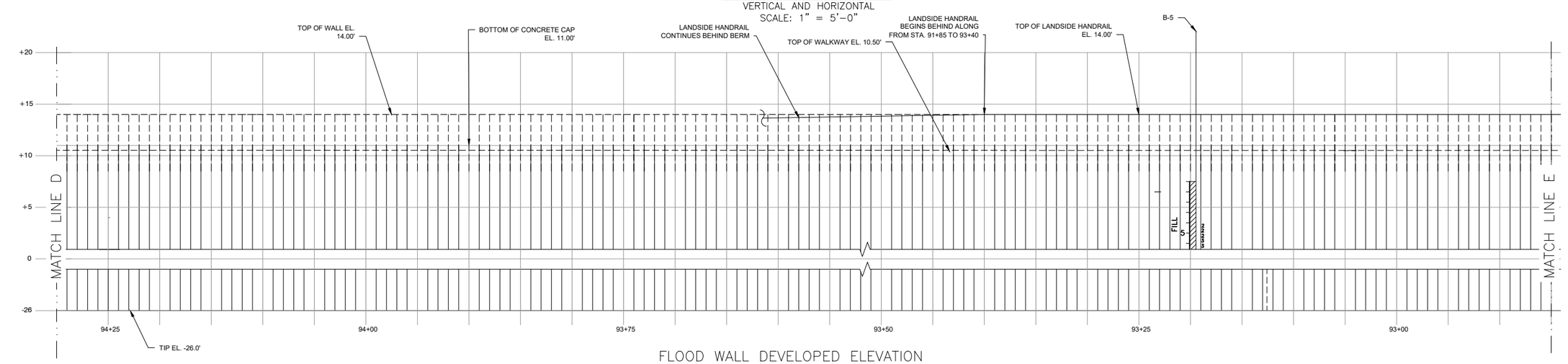
Rev.16 Date: 02/2023



FLOOD WALL DEVELOPED ELEVATION
STA. 97+20 – 95+75
VERTICAL AND HORIZONTAL
SCALE: 1" = 5'–0"



FLOOD WALL DEVELOPED ELEVATION
STA. 95+75 – 94+30
VERTICAL AND HORIZONTAL
SCALE: 1" = 5'–0"



FLOOD WALL DEVELOPED ELEVATION
STA. 94+30 – 92+85
VERTICAL AND HORIZONTAL
SCALE: 1" = 5'–0"

5 2.5 0 5 10
VERTICAL AND HORIZONTAL SCALE: 1"=5'

Project:
ISLAND END RIVER FLOOD RESILIENCE PROVISIONS EAST

CHELSEA SEAL

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants:

Revisions:

No.	Date	Description

Seal:

Issued For:
PRELIMINARY DESIGN

Scale:	AS NOTED
Date:	FEBRUARY 2023
Drawn By:	GN
Reviewed By:	MEA
Approved By:	MEA

W&S Project No.:
W&S File No.:

Drawing Title:
STRUCTURAL ELEVATION - 2

Sheet Number:
RPE-S-202

Rev. 1.6 Date: 02/2023

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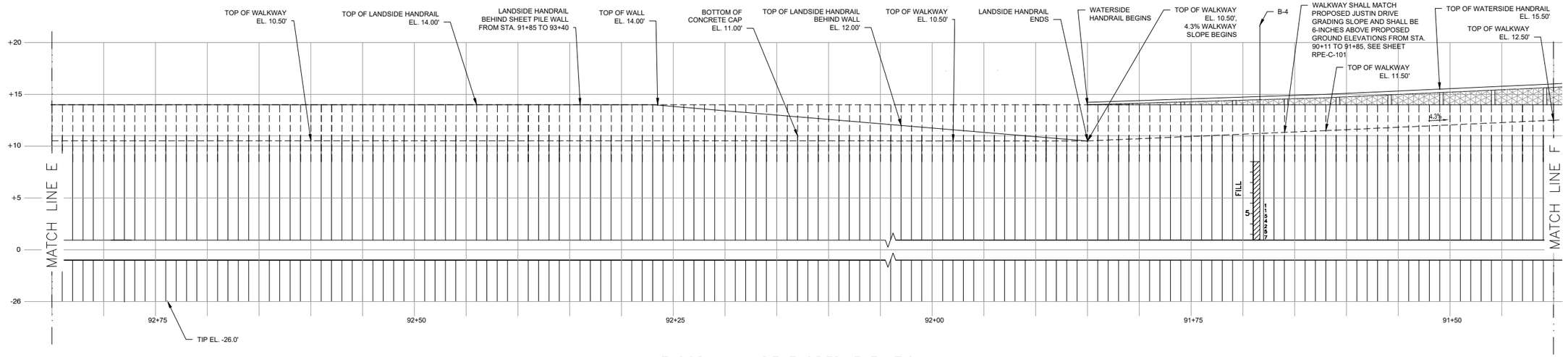
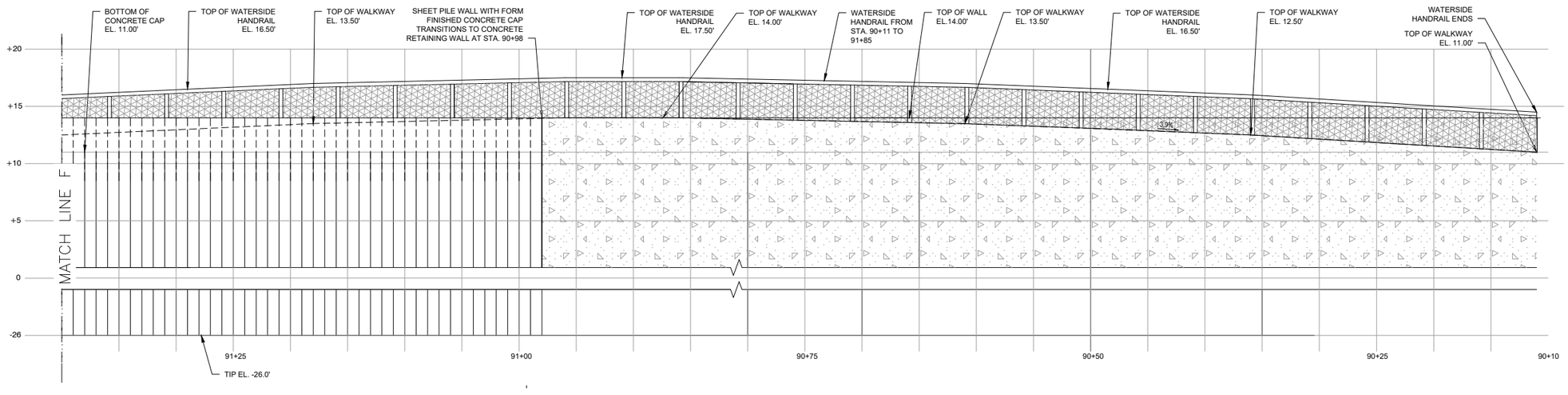


FLOOD WALL DEVELOPED ELEVATION
STA. 92+85 – 91+40

VERTICAL AND HORIZONTAL
SCALE: 1" = 5'–0"



FLOOD WALL DEVELOPED ELEVATION
STA. 91+40 – 90+10

VERTICAL AND HORIZONTAL
SCALE: 1" = 5'–0"

5 2.5 0 5 10
VERTICAL AND HORIZONTAL SCALE: 1"=5'

P:\MA\Everett\Bike Evc River Area\CADD\5 DESIGN\CIVIL - Structural\Elevations.dwg

Project:
ISLAND END RIVER FLOOD RESILIENCE PROVISIONS EAST

Weston & Sampson
Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants:

Revisions:

No.	Date	Description

Seal:

Issued For:
PRELIMINARY DESIGN

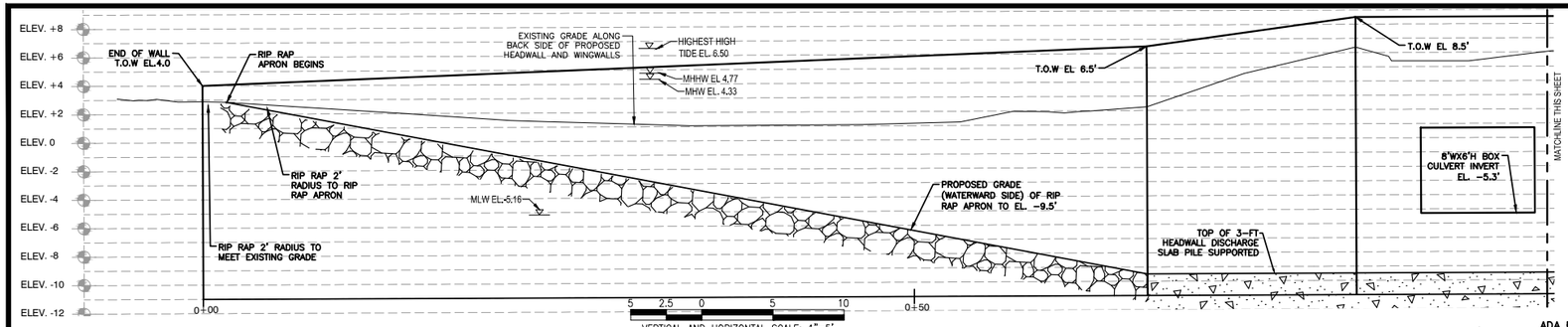
Scale:	AS NOTED
Date:	FEBRUARY 2023
Drawn By:	GN
Reviewed By:	MEA
Approved By:	MEA

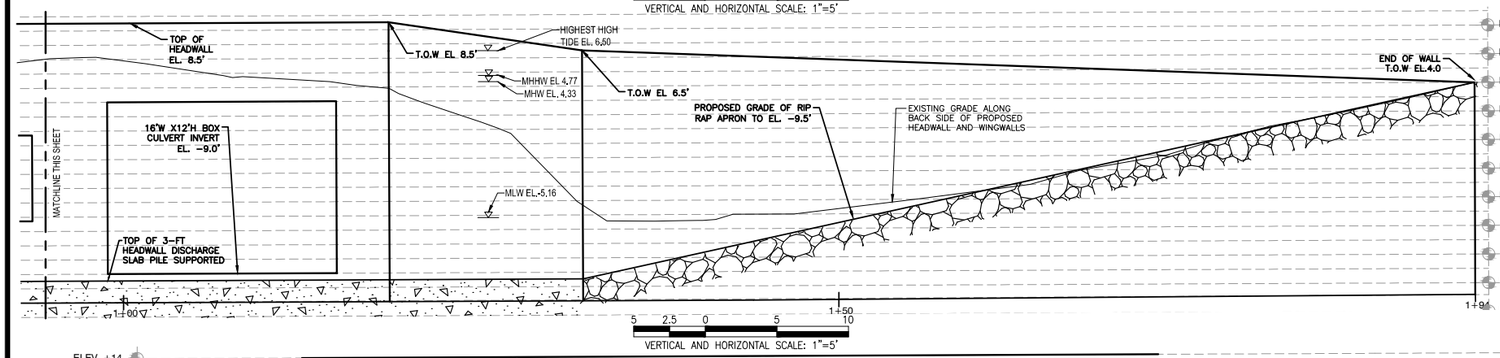
W&S Project No.:
W&S File No.:

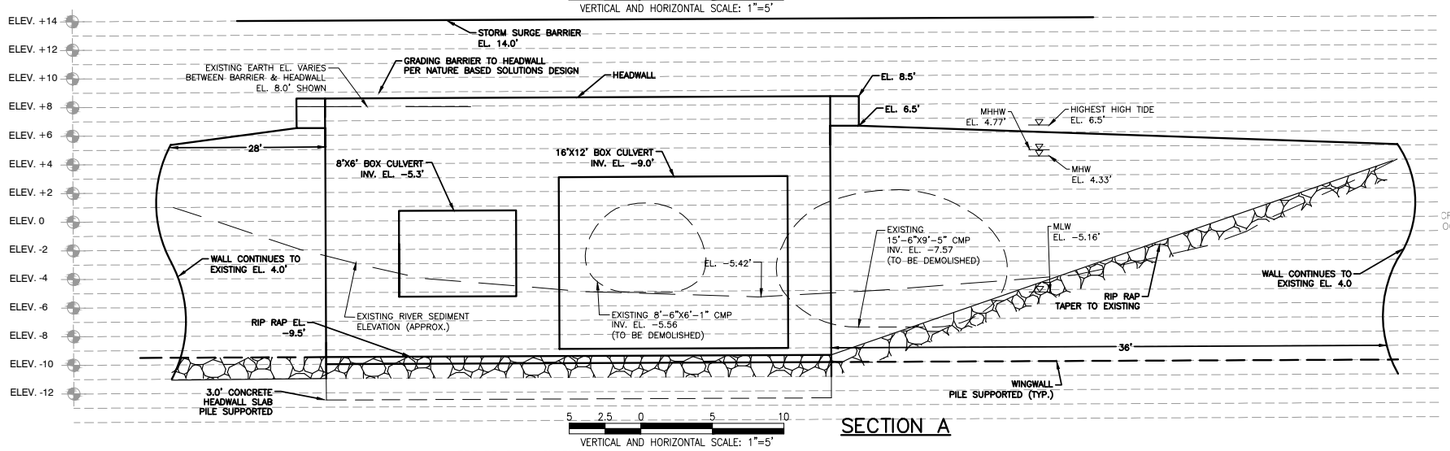
Drawing Title:
STRUCTURAL ELEVATION - 3

Sheet Number:
RPE-S-203

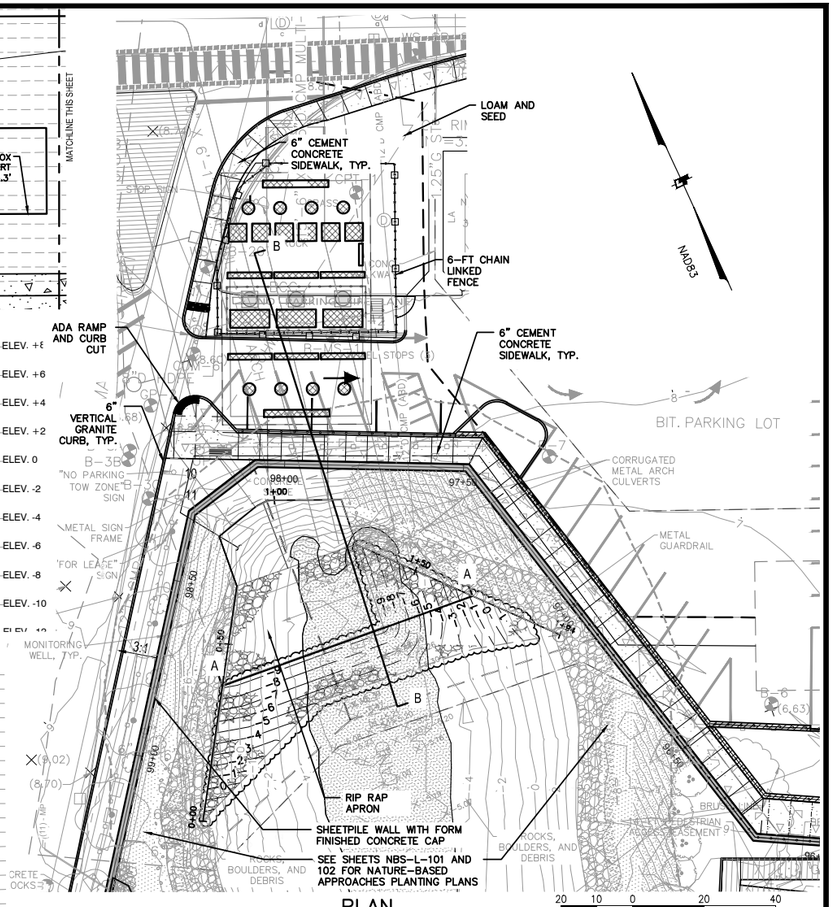
Rev.: 6 Date: 02/2023



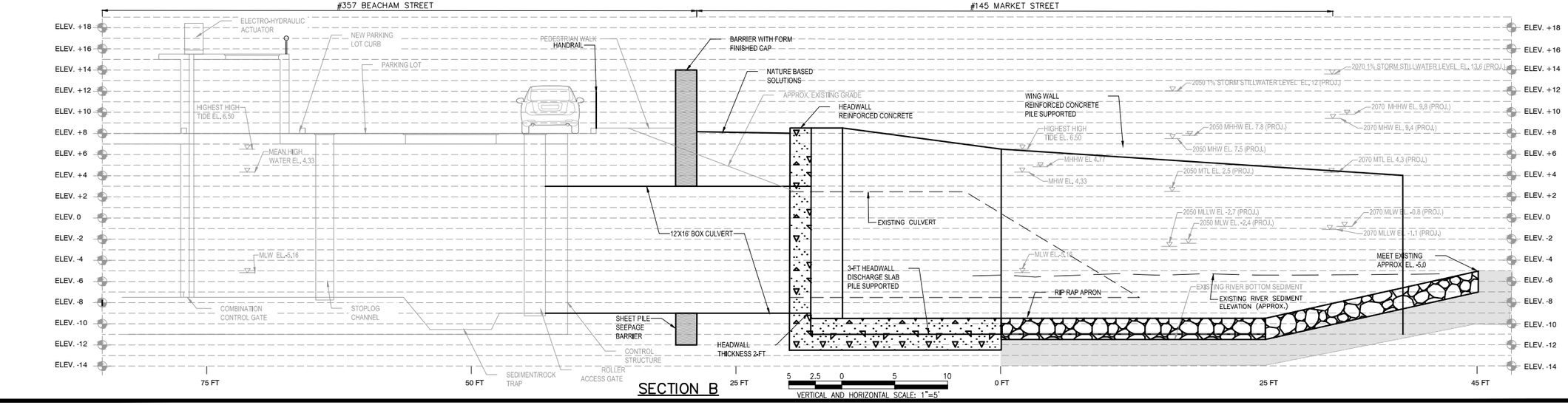




SECTION A



PLAN



SECTION B

Project:

ISLAND END RIVER FLOOD RESILIENCE PROVISIONS EAST

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants:

Revisions:

No.	Date	Description

Seal:

Issued For:

PROGRESS PRINT

Scale:	AS NOTED
Date:	OCTOBER 2023
Drawn By:	CFW
Reviewed By:	TPC
Approved By:	BWA
W&S Project No.:	-
W&S File No.:	

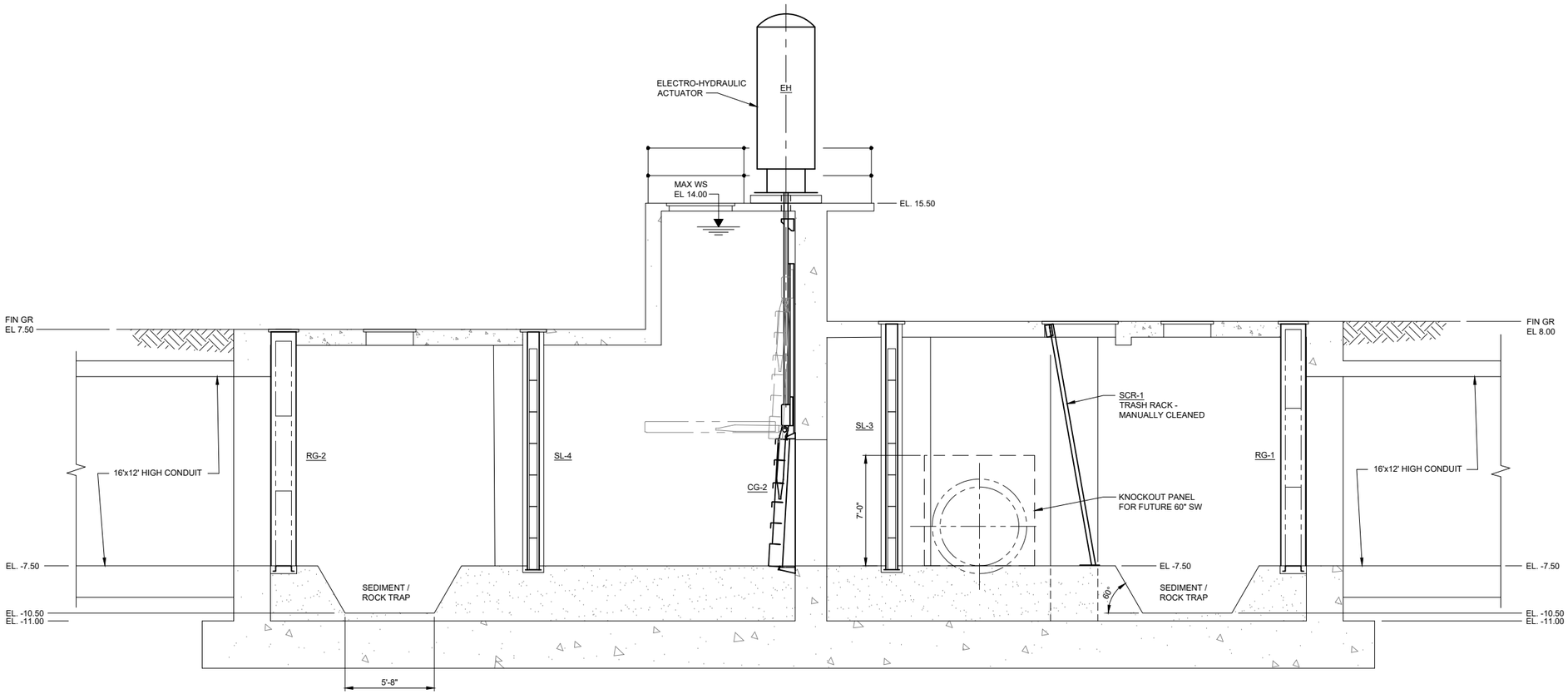
Drawing Title:

HEADWALL SECTIONS

Sheet Number:

SSCF-C-301

Rev. 1.0 Date: 10/2023



SECTION 1 / 10 D-101

SCALE: 1/4"=1'-0"

0 4 8 12

1/4"=1'-0" SCALE FEET

PATHFILENAME: I:\DCS\PROJECTS\WTR\60669652_ISLANDENDRIVER\900_CAD_GIS\910_CAD\20-SHEETS\D\10 D-301.DWG

LAST UPDATE: Thursday, September 21, 2023 11:46:38 AM

PLOT DATE: Friday, October 13, 2023 1:38:31 PM

AECOM

PROJECT

ISLAND END RIVER RESILIENCY PROJECT STORM SURGE CONTROL FACILITY

CLIENT

CITY OF CHELSEA, MA

500 BROADWAY
CHELSEA, MA 02150

CONSULTANT

AECOM TECHNICAL SERVICES, INC.
250 APOLLO DRIVE
CHELMSFORD, MA 01824
PHONE: (978) 905-2100
www.aecom.com

REGISTRATION

25% SUBMITTAL
PRELIMINARY COPY

NOTE: This document is preliminary only and is not intended for any purpose except review and comment by the owner and its agents.

ISSUE/REVISION

I/R	DATE	DESCRIPTION

PROJECT NUMBER

60669652

Designed By:	P.M.
Drawn By:	M.B.
Dept Check:	K.B.
Proj Check:	T. HARRISON
Date:	DECEMBER 2022
Scale:	AS SHOWN

DISCIPLINE

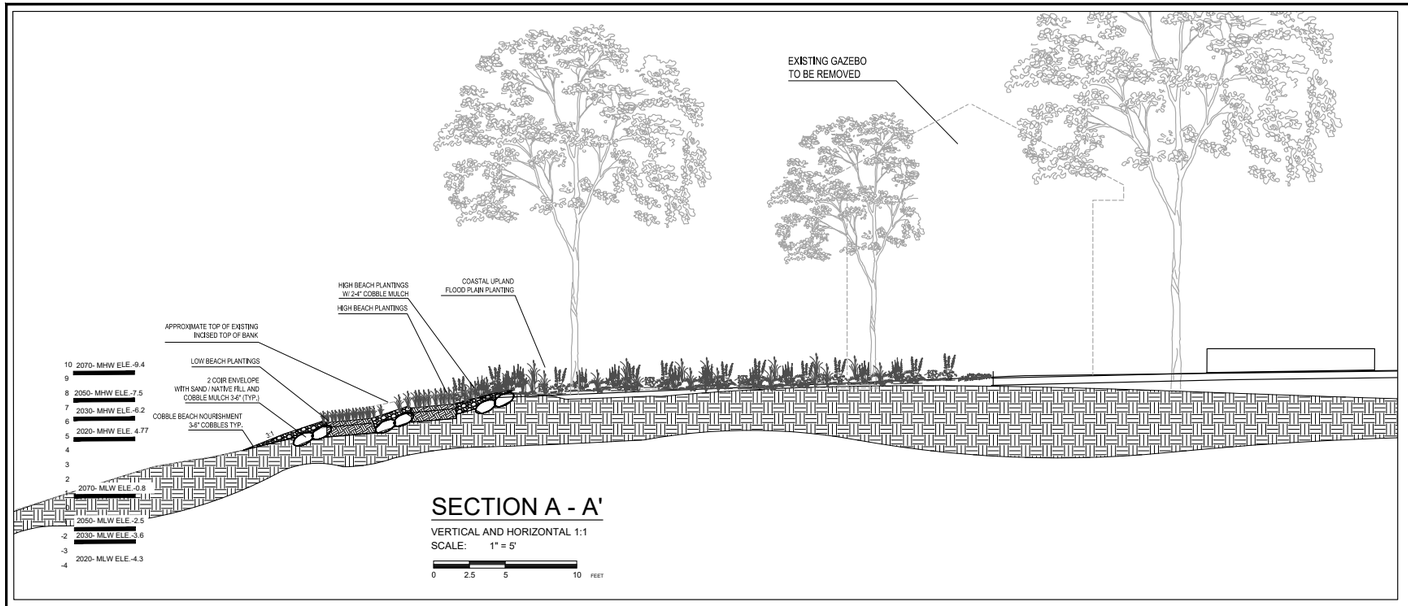
MECHANICAL PROCESS

SHEET TITLE

CONTROL STRUCTURE SECTION

SHEET NUMBER

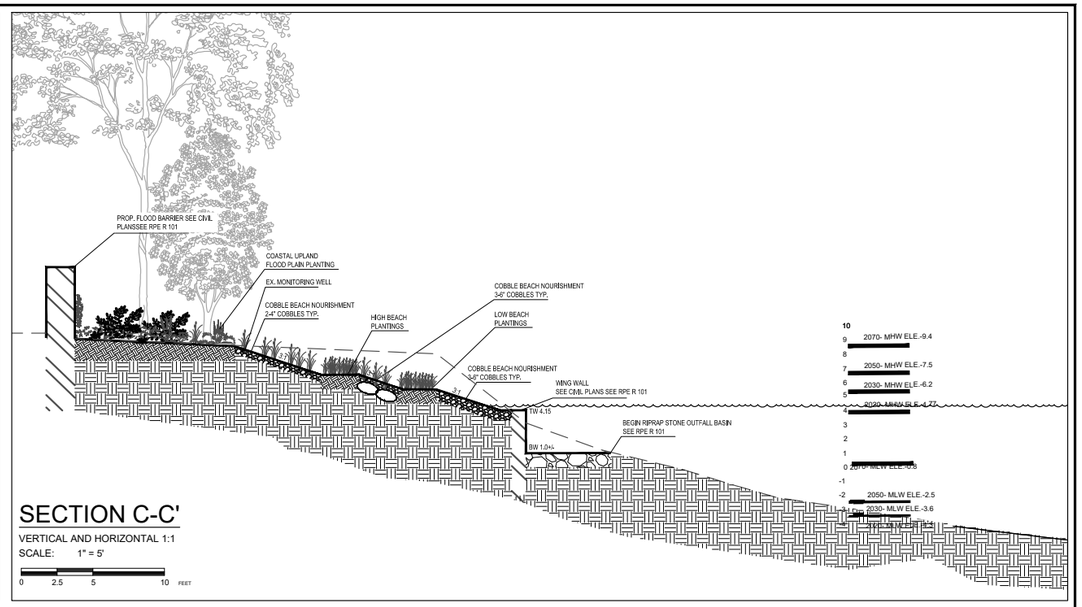
SSCF-C-302



SECTION A - A'

VERTICAL AND HORIZONTAL 1:1
SCALE: 1" = 5'

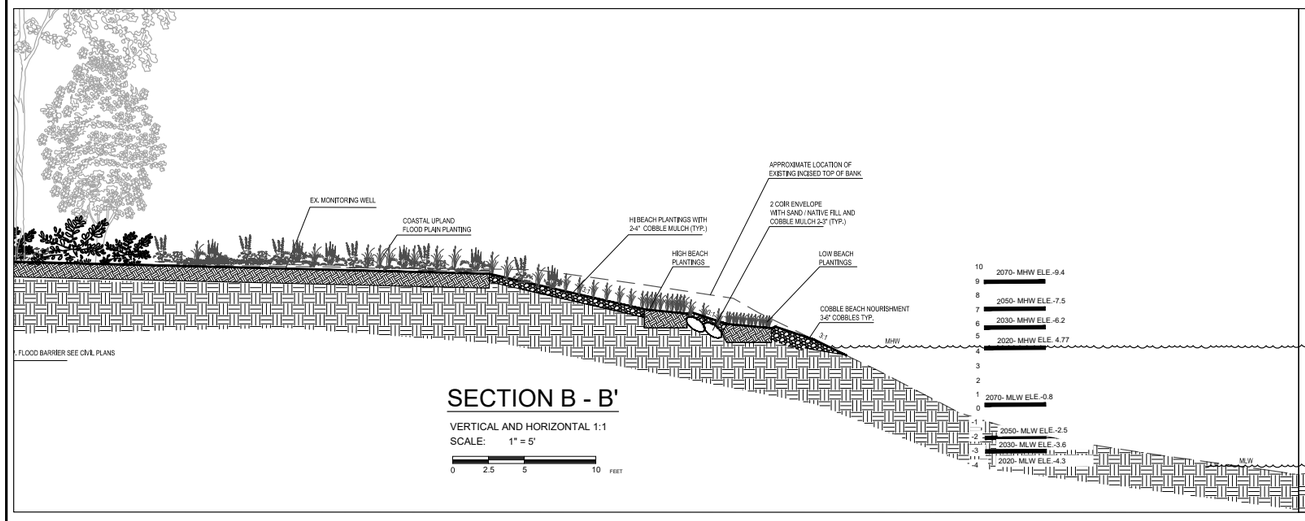
0 2.5 5 10 FEET



SECTION C-C'

VERTICAL AND HORIZONTAL 1:1
SCALE: 1" = 5'

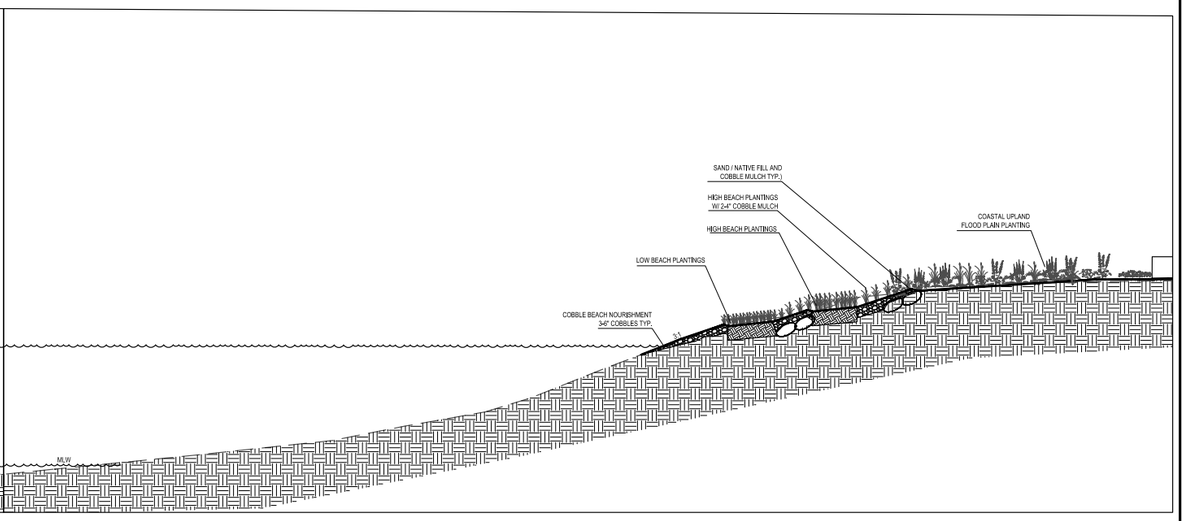
0 2.5 5 10 FEET

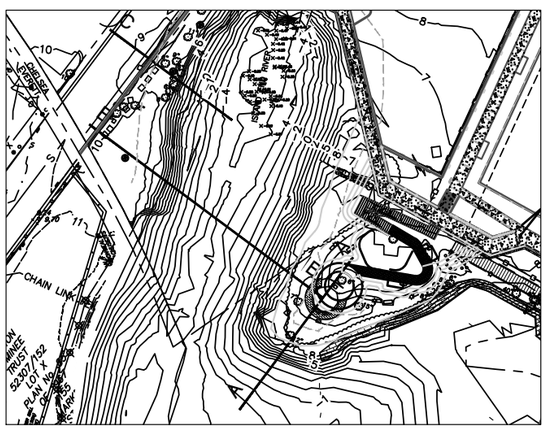


SECTION B - B'

VERTICAL AND HORIZONTAL 1:1
SCALE: 1" = 5'

0 2.5 5 10 FEET





KEY PLAN

SCALE : 1" = 50'

Mass EOEA

Island End River

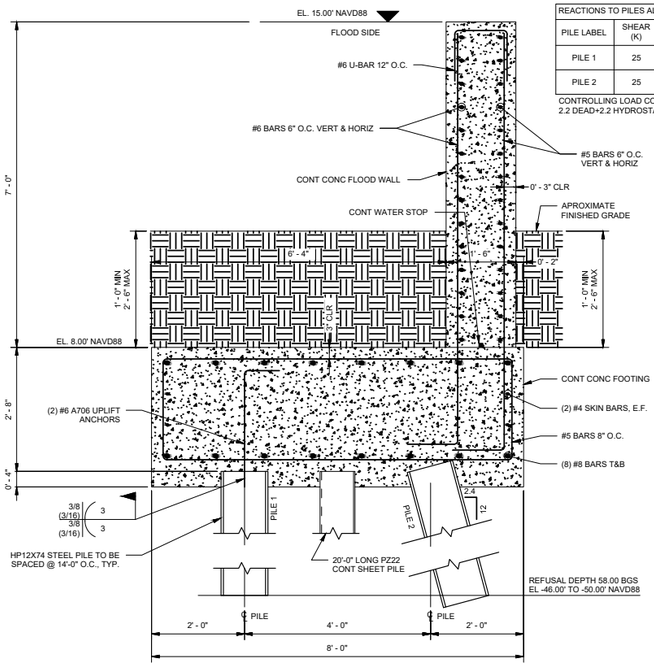
PLANTING SECTIONS

Everett & Chelsea, MA

SHEET - NBA- L-201

BSC GROUP
803 Summer Street
Boston, Massachusetts
02127
617 896 4300

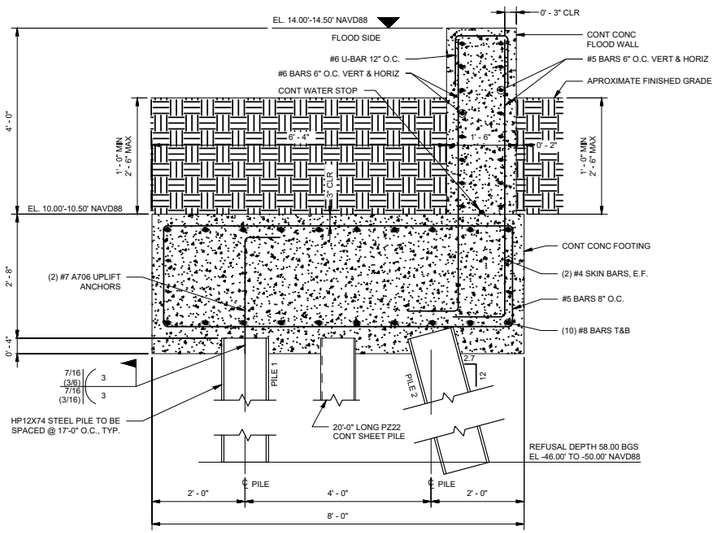
DATE: 10 / 26 / 2023
FILE AT: \\bscbos\wor\Projects-WOR\895105\...



REACTIONS TO PILES ALONG LENGTH OF WALL			
PILE LABEL	SHEAR (K)	COMP (K)	TENSION (K)
PILE 1	25	-	47
PILE 2	25	236	-

CONTROLLING LOAD COMBINATION:
2.2 DEAD+2.2 HYDROSTATIC+2.2 HYDRODYNAMIC

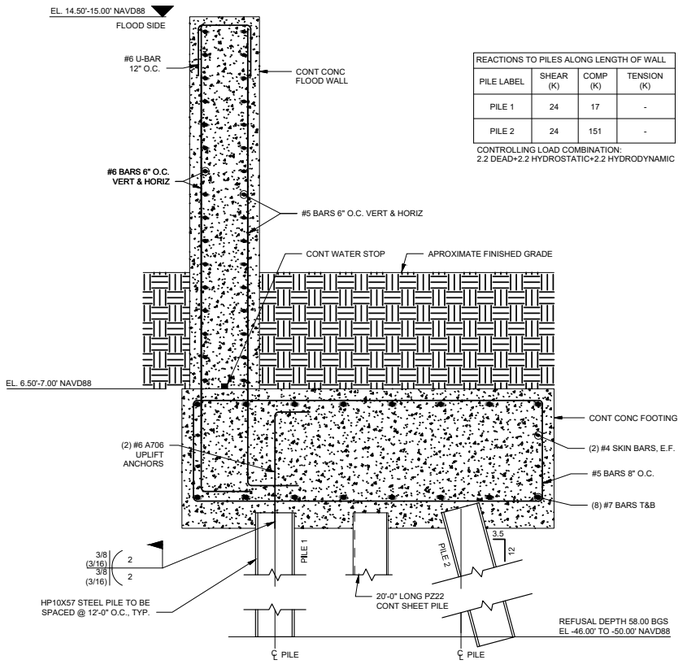
1 - FLOOD BARRIER SECTION - TYPE 1



REACTIONS TO PILES ALONG LENGTH OF WALL			
PILE LABEL	SHEAR (K)	COMP (K)	TENSION (K)
PILE 1	30	-	50
PILE 2	30	255	-

CONTROLLING LOAD COMBINATION:
2.2 DEAD+2.2 HYDROSTATIC+2.2 HYDRODYNAMIC

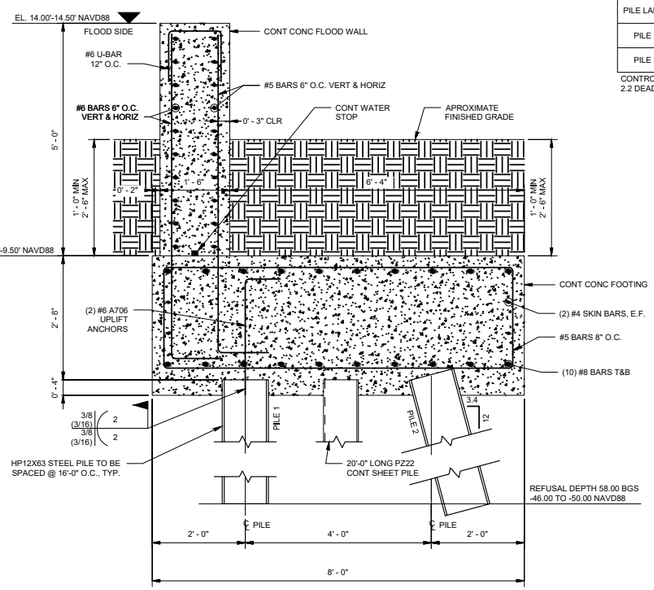
2 - FLOOD BARRIER SECTION - TYPE 2



REACTIONS TO PILES ALONG LENGTH OF WALL			
PILE LABEL	SHEAR (K)	COMP (K)	TENSION (K)
PILE 1	24	17	-
PILE 2	24	151	-

CONTROLLING LOAD COMBINATION:
2.2 DEAD+2.2 HYDROSTATIC+2.2 HYDRODYNAMIC

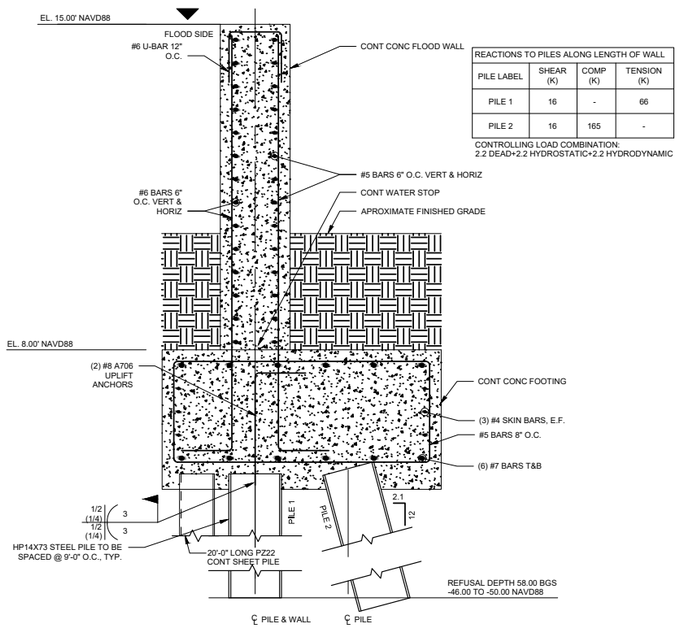
3 - FLOOD BARRIER SECTION - TYPE 3



REACTIONS TO PILES ALONG LENGTH OF WALL			
PILE LABEL	SHEAR (K)	COMP (K)	TENSION (K)
PILE 1	28	12	-
PILE 2	28	189	-

CONTROLLING LOAD COMBINATION:
2.2 DEAD+2.2 HYDROSTATIC+2.2 HYDRODYNAMIC

4 - FLOOD BARRIER SECTION - TYPE 4



REACTIONS TO PILES ALONG LENGTH OF WALL			
PILE LABEL	SHEAR (K)	COMP (K)	TENSION (K)
PILE 1	16	-	66
PILE 2	16	165	-

CONTROLLING LOAD COMBINATION:
2.2 DEAD+2.2 HYDROSTATIC+2.2 HYDRODYNAMIC

5 - FLOOD BARRIER SECTION - TYPE 5

TETRA TECH
www.tetratech.com
498 7TH AVENUE, 15TH FLOOR
NEW YORK, NY 10018
PHONE: (646) 576-4034

MARK	DATE	DESCRIPTION	BY

CITY OF EVERETT

ISLAND END RIVER FLOOD PROVISIONS WEST

STRUCTURAL SECTIONS

PROJ:	200-01291-22002
DESN:	JA
DRWN:	CY
CHKD:	JO

RPW-S-301

Bar Measures 1 inch, otherwise drawing not to scale

Attachment D

EJ SCREENING FORM & POPULATIONS LIST

Environmental Justice Screening Form

Project Name	Island End River Flood Resilience Project
Anticipated Date of MEPA Filing	10/27/2023
Proponent Name	City of Chelsea City of Everett
Contact Information (e.g., consultant)	**Proponents:** Alexander Train City of Chelsea- Department of Housing and Community Development: 500 Broadway, Chelsea, MA 02150 Erik Swanson City of Everett- Engineering Department: 484 Broadway, Everett, MA 02149 **Planning and Permitting Consultant**: Katie Moniz Fort Point Associates, Inc A Tetra Tech Company 31 State Street, 3rd Floor, Boston, MA 02109 kmoniz@fpa-inc.com (617) 279-4388 **Community Services:** Bianca Bowman GreenRoots 227 Marginal Street, Suite1, Chelsea, MA 02150 biancab@greenrootschelsea.org 617-466-3076 x121
Public website for project or other physical location where project materials can be obtained (if available)	City of Chelsea: https://www.chelseama.gov/housing-and-community-development-department City of Everett: https://cityofeverett.com/city-hall/departments/planning-development/conservation-commission/ coUrbanize: https://www.islandendriver.com/home
Municipality and Zip Code for Project (if known)	Chelsea, MA 02150 Everett, MA 02149
Project Type* (list all that apply)	Coastal Infrastructure
Is the project site within a mapped 100-year FEMA flood plain? Y/N/yet unknown	Yes
Estimated GHG emissions of conditioned spaces if known (click **here** for GHG Estimation tool)	N/A

Project Description

1. Provide a brief project description, including overall size of the project site and square footage of proposed buildings and structures if known.

   The Cities of Chelsea and Everett (the "Proponents") propose to construct a coastal flood barrier, outlet control structure, and related amenities at Island End River ("IER") in the Cities of Chelsea and Everett (the "Project Site"). The approximately 6.5-acre Project Site is located on the IER and is currently comprised of a mix of commercial and industrial uses and supporting roadway and utility infrastructure. The proposed IER Flood Resilience Project (the "Project") will construct a new 4,640 linear-foot (lf) flood barrier, 192 square-foot underground surge control structure, and associated wetland and public access improvements along the IER.

2. List anticipated MEPA review thresholds (301 CMR 11.03) (if known)

   - 301 CMR 11.03(3)(b)1.a: Alteration of a coastal bank
   - 301 CMR 11.03(3)(b)1.c: Alteration of 1,000 or more sf of salt marsh or outstanding resource waters
   - 301 CMR 11.03(3)(b)1.d: Alteration of 5,000 or more sf of bordering or isolated vegetated wetland
   - 301 CMR 11.03(3)(b)1.f: Alteration of one half acre or more of any other wetlands
   - 301 CMR 11.03(3)(f)6: Construction, reconstruction, or expansion of an existing solid fill structure of 1,000 or more sf base area

3. List all anticipated state, local and federal permits needed for the project (if known)

Agency	Approval
Local	
City of Everett	• Utility Connection Permits
City of Chelsea	• Utility Connection Permits
Everett Conservation Commission	• Order of Conditions
Chelsea Conservation Commission	• Order of Conditions
State	
Executive Office of Energy and Environmental Affairs	• Secretary's MEPA Certificate
Massachusetts Department of Environmental Protection	• Chapter 91 License • 401 Water Quality Certification
Massachusetts Historical Commission	• Determination of No Adverse Impact
Federal	
Army Corps of Engineers	• General Permit
Environmental Protection Agency	• NPDES Construction/Stormwater General Permit

4. Identify EJ populations and characteristics (Minority, Income, English Isolation) within 5 miles of project site (can attach map from EJ Maps Viewer in lieu of narrative)

Within a 5-mile radius of the Project Site, there are 623 census block groups that trigger seven EJ criteria. These criteria include: Minority; Income; English Isolation, Income and Minority; Minority and English Isolation; Income and English Isolation; and Minority, Income, and English Isolation.

5. Identify any municipality or census tract meeting the definition of "vulnerable health EJ criteria" in the DPH EJ Tool located in whole or in part within a 1 mile radius of the project site:

Heart Attack

- Chelsea
- Everett

Childhood Asthma:

- Boston
- Chelsea
- Everett
- Somerville

Childhood Blood Lead (Census Tracts 2010)

- 25025160101
- 25017342500
- 25017342101
- 25025160200
- 25025050101
- 25025160502
- 25025050901
- 25025160501
- 25017351403

Low Birth Weight (Census Tracts 2010)

- 25017350104
- 25025040600
- 25017342400
- 25025160602
- 25025050101
- 25025160601
- 25017351403
- 25025160200
- 25025040401
- 25025160502
- 25025160400
- 25025050901
- 25025160501

6. Identify potential short-term and long-term environmental and public health impacts that may affect EJ Populations and any anticipated mitigation

The Project is not expected to result in potential permanent adverse environmental or public health impacts that may affect EJ populations.

Temporary construction-period air quality impacts are a potential source of negative environmental and public health impacts for the local community. To avoid or minimize the effects of fugitive dust and exhaust emissions from construction vehicles, appropriate mitigation measures will be employed, such as the use of diesel retrofitted equipment and wetting down areas during construction. To avoid, mitigate, or minimize temporary construction-period noise pollution impacts, the Project will comply with the City of Everett Noise and Work Ordinance. Efforts will be made to minimize the noise impact of construction activities, including appropriate mufflers on all equipment such as air compressors and welding equipment, maintenance of intake and exhaust mufflers, turning off idling equipment, replacing specific operations and techniques with less noisy ones, and other appropriate noise reduction measures. Construction management and scheduling will minimize impacts on the surrounding environment and will include plans for construction worker commuting, routing plans for trucking and deliveries, and control of noise and dust. Designated truck routes will be established to govern where construction trucks access and egress the Project Site to minimize construction related traffic. The contractor will still use best management practices, including a turbidity curtain, to minimize disturbance to the IER. To ensure public safety in and around the public park, appropriate signage will be employed to show safe passageways to access the park and notify the community of construction related activity.

7. Identify project benefits, including "Environmental Benefits" as defined in 301 CMR 11.02, that may improve environmental conditions or public health of the EJ population

The Project is anticipated to provide several economic and environmental benefits. Environmental benefits of the Project include an improved public realm, enhanced pedestrian safety conditions, ecological improvements such as improved water quality, and flood protection. The Project will provide additional community benefits including, new sidewalks with street trees, scenic overlooks, and bike racks and benches, and include a 1/5-mile riverfront park to access the waterfront and provide expanded public open space. This landscaping will contribute to a reduction in the overall impervious surface area and urban heat island effect on the Project Site. Flood protection measures will protect over 500 acres of densely developed urban neighborhoods in Chelsea and Everett.

8. Describe how the community can request a meeting to discuss the project, and how the community can request oral language interpretation services at the meeting. Specify how to request other accommodations, including meetings after business hours and at locations near public transportation.

Members of the community can request a meeting or obtain information, including translated materials, by contacting Bianca Bowman at 617-466-3076 x121 or biancab@greenroots.org . Requests for accommodations, including meetings after business hours and at locations near public transportation, can also be sent to Bianca Bowman.

Project information in English, Arabic, Spanish or Spanish Creole, Chinese, French Creole, and Portuguese or Portuguese Creole will be maintained on the websites below:

City of Chelsea: https://www.chelseama.gov/housing-and-community-development-department

City of Everett: https://cityofeverett.com/city-hall/departments/planning-development/conservation-commission/

coUrbanize: https://www.islandendriver.com/home

SPANISH

Formulario de evaluación de justicia ambiental

Nombre del proyecto	Proyecto de resistencia a las inundaciones del río Island End
Fecha prevista de presentación de MEPA	27/10/2023
Nombre del proponente	Ciudad de Chelsea Ciudad de Everett
Información de contacto (por ejemplo, asesor)	**Proponentes:** Tren Alexander Ciudad de Chelsea- Departamento de Vivienda y Desarrollo Comunitario: 500 Broadway, Chelsea, MA 02150 Erik Swanson Ciudad de Everett- Departamento de Ingeniería: 484 Broadway, Everett, MA 02149 **Consultor de Planificación y Permisos**: Katie Moniz Fort Point Associates, Inc. A Tetra Tech Company 31 State Street, 3rd Floor, Boston, MA 02109 kmoniz@fpa-inc.com (617) 279-4388 **Servicios comunitarios:** Bianca Bowman GreenRoots 227 Marginal Street, Suite1, Chelsea, MA 02150 biancab@greenrootschelsea.org 617-466-3076 x121
Sitio web público del proyecto u otro lugar físico donde se pueda obtener material del proyecto (si está disponible)	Ciudad de Chelsea: https://www.chelseama.gov/housing-and-community-development-department Ciudad de Everett: https://cityofeverett.com/city-hall/departments/planning-development/conservation-commission/ coUrbanize: https://www.islandendriver.com/home
Municipio y código postal del proyecto (si se conoce)	Chelsea, MA 02150 Everett, MA 02149
Tipo de proyecto* (enumere todos los que correspondan)	Infraestructura costera
¿Se encuentra el lugar del proyecto dentro de un terreno inundable de 100 años mapeado por FEMA? Sí/No/Todavía se desconoce	Sí

Emisiones estimadas de GEI de los espacios acondicionados, si se conocen (hacer clic **aquí** para acceder a la herramienta de estimación de GEI)	N/A

Descripción del proyecto

1. Proporcione una breve descripción del proyecto, incluido el tamaño general del sitio del proyecto y la superficie en pies cuadrados de los edificios y estructuras propuestos, si se conocen.

   Las ciudades de Chelsea y Everett (los "proponentes") proponen la construcción de una barrera para las inundaciones costeras, una estructura de control de desagüe y servicios relacionados en el río Island End ("IER") en las ciudades de Chelsea y Everett (el "sitio del proyecto"). El emplazamiento del proyecto, de aproximadamente 6,5 acres, está situado en el IER y actualmente consta de una mezcla de usos comerciales e industriales y de infraestructuras viarias y de servicios públicos de apoyo. El proyecto propuesto de resistencia a las inundaciones del IER (el "proyecto") construirá una nueva barrera contra inundaciones de 4.640 pies lineales (lf), una estructura subterránea de control de oleaje de 192 pies cuadrados y las mejoras asociadas de humedales y acceso público a lo largo del IER.

2. Indique los umbrales de revisión de MEPA anticipados (301 CMR 11.03) (si se conocen).

   - 301 CMR 11.03(3)(b)1.a: Alteración de un banco costero
   - 301 CMR 11.03(3)(b)1.c: Alteración de 1.000 pies cuadrados o más de marismas o aguas de recursos excepcionales
   - 301 CMR 11.03(3)(b)1.d: Alteración de 5.000 pies cuadrados o más de un humedal con vegetación aislada o limítrofe
   - 301 CMR 11.03(3)(b)1.f: Alteración de medio acre o más de cualquier otro humedal
   - 301 CMR 11.03(3)(f)6: Construcción, reconstrucción o ampliación de una estructura de relleno sólido existente de 1.000 pies cuadrados o más de superficie base

3. Enumere todos los permisos estatales, locales y federales previstos necesarios para el proyecto (si se conocen).

Agencia	**Aprobación**
Local	
Ciudad de Everett	• Permisos de conexión de servicios
Ciudad de Chelsea	• Permisos de conexión de servicios
Comisión de Conservación de Everett	• Orden de las condiciones
Comisión de Conservación de Chelsea	• Orden de las condiciones
Estado	
Oficina Ejecutiva de Energía y Asuntos Ambientales	• Certificado MEPA del Secretario

Departamento de Protección Ambiental de Massachusetts	• Capítulo 91 Licencia • Certificación 401 de la calidad del
Comisión Histórica de Massachusetts	• Determinación de la ausencia de impacto adverso
Federal	
Cuerpo de Ingenieros del Ejército	• Permiso general
Agencia de Protección Ambiental	• Permiso general de construcción/aguas pluviales NPDES

4. Identifique las poblaciones y las características de justicia ambiental (EJ) (minorías, ingresos, aislamiento por el idioma inglés) en un radio de 5 millas del sitio del proyecto (puede adjuntar un mapa de EJ Maps Viewer en lugar de una descripción).

   En un radio de 5 millas del emplazamiento del proyecto, hay 623 grupos de bloques censales que activan siete criterios de justicia ambiental. Estos criterios incluyen: minoría; ingresos; aislamiento por el idioma inglés, ingresos y minoría; minoría y aislamiento por el idioma inglés; ingresos y aislamiento por el idioma inglés; y minoría, ingresos y aislamiento por el idioma inglés.

5. Identifique cualquier municipio o zona censal que cumpla con la definición de "criterios de justicia ambiental por salud vulnerable" en la herramienta DPH Ej Tool que se encuentre total o parcialmente dentro de un radio de 1 milla del sitio del proyecto.

   Ataque al corazón
   - Chelsea
   - Everett

   Asma infantil:
   - Boston
   - Chelsea
   - Everett
   - Somerville

   Plomo en sangre en la niñez (secciones censales de 2010)
   - 25025160101
   - 25017342500
   - 25017342101
   - 25025160200
   - 25025050101
   - 25025160502
   - 25025050901
   - 25025160501
   - 25017351403

   Bajo peso al nacer (secciones censales de 2010)
   - 25017350104

- 25025040600
- 25017342400
- 25025160602
- 25025050101
- 25025160601
- 25017351403
- 25025160200
- 25025040401
- 25025160502
- 25025160400
- 25025050901
- 25025160501

6. Identifique los posibles impactos al medio ambiente y a la salud pública a corto y largo plazo que podrían afectar poblaciones de justicia ambiental y cualquier mitigación prevista.

No se espera que el proyecto provoque posibles impactos permanentes al medio ambiente o a la salud pública que puedan afectar poblaciones de justicia ambiental.

Una posible fuente de impactos negativos para la salud de la comunidad local podría ser impactos temporales sobre la calidad del aire durante el periodo de construcción. Para evitar o minimizar los efectos de emisiones fugitivas de polvo y escape de los vehículos de construcción, se emplearán medidas de mitigación adecuadas, como usar equipos diésel retroadaptados y humedecer las zonas durante la construcción. Para evitar, mitigar o minimizar los impactos temporarios de contaminación sonora durante el periodo de construcción, el proyecto cumplirá con la Ordenanza de Ruido y Trabajo de la Ciudad de Everett. Se realizarán esfuerzos para minimizar el impacto sonoro de las actividades de construcción, incluyendo silenciadores adecuados en todos los equipos, como compresores de aire y equipo de soldadura, mantenimiento de silenciadores de admisión y escape, apagado de equipos inactivos, sustitución de operaciones y técnicas específicas por otras menos ruidosas y otras medidas adecuadas de reducción de ruido. La gestión y la programación de la construcción minimizarán el impacto en el entorno circundante e incluirán planes para el desplazamiento de los trabajadores de la construcción, planes de ruta para los camiones y las entregas, y el control del ruido y el polvo. Se establecerán rutas de camiones designadas para regular el acceso y la salida de los camiones de construcción del sitio del proyecto para minimizar el tráfico relacionado con la construcción. El contratista seguirá utilizando las mejores prácticas de gestión, incluida una cortina de turbidez, para minimizar las perturbaciones en el IER. Para garantizar la seguridad pública dentro y alrededor del parque público, se empleará una señalización adecuada para mostrar los pasajes seguros para acceder al parque y notificar a la comunidad de las actividades relacionadas con la construcción.

7. Identifique los beneficios del proyecto, incluidos los "beneficios ambientales" conforme a la definición en 301 CMR 11.02, que podrían mejorar las condiciones ambientales o la salud pública de la población de justicia ambiental.

Se prevé que el proyecto proporcione varios beneficios económicos y ambientales. Los beneficios ambientales del proyecto incluyen mejoras en el espacio público, mejoras en las condiciones de seguridad de los peatones, mejoras ecológicas, como la mejora de la calidad del agua y la protección contra las inundaciones. El proyecto proporcionará beneficios adicionales a la comunidad, incluidas nuevas aceras con árboles en las calles, miradores, aparcamientos para bicicletas y bancos, e incluirá un parque de 1/5 millas frente al río para acceder al paseo marítimo y proporcionar un espacio público abierto ampliado. Este paisaje contribuirá a reducir la superficie impermeable global y el efecto de isla de calor urbano en el emplazamiento del proyecto. Las medidas de protección contra las inundaciones protegerán más de 500 acres de barrios urbanos densamente desarrollados en Chelsea y Everett.

8. Describa cómo la comunidad puede solicitar una reunión para discutir el proyecto y cómo puede solicitar servicios de interpretación oral de idiomas en la reunión. Especifique cómo solicitar otras adaptaciones, incluidas las reuniones fuera del horario laboral y en lugares cercanos al transporte público.

Los miembros de la comunidad pueden solicitar una reunión u obtener información, incluido el material traducido, poniéndose en contacto con Bianca Bowman a través del teléfono 617-466-3076 x121 o del correo electrónico biancab@greenroots.org . Las solicitudes de ajustes, incluidas las reuniones fuera del horario laboral y en lugares cercanos al transporte público, también pueden dirigirse a Bianca Bowman.

La información del proyecto en inglés, árabe, español o criollo español, chino, criollo francés y portugués o criollo portugués se mantendrá en los sitios web que se indican a continuación:

Ciudad de Chelsea: https://www.chelseama.gov/housing-and-community-development-department

Ciudad de Everett: https://cityofeverett.com/city-hall/departments/planning-development/conservation-commission/

coUrbanize: https://www.islandendriver.com/home

PORTUGUESE

Formulário de Triagem de Justiça Ambiental

Nome do Projeto	Projeto de Resiliência a Inundações do Island End River
Data prevista para a submissão do MEPA	27/10/2023
Nomes do Proponentes	Cidade de Chelsea Cidade de Everett
Informações de contato (por exemplo, consultor)	**Proponentes:** Alexander Train Cidade de Chelsea- Departamento de Habitação e Desenvolvimento Comunitário: 500 Broadway, Chelsea, MA 02150 Erik Swanson Cidade de Everett- Departamento de Engenharia 484 Broadway, Everett, MA 02149 **Consultor de Planejamento e Permissões:** Katie Moniz Associados Fort Point, Inc. Uma empresa da Tetra Tech 31 State Street, 3rd Floor, Boston, MA 02109 kmoniz@fpa-inc.com (617) 279-4388 **Serviços Comunitários** Bianca Bowman GreenRoots 227 Marginal Street, Suite1, Chelsea, MA 02150 biancab@greenrootschelsea.org 617-466-3076 x121
Site público para projeto ou outro local físico onde o material do projeto pode ser obtido (se disponível)	Cidade de Chelsea: https://www.chelseama.gov/housing-and-community-development-department Cidade de Everett: https://cityofeverett.com/city-hall/departments/planning-development/conservation-commission/ coUrbanize: https://www.islandendriver.com/home
Município e Código Postal do Projeto (se conhecido)	Chelsea, MA 02150 Everett, MA 02149
Tipo de projeto* (liste todos os que se aplicam)	Infraestrutura costeira
O local do projeto está dentro de uma planície de inundação mapeada pela FEMA por 100 anos? Sim/Não/ainda desconhecido	Sim

Emissões estimadas de GEE de espaços condicionados, se conhecidas (click (clique aqui para a ferramenta de estimativa de GHG)	N/A

Descrição do projeto

1. Forneça uma breve descrição do projeto, incluindo o tamanho total do local do projeto e o tamanho das construções e estruturas propostas, se conhecidos.

   As Cidades de Chelsea e Everett (os "Proponentes") propõem a construção de uma barreira costeira contra enchentes, estrutura de controle de escoadouros e comodidades relacionadas no Island End River ("IER") nas Cidades de Chelsea e Everett (o "Local do Projeto"). O Local do Projeto de aproximadamente 6,5 acres está localizado no IER e é atualmente composto de uma mistura de usos comerciais e industriais, de infraestrutura viária, e de serviços públicos de apoio. O Projeto de Resiliência a Inundações proposto pela IER (o "Projeto") construirá uma nova barreira de inundação de 4.640 pés lineares (lf), uma estrutura de controle de sobretensões subterrâneas de 192 pés quadrados, e melhorias no acesso público associadas a zonas úmidas ao longo do IER.

2. Liste os limites de revisão do MEPA antecipadps (301 CMR 11.03) (se conhecidos)

   - 301 CMR 11.03(3)(b)1.a: Alteração de um banco da costa
   - 301 CMR 11.03(3)(b)1.c: Alteração de 1.000 ou mais sf de pântanos salgados ou águas de recursos excepcionais
   - 301 CMR 11.03(3)(b)1.d: Alteração de 5.000 ou mais sf de zona úmida com vegetação limítrofe ou isolada
   - 301 CMR 11.03(3)(b)1.f: Alteração de meio acre ou mais de qualquer outro pântano
   - 301 CMR 11.03(3)(f)6: Construção, reconstrução ou expansão de uma estrutura de preenchimento sólido existente de 1.000 ou mais sf de área de base

3. Liste todas as licenças estaduais, locais e federais previstas necessárias para o projeto (se conhecidas)

Agência	**Aprovação**
Local	
Cidade de Everett	• Licenças de conexão de utilidades
Cidade de Chelsea	• Licenças de conexão de utilidades
Comissão de Conservação do Everett	• Ordem de condições
Comissão de Conservação do Chelsea	• Ordem de condições
Estado	
Escritório Executivo de Energia e Assuntos Ambientais	• Certificate do Secretário da MEPA
Escritório Executivo de Assuntos Energéticos e Ambientais	• Licença do Capítulo 91 • Certificação 401 de Qualidade da

Comissão Histórica de Massachusetts	• Determinação da ausência de impacto
Federal	
Corpo de Engenheiros do Exército	• Autorização geral
Agência de Proteção Ambiental	• Licença NPDES Geral de Construção e Águas de Tempestades

4. Identifique populações e características do EJ (Minoria, Renda, Isolamento de inglês) dentro de 5 milhas do local do projeto (pode anexar mapa do EJ Maps Viewer no lugar da narrativa)

Dentro de um raio de 5 milhas do local do projeto, existem 623 grupos de blocos censitários que acionam sete critérios EJ. Estes critérios incluem: Minoria; Renda; Isolamento de inglês, Renda e Minoridade; Isolamento de Inglês e Minoridade; Renda e Isolamento de inglês; e Isolamento de inglês, Renda e Minoridade.

5. Identificar qualquer município ou trato censitário que corresponda à definição de "critérios de EJ de saúde vulnerável" na Ferramenta DPH EJ Tool localizada no todo ou em parte dentro de um raio de 1 milha do local do projeto:

Ataque Cardíaco
- Chelsea
- Everett

Asma infantil:
- Boston
- Chelsea
- Everett
- Somerville

Chumbo em sangue infantil (Tractos do Censo de 2010)
- 25025160101
- 25017342500
- 25017342101
- 25025160200
- 25025050101
- 25025160502
- 25025050901
- 25025160501
- 25017351403

Baixo Peso de Nascimento (Tractos do Censo de 2010)
- 25017350104
- 25025040600
- 25017342400
- 25025160602
- 25025050101
- 25025160601
- 25017351403
- 25025160200

- 25025040401
- 25025160502
- 25025160400
- 25025050901
- 25025160501

6. Identifique potenciais impactos ambientais e de saúde pública a curto e longo prazos que possam afetar as populações de EJ e qualquer mitigação antecipada

Não se espera que o projeto resulte em impactos ambientais ou de saúde pública potencialmente adversos permanentes que possam afetar as populações de EJ.

Os impactos temporários na qualidade do ar durante o período de construção são uma fonte potencial de impactos ambientais e de saúde pública negativos para a comunidade local. Para evitar ou minimizar os efeitos da poeira fugitiva e das emissões de escape dos veículos de construção, serão empregadas medidas apropriadas de mitigação, tais como o uso de equipamentos a diesel recondicionados e o molhamento de áreas baixas durante a construção. Para evitar, mitigar ou minimizar os impactos temporários da poluição sonora durante a construção, o Projeto cumprirá a Portaria sobre Ruído e Trabalho da Cidade de Everett. Serão feitos esforços para minimizar o impacto do ruído das atividades de construção, incluindo silenciadores apropriados em todos os equipamentos, tais como compressores de ar e equipamentos de solda, manutenção dos silenciadores de admissão e escape, desligamento de equipamentos ociosos, substituição de operações e técnicas específicas por outras menos ruidosas, e outras medidas apropriadas de redução de ruído. A gestão e programação da construção minimizará os impactos no ambiente ao redor e incluirá planos para o deslocamento dos trabalhadores da construção, planos de roteamento para caminhões e entregas, e controle de ruído e poeira. Serão estabelecidas rotas de caminhões designadas para governar onde os caminhões de construção acessam e saem do local do projeto para minimizar o tráfego relacionado à construção. O empreiteiro ainda usará as melhores práticas de gerenciamento, incluindo uma cortina de turbidez, para minimizar os distúrbios ao RIC. Para garantir a segurança pública dentro e ao redor do parque público, será utilizada sinalização apropriada para mostrar passagens seguras para acessar o parque e notificar a comunidade sobre atividades relacionadas à construção.

7. Identifique benefícios do projeto, incluindo "Benefícios Ambientais", conforme definido no 301 CMR 11.02, que vão melhorar as condições ambientais ou a saúde pública da população do EJ

Espera-se que o projeto proporcione vários benefícios econômicos e ambientais. Os benefícios ambientais do projeto incluem um melhor domínio público, melhores condições de segurança para os pedestres, melhorias ecológicas, como a melhoria da qualidade da água e a proteção contra enchentes. O projeto proporcionará benefícios adicionais para a comunidade, incluindo novas calçadas com árvores de rua, mirantes panorâmicos, e bicicletários e bancos, e incluirá um parque à beira do rio de 1/5 de milha para acessar a orla e proporcionar maior espaço público aberto. Este paisagismo contribuirá para a redução da área total impermeável e do efeito ilha de calor urbano no local do projeto. Medidas de proteção contra enchentes protegerão mais de 500 acres de bairros urbanos densamente desenvolvidos em Chelsea e Everett.

8. Descreva como a comunidade pode solicitar uma reunião para discutir o projeto, e como a comunidade pode solicitar serviços de interpretação oral na reunião. Especificque como solicitar outras acomodações, incluindo reuniões após o horário comercial e em locais próximos ao transporte público.

Os membros da comunidade podem solicitar uma reunião ou obter informações, incluindo materiais traduzidos, entrando em contato com Bianca Bowman pelo telefone 617-466-3076 x121 ou biancab@greenroots.org . Os pedidos de acomodação, incluindo reuniões após o horário comercial e em locais próximos ao transporte público, também podem ser enviados para Bianca Bowman.

Informações do projeto em inglês, árabe, espanhol ou crioulo espanhol, chinês, crioulo francês e crioulo português ou português serão mantidas nos sites abaixo:

Cidade de Chelsea: https://www.chelseama.gov/housing-and-community-development-department

Cidade de Everett: https://cityofeverett.com/city-hall/departments/planning-development/conservation-commission/

coUrbanize: https://www.islandendriver.com/home

CHINESE

环境公平筛查表

项目名称	岛尾河洪灾复原力项目
MEPA备案预计日期	2023/10/23
动议方姓名	切尔西市 埃弗雷特市
联系人信息（如顾问）	**动议人：** Alexander Train 切尔西市- 住房和社区发展部： 500 Broadway, Chelsea, MA 02150 Erik Swanson 埃弗雷特市-工程部： 484 Broadway, Everett, MA 02149 **规划和许可顾问：** Katie Moniz 德聪公司旗下角岬联合公司 31 State Street, 3rd Floor, Boston, MA 02109 kmoniz@fpa-inc.com (617) 279-4388 **社区服务：** Bianca Bowman GreenRoots 227 Marginal Street, Suite1, Chelsea, MA 02150 biancab@greenrootschelsea.org 617-466-3076 x121
项目的公开网站，或可以获取项目材料的其他实体地点（如有）	切尔西市：https://www.chelseama.gov/housing-and-community-development-department 埃弗雷特市：https://cityofeverett.com/city-hall/departments/planning-development/conservation-commission/ coUrbanize: https://www.islandendriver.com/home
项目所在市镇及项目的邮政编码（如已知）	麻州切尔西市02150 麻州埃弗雷特市
项目类型*（列出所有适用类型）	沿海基础设施
项目地点是否位于百年一遇级别FEMA洪泛平原之内？是/否/未知	是

室内空调温室气体排放量估算，如已知 (点击 **这里**获取温室气体估算工具)	N/A

项目描述

1.请简要描述项目，包括项目场地的总体规模和拟议建筑物的面积和结构（如已知）。

切尔西市和埃弗雷特市（“动议方”）提议在切尔西和埃弗雷特市（“项目现场”）的岛尾河（“IER”）建造沿海防洪堤、泄水控制构建物和相关设施。该项目占地约6.5英亩，位于岛尾河（IER）上，目前是商业和工业用途以及配套的道路和公用事业基础设施。拟议的IER洪灾复原力项目（“项目”）将沿IER新造一条4640英尺直线长度（lf）的防洪堤，192平方英尺的地下浪涌控制结构，同时改善相应的湿地和公众通道。

2.列出预期的 MEPA 审查阈值 (301 CMR 11.03)（如已知）

- 301 CMR 11.03(3)(b)1.a:沿海堤坝的改建
- 301 CMR 11.03(3)(b)1.c:改变1000平方英尺及以上的盐沼或突出资源水域
- 301 CMR 11.03(3)(b)1.d:改变5000平方英尺及以上临界或孤立植被湿地
- 301 CMR 11.03(3)(b)1.f:改变半英亩及以上其他湿地
- 301 CMR 11.03(3)(f)6:建造、重建或扩建占地 1000 平方英尺及以上的现有实体填充结构

3.列出项目预期所需的所有州政府、地方政府和联邦政府许可证（如已知）

审批机构	**审批内容**
当地	
埃弗雷特市	• **公共**设施连接许可
切尔西市	• **公共**设施连接许可
埃弗雷特保护委员会	• **保持**现状令
切尔西保护委员会	• **保持**现状令
州政府	
能源和环境事务执行办公室	• MEPA证书
麻州环境保护部	• **第91章**许可 • 401水质认证
麻州历史委员会	• **确定无不良影响**
麻州政府	

陆军工程兵团	• 一般许可
国家环境保护局	• NPDES建筑/雨水一般许可

4.说明项目场地 5 英里范围内的 EJ（环境公平）人口及其特征（少数族裔、收入、英语不通）（可以使用EJ（环境公平）地图查看器 附图代替文字叙述）

项目站点的 5 英里半径范围内，有 623 个普查区块组涉及到七个 EJ 标准。相应标准包括：少数族裔；收入；英语不通，收入和少数族裔；少数族裔和英语不通；收入和英语不能；以及少数族裔、收入和英语不通。

5.使用DPH EJ（环境公平）工具说明全部位于或部分位于项目场地 1 英里半径范围内，符合“弱势健康环境公平标准”定义的城市或人口普查区

心脏病

- 切尔西
- 埃弗雷特

儿童哮喘：

- 波士顿
- 切尔西
- 埃弗雷特
- 萨默维尔

儿童血铅（2010年人口普查）

- 25025160101
- 25017342500
- 25017342101
- 25025160200
- 25025050101
- 25025160502
- 25025050901
- 25025160501
- 25017351403

低出生体重（2010年人口普查）

- 25017350104
- 25025040600
- 25017342400
- 25025160602
- 25025050101
- 25025160601
- 25017351403

- 25025160200
- 25025040401
- 25025160502
- 25025160400
- 25025050901
- 25025160501

6.说明可能影响环境公平人口的潜在的短期和长期环境及公共卫生因素，以及相应的预期缓解措施

该项目预计不会产生可能影响EJ人群的潜在永久性不利环境或公共卫生因素。

施工期暂时的空气质量影响是对当地社区的环境和公共健康产生负面影响的一个潜在来源。为避免或尽量减少工程车辆逸散性粉尘及废气排放的影响，我们会采取适当的纾缓措施，如使用柴油改装设并在施工期间加湿相应的工作区域。为避免、减轻或尽量减少施工期暂时的噪音污染影响，本项目将遵守《埃弗雷特市噪音及工作条例》。项目将努力尽量减少施工活动的噪音影响，包括在所有设备上安装适当的消声器，如空气压缩机和焊接设备，养护进排气消声器，关闭空转设备，采用噪音较小的施工方式和技术设备，以及其他适当的降噪措施。施工管理和调度将最大限度地减少对周围环境的影响，并将制定施工人员通勤计划，卡车运输和交付路线计划以及噪音和灰尘控制措施。 项目将设计专门的卡车路线，用于管理施工卡车进出项目场地，尽量减少因施工发生的交通。承包商仍将使用最佳工程管理实践，包括使用浊度幕，尽量减少对岛尾河的干扰。为确保公园内及周边的公共安全，我们会使用适当的标牌，指示进入公园的安全通道，并告知社区相关的施工活动。

7.明确项目效益，包括《麻州通法301 CMR 11.02》定义的"环境效益"，改善环境公平人口的环境条件或公共卫生

预计该项目将带来若干经济和环境效益。项目的环境效益包括改善公共区域、改善行人安全条件，并具有改善生态的作用，如改善水质和防洪。项目还将具有额外的社区效益，包括栽种行道树的新的人行道，优美的景观、自行车停放架、长椅，同时还建有一个1/5英里的河滨公园，供人们进入河滨并扩大公共开放空间。这种景观设计将有助于减少项目现场的整体不透水面积和城市热岛效应。防洪措施将保护切尔西和埃弗雷特超过500英亩的密集发展城市社区。

8.描述社区要求召开会议讨论项目的程序，以及社区要求会议提供口语翻译服务的程序。说明公众如何申请其他特殊安置措施，包括下班时间之后的公众会议，以及邻近公交地点的公众会议。

社区成员可以拨打 617-466-3076 x121 或致电邮biancab@greenroots.org联系比安卡·鲍曼（ Bianca Bowman），要求召开会议或索要相关材料。特殊安置措施，包括要求在下班时间之后举行公众会议，以及在邻近公交地点举行公众会议，也可以联系比安卡·鲍曼。

项目信息的英语、阿拉伯语、西班牙语或西班牙语克里奥尔语、中文、法语克里奥尔语以及葡萄牙语或葡萄牙语克里奥尔语版本将在以下网站上维护：

切尔西市： https://www.chelseama.gov/housing-and-community-development-department

埃弗雷特市：https://cityofeverett.com/city-hall/departments/planning-development/conservation-commission/

coUrbanize: https://www.islandendriver.com/home

ARABIC

نموذج الفحص الخاص بالعدالة البيئية

اسم المشروع	مشروع آيلاند ايند ريفر لصد الفيضانات (Island End River Flood Resilience Project)
التاريخ المتوقع لتقديم النموذج الخاص بقانون السياسة البيئية لولاية ماساتشوستس	2023/10/27
اسم الجهة:	مدينة تشيلسي مدينة إيفيريت
معلومات الاتصال: (مثل، المستشار)	**الجهات:** Alexander Train City of Chelsea- Department of Housing and Community Development: 500 Broadway, Chelsea, MA 02150 **الشخص المعني:** Erik Swanson City of Everett- Engineering Department: 484 Broadway, Everett, MA 02149 **مستشار التخطيط وإصدار الرخص:** Katie Moniz Fort Point Associates, Inc A Tetra Tech Company 31 State Street, 3rd Floor, Boston, MA 02109 kmoniz@fpa-inc.com (617) 279-4388 **خدمات المجتمع المحلي:** Bianca Bowman GreenRoots 227 Marginal Street, Suite1, Chelsea, MA 02150 biancab@greenrootschelsea.org 617-466-3076 وبعد ذلك اضغط الرقم 121
الموقع الإلكتروني العام للمشروع أو عنوان المكان الذي يمكن من خلاله الاطلاع على المواد المعلقة بالمشروع (إن وجدت)	مدينة تشيلسي: https://www.chelseama.gov/housing-and-community-development-department مدينة إيفيريت: https://cityofeverett.com/city-hall/departments/planning-development/conservation-commission/ coUrbanize: https://www.islandendriver.com/home
البلدية والرمز البريدي (الزبكود) للمشروع (إذا كان معروفا)	مدينة تشيلسي، ولاية ماساتشوستس. الرمز البريدي (02150) مدينة إيفيريت، ولاية ماساتشوستس. الرمز البريدي (02149)
نوعية المشروع* (يُرجى ادراج كل ما ينطبق)	البنى التحية للشاطئ
هل موقع المشروع ضمن سهل مُعرض للفيضان أدرجته الوكالة الفيدرالية لإدارة الطوارئ للـ 100 سنة المقبلة؟ تكون الإجابة بـ "نعم"، أو "كلا"، أو "غير معروف"	نعم

تقديرات انبعاثات غازات الدفيئة في الأماكن المُكيفة (يُرجى النقر هنا للحصول على الأداة الخاصة بانبعاثات غازات الدفيئة)	لا ينطبق

وصف المشروع

1. يُرجى تقديم وصف للمشروع، بما في ذلك الحجم الكلي لموقع المشروع والمساحة المربعة للمباني والهياكل المقترحة إذا كانت معروفة.

تقترح مدينتا تشيلسي وإيفيريت ("الجهتان المعنيتان") بناء حاجز ساحلي للفيضانات، وهيكل خارجي للسيطرة، والمرافق ذات الصلة في آيلاند ايند ريفر في مدينتي تشيلسي وإيفريت ("موقع المشروع"). يقع موقع المشروع الذي تبلغ مساحته 6.5 فدان تقريبا في آيلاند ايند ريفر ويتألف حاليا من مزيج من الاستخدامات التجارية والصناعية والطرق الداعمة والبنية التحتية للمرافق. سيقوم مشروع آيلاند ايند ريفر المقترح لصد الفيضانات ("المشروع") ببناء حاجز للفيضانات بطول 4640 قدما طوليا، وهيكل للسيطرة تحت الأرض بمساحة 192 قدما مربعا، وما يرتبط بها من تحسينات في الأراضي الرطبة والوصول العام على طول آيلاند ايند ريفر.

2. يُرجى إدراج العتبات المتوقعة والخاصة بمراجعة قانون السياسة البيئية لولاية ماساتشوستس (301 CMR 11.03) (إذا كانت معروفة)

- 301 CMR 11.03(3)(b)1.a: تعديل الضفة الساحلية.
- 301 CMR 11.03(3)(b)1.c: تعديل 1000 قدم مربع أو أكثر من المستنقعات المالحة أو مياه الموارد غير المؤهلة.
- 301 CMR 11.03(3)(b)1.d: تعديل 5000 قدم مربع أو أكثر من الأراضي الرطبة النباتية المتاخمة أو المعزولة.
- 301 CMR 11.03(3)(b)1.f: تعديل نصف فدان أو أكثر من أي أراضي رطبة أخرى.
- 301 CMR 11.03(3)(f)6: إنشاء أو إعادة بناء أو توسيع هيكل حشو صلب قائم بمساحة 1000 قدم مربع أو أكثر من المنطقة الأساسية.

3. يُرجى إدراج جميع التراخيص الخاصة بالولاية والتراخيص المحلية والفيدرالية التي من المتوقع أن يتم الحصول عليها لتنفيذ المشروع (إذا كانت معروفة).

الوكالة	الموافقة
على المستوى المحلي	
مدينة إيفيريت	• تصاريح ربط الخدمات
مدينة تشيلسي	• تصاريح ربط الخدمات
لجنة المُحافظة على الأراضي في إي	• الأمر الخاص بالأوضاع
لجنة المُحافظة على الأراضي في إيفيريت	• الأمر الخاص بالأوضاع
على مستوى الولاية	
المكتب التنفيذي للطاقة والشؤون البيئية	• شهادة قانون السياسة البيئية لولاية ماساتشوستس الخاصة بالولاية
قسم الحماية البيئية في ولاية ماساتشوستس	• الرخصة الخاصة بالفصل 91 • شهادة جودة المياه (401)
هيئة ولاية ماساتشوستس المعنية بالجوانب التاريخية	• موافقة بعدم وجود تأثيرات سلبية للمشروع

على المستوى الفيدرالي	
فيلق المهندسين التابع للجيش الأمريكي	• رخصة عامة
الوكالة الأمريكية لحماية البيئة	• رخصة عامة للبناء ومقاومة العواصف من النظام الوطني للتخلص من المواد الملوثة

4. يُرجى تحديد الفئات السكانية والخصائص المتعلقة بالعدالة البيئية (الأقليات، والدخل، والعزل الإنجليزي) ضمن مسافة 5 أميال من موقع المشروع (يمكن إرفاق خارطة تحدد المحيط بمسافة 5 أميال من (EJ Maps Viewer) عوضا عن السرد)

ضمن دائرة نصف قطرها 5 أميال من موقع المشروع، هناك 623 مجموعة حسب التعداد تشير إلى سبعة معايير تخص العدالة البيئية. وتشمل هذه المعايير :الأقليات، والدخل، والعزل الإنجليزي، والدخل والأقليات، والأقليات والعزل الإنجليزية، والدخل والعزل الإنجليزي، والأقليات، والدخل والعزل الإنجليزي.

5. يُرجى تحديد أي بلدية أو منطقة تعداد سكاني تفي بتعريف "معايير الصحة الضعيفة الخاصة بالعدالة البيئية" في أداة العدالة البيئية التابعة لقسم الصحة العامة الموجودة كليا أو جزئيا في دائرة نصف قطرها ميل واحد من موقع المشروع.

نوبة قلبية
- تشيلسي
- إيفيريت

الربو عند الأطفال:
- بوسطن
- تشيلسي
- إيفيريت
- سومر فل

مادة الرصاص في الدم (حسب تعداد المناطق في 2010)
- 25025160101
- 25017342500
- 25017342101
- 25025160200
- 25025050101
- 25025160502
- 25025050901
- 25025160501
- 25017351403

نقص الوزن عند الولادة (حسب تعداد المناطق في 2010)
- 25017350104
- 25025040600
- 25017342400
- 25025160602
- 25025050101
- 25025160601
- 25017351403

- 25025160200
- 25025040401
- 25025160502
- 25025160400
- 25025050901
- 25025160501

6. يُرجى تحديد التأثيرات البيئية والصحية العامة المحتملة على المدى القصير والطويل والتي قد تؤثر على سكان موضوع العدالة البيئية وأي تخفيف متوقع.

من غير المتوقع أن ينتج عن المشروع تأثيرات بيئية أو صحية عامة دائمة محتملة قد تؤثر على سكان موضوع العدالة البيئية.

تعتبر تأثيرات جودة الهواء في فترة البناء المؤقتة مصدرا محتملا للتأثيرات الصحية السلبية على المجتمع المحلي. ولتجنب أو تقليل آثار الغبار المنتشر وانبعاثات العادم من مركبات البناء، سيتم استخدام تدابير التخفيف المناسبة، مثل استخدام معدات الديزل المعدلة ومناطق ترطيب أثناء البناء. ولتجنب أو تخفيف أو تقليل آثار التلوث الضوضائي لفترة البناء المؤقتة، سيمتثل المشروع لقانون مدينة إيفيريت للضوضاء والعمل. وسيتم بذل الجهود لتقليل تأثير الضوضاء الناتجة عن أنشطة البناء، بما في ذلك كاتمات الصوت المناسبة على جميع المعدات مثل ضواغط الهواء ومعدات اللحام، وصيانة كاتمات السحب والعادم، وإيقاف تشغيل معدات التباطؤ، واستبدال العمليات والتقنيات المحددة بأخرى أقل ضوضاء، وتدابير أخرى مناسبة للحد من الضوضاء. وستعمل الأقسام المعنية بإدارة وجدولة الإنشاءات على تقليل التأثيرات على البيئة المحيطة وسيتضمن ذلك خططا تخص التنقل اليومي لعمال البناء، وخطط تخص الطرق التي تسلكها شاحنات النقل والتسليم، والتحكم في الضوضاء والغبار. وسيتم إنشاء مسارات للشاحنات للتحكم في مكان وصول شاحنات البناء إلى موقع المشروع وخروجه منها لتقليل حركة المرور المرتبطة بالبناء. وسيواصل المتعاقد في استخدام أفضل ممارسات الإدارة، بما في ذلك ستارة العزل لتقليل مستوى الازعاج في منطقة آيلاند ايند ريفر لضمان السلامة العامة داخل وحول المتنزه العام، وسيتم استخدام لافتات مناسبة لإظهار ممرات آمنة للوصول إلى المتنزه وإخطار المجتمع المحلي بالأنشطة المتعلقة بالبناء.

7. يُرجى تحديد فوائد المشروع، بما في ذلك "الفوائد البيئية" على النحو المحدد في (301 CMR 11.02)، التي قد تحسن الظروف البيئية أو الصحة العامة لسكان موضوع العدالة البيئية.

من المتوقع أن يوفر المشروع العديد من الفوائد الاقتصادية والبيئية. وتشمل الفوائد البيئية للمشروع تحسين المجال العام وتحسين ظروف سلامة المشاة والتحسينات البيئية مثل تحسين جودة المياه والحماية من الفيضانات. وسيوفر المشروع مزايا مجتمعية إضافية بما في ذلك، أرصفة مشاة جديدة مع شوارع تحتوي على اشجار، وإطلالات خلابة، ومواقف للدراجات الهوائية ومصاطب للجلوس، ويشمل ذلك متنزها على واجهة النهر بطول 1/5 ميل للوصول إلى الواجهة البحرية وتوفير مساحة مفتوحة عامة موسعة. وستساهم هذه المناظر الطبيعية في تقليل المساحة السطحية الكلية التي لا تصل إلى الماء والتأثير الحراري الحضري للجزيرة على موقع المشروع. وستحمي تدابير الحماية من الفيضانات أكثر من 500 فدان من الأحياء الحضرية المتطورة بكثافة في تشيلسي وإيفيريت.

8. يُرجى وصف كيف يمكن للمجتمع أن يطلب عقد اجتماع لمناقشة المشروع، وكيف يمكن للمجتمع أن يطلب خدمات الترجمة الشفوية في الاجتماع. كما يُرجى تحديد كيفية طلب وسائل الراحة الأخرى، بما في ذلك الاجتماعات بعد ساعات العمل وفي المواقع القريبة من وسائل النقل العام.

يمكن لأعضاء المجتمع المحلي طلب اجتماع أو الحصول على معلومات، بما في ذلك المواد المترجمة، من خلال الاتصال بالسيدة/ بيانكا بومان (Bianca Bowman) على الهاتف (617-466-3076) وثم اضغط الرقم (121)، أو من خلال الإيميل (biancab@greenroots.org).

ستتوفر معلومات حول المشروع باللغات الإنجليزية، والعربية، والاسبانية، والاسبانية الكريول، والصينية، والفرنسية الكريول، والبرتغالية، والبرتغالية الكريول على الموقعين الإلكترونيين أدناه:

مدينة تشيلسي: https://www.chelseama.gov/housing-and-community-development-department

مدينة إيفيريت: https://cityofeverett.com/city-hall/departments/planning-development/conservation-commission/

https://www.islandendriver.com/home :coUrbanize

HAITIAN CREOLE

Fòmilè Depistaj sou Jistis Anviwonnman

Non Pwojè a	Island End River Flood Resilience Project (Pwojè Island End River sou Pwoteksyon kont Inondasyon)
Dat antisipe pou depoze nan MEPA	27/10/2023
Non kote k ap Pwopoze a	Vil Chelsea : City of Everett
Moun pou kontakte (tankou konsiltan an)	**Moun ak Kote k ap Pwopoze yo :** Alexander Train City of Chelsea- Department of Housing and Community Development: 500 Broadway, Chelsea, MA 02150 Erik Swanson City of Everett- Engineering Department: 484 Broadway, Everett, MA 02149 **Konsiltan pou Plànifikasyon ak Pèmisyon** Katie Moniz Fort Point Associates, Inc A Tetra Tech Company 31 State Street, 3rd Floor, Boston, MA 02109 kmoniz@fpa-inc.com (617) 279-4388 **Sèvis Kominotè :** Bianca Bowman GreenRoots 227 Marginal Street, Suite 1, Chelsea, MA 02150 biancab@greenrootschelsea.org 617-466-3076 x121
Sit entènèt piblik pou pwojè, oswa lòt kote fizik yo ka jwenn materyèl pou pwojè (si genyen)	Vil Chelsea : https://www.chelseama.gov/housing-and-community-development-department Vil Everett : https://cityofeverett.com/city-hall/departments/planning-development/conservation-commission/ coUrbanize: https://www.islandendriver.com/home
Minisipalite ak Kòd Postal pou Pwojè a (si ou konnen)	Chelsea, MA 02150 Everett, MA 02149
Ki Kalite Pwojè* (ekri tout sa ki aplikab)	Enfrastrikti Kostal
Èske kote Pwojè a ye nan yon plenn inondab FEMA katografye pou 100 an ? Wi / Non / Pako konnen	Wi
Emisyon GHG ki evalye pou espas kondisyonnen yo, si ou konnen (klike **isit la pou zouti**	Pa Aplikab (N/A)

Estimasyon GHG a)	

Deskripsyon Pwojè a

1. Bay yon deskripsyon kout sou pwojè a, avèk dimansyon jenneral kote pwojè a ap fèt, ak sipèfisi bilding yo pwopoze a, ak estrikti a si ou konnen.

   Vil Chelsea ak Everett (k ap "Pwopoze" yo) ofri pou yo bati yon baryè kont inondasyon sou kòt la, ak yon estrikti pou kontwole sòti, ak lòt akseswa nan Island End River ("IER") nan Vil Chelsea ak Everett (kote pou fè "Pwojè" a). Anplasman Pwojè a mezire anviwon 6.5 kawo tè, li sou IER la, epi kounye a li se yon konbinezon aktivite komèsyal ak endistriyèl, ak wout ki sèvi yo, ak enfrastrikti pou sèvis itilitè. Pwojè pou Defans kont Inondasyon IER yo pwopoze a (n ap rele "Pwojè" a) pral bati yon nouvo baryè kont inondasyon 4,640 pye lineyè ("lf" ki vle di "linear foot"), ak yon estrikti anba tè ki mezire 192 pye kare pou kontwole lè dlo monte, ak fè travay amelyorasyon nan marekaj ak aksè piblik ki kouri bò IER la.

2. Ekri nivo yo antisipe pou revizyon MEPA yo (301.CMR 11.03) (si ou konnen)

   - 301 CMR 11.03(3)(b)1.a : Alterasyon yon zòn kotyè
   - 301 CMR 11.03(3)(b)1.c : Alterasyon omwen 1,000 pye kare ("sf" ki vle di "square foot") marè salan oswa resous dlo ki kapab sèvi
   - 301 CMR 11.03(3)(b)1.d : Alterasyon omwen 5,000 pye kare marekaj arebò dlo oswa marekaj vejetatif izole
   - 301 CMR 11.03(3)(b)1.f : Alterasyon omwen demi kawo tè nan nenpòt ki lòt marekaj
   - 301 CMR 11.03(3)(f)6: Bati, rebati, ak agrandi yon estrikti ranblè solid ki la deja, ki gen yon sifas omwen 1,000 pye kare

3. Ekri tout pèmi ki pral nesesè yo pou Eta a, ak pou nivo lokal ak federal pou pwojè a (si ou konnen)

Ajans	**Apwobasyon**
Lokal	
Vil Everett	• Pèmi Konneksyon pou Sèvis Itilitè
Vil Chelsea	• Pèmi Konneksyon pou Sèvis Itilitè
Komisyon Konsèvasyon Everett	• Lòd Kondisyon
Komisyon Konsèvasyon Chelsea	• Lòd Kondisyon
Eta	
Ajans Egzekitif pou Ennèji ak Zafè Anviwonnman (Executive Office of Energy and Environmental Affairs)	• Sètifika Sekretè MEPA
Depatman Pwoteksyon Anviwonnman Massachusetts	• Chapit 91 Lisans • Sètifikasyon 401 pou Kalite Dlo
Komisyon Istorik Massachusetts	• Konklizyon ki di Pa gen Move Konsekans

Federal	
Sèvis Enjennyè Lame	• Pèmi Jenneral
Ajans Pwoteksyon Anviwonnman	• Pèmi Jenneral NPDES pou Konstriksyon / Tretman Dlo Lapli

4. Idantifye popilasyon EJ ak karakteristik yo (Minorite, Salè, Izolman poutèt lang angle) nan yon reyon 5 mil avèk kote pwojè a ye a (ou mèt voye kat EJ Maps Viewer pase pou ou voye deskripsyon)

   Nan yon reyon 5 mil avèk Kote pou Pwojè a, genyen 623 gwoup blòk pou resansman ki bay sèt kritè EJ. Men kisa kritè yo ye : Minorite ; Salè ; Izolman poutèt Lang Angle, Salè, ak Minorite ; Minorite ak Izolman poutèt Lang Angle ; Salè ak Izolman poutèt Lang Angle ; ak Izolman poutèt Minorite, Salè, ak Lang Angle.

5. Idantifye nenpòt minisipalite oswa zòn resansman ki satisfè definisyon “kritè vilnerabilite pou sante EJ” nan DPH EJ Tool ki nan tout, oswa nan yon pati pwojè a ki nan yon reyon 1 mil avèk kote pwojè a ye :

   Kriz kè :
   - Chelsea
   - Everett

   Maladi Opresyon Timoun :
   - Boston
   - Chelsea
   - Everett
   - Somerville

   Plon nan San Timoun (Zòn Resansman 2010)
   - 25025160101
   - 25017342500
   - 25017342101
   - 25025160200
   - 25025050101
   - 25025160502
   - 25025050901
   - 25025160501
   - 25017351403

   Pwa Fèb nan Nesans (Zòn Resansman 2010)
   - 25017350104
   - 25025040600
   - 25017342400
   - 25025160602
   - 25025050101
   - 25025160601
   - 25017351403
   - 25025160200
   - 25025040401

- 25025160502
- 25025160400
- 25025050901
- 25025160501

6. Idantifye enpak sou anviwonnman ak sou sante piblik pandan lontan oswa pou yon tan kout, ki kapab gen konsekans sou Popilasyon EJ yo ak nenpòt chanjman yo kapab lakòz.

Pwojè a pa sanse lakòz okenn chanjman negatif potansyèl ni okenn konsekans sou sante piblik ki kapab aji sou popilasyon EJ yo.

Enpak peryòd konstriksyon tanporè yo sou kalite lè a kapab lakòz yon enpak negatif sou anviwonnman ak sante piblik pou kominote lokal yo. Pou anpeche oswa redwi konsekans pousyè k ap chape ak emisyon ki soti nan veyikil konstriksyon yo, gen mwayen mitigasyon yo pral sèvi, tankou ekipman ki adapte pou dizèl ak mouye atè pandan travay konstriksyon yo. Pou anpeche, oswa modifye, oswa redwi enpak tanporè bwi travay konstriksyon yo, Pwojè a ap respekte Òdonnans pou Travay ak Bwi Vil Everett la. Yo pral pran dispozisyon pou redwi enpak bwi aktivite konstriksyon yo, tankou enstale moflè sou aparèy tankou konpresyon lè ak soudi, antretyen moflè ak aparèy aspirasyon, etenn aparèy ki p ap sèvi, ranplase aktivite ak teknik yo kapab avèk lòt ki fè mwens bwi, epi lòt mwayen ki kapab sèvi pou diminye bwi. Òganizasyon ak plannifikasyon travay konstriksyon yo pral redwi enpak sou anviwonnman nan zòn lan, epi yo pral gen plan pou transpò travayè konstriksyon yo, ak plan pou wout veyikil ak livrezon yo, ak mwayen kontwòl kont bwi ak pousyè. Yo pral chwazi wout ki kontwole chimen veyikil konstriksyon yo pran pou antre ak soti nan kote Pwojè a ap fèt la, pou redwi trafik k ap patisipe nan konstriksyon an. Kontraktè a ap toujou sèvi avèk bon metòd administrasyon, tankou baryè kont pousyè, pou redwi move konsekans sou IER la. Pou pwoteje sekirite piblik la nan pak la ak ozalantou li, yo pral mete siyal ki montre kote moun ka pase an sekirite pou antre nan pak la, ak pou fè kominote a konnen ki aktivite konstriksyon k ap fèt.

7. Idantifye avantaj pwojè a, sa ki vle di tou "Avantaj pou Anviwonnman" yo, dapre definisyon nan 301 CMR 11.02, ki kapab amelyore kondisyon anviwonnman an oswa sante piblik la nan popilasyon EJ yo.

Pwojè a sanse pote plizyè avantaj pou ekonnomi ak anviwonnman an. Nan pami avantaj Pwojè a ap pote, genyen amelyorasyon nan zòn piblik la, pi bon kondisyon sekirite pou pyeton yo, ak amelyorasyon ekolojik tankou pi bon kalite lè ak pwoteksyon kont inondasyon. Pwojè a pral pote plis avantaj ankò pou kominote a, tankou nouvo twotwa avèk pyebwa toupre lari, peyizaj natirèl pou moun gade, chimen pou bisiklèt ak ban pou chita, epi yon pak 1/5 mil arebò larivyè, pou moun antre sou kote larivyè a, ak plis espas louvri pou piblik la. Amennajman sa a pral pèmèt redwi espas kote moun pa kapab antre yo, ak chalè nan vil la nan zòn kote Pwojè a ap fèt la. Travay kont inondasyon yo pral pwoteje 500 kawo tè ki genyen katye anpil moun rete nan Chelsea ak Everett.

8. Esplike kouman kominote a kapab mande yon reyinyon pou pale sou pwojè a, ak kouman kominote a kapab mande sèvis entèprèt pandan reyinyon an. Presize kouman pou mande lòt aranjman, tankou rankont apre lè travay nan kote ki pre transpòt piblik yo.

Si manm nan kominote a vle mande yon reyinyon, oswa enfòmasyon, oswa dokiman ki tradwi nan lòt lang, yo mèt kontakte Bianca Bowman nan nimewo 617-466-3076 x121 oubyen nan adrès biancab@greenroots.org. Yo mèt voye mande aranjman, oswa reyinyon apre lè travay nan kote ki gen transpò piblik, nan adrès Bianca Bowman.

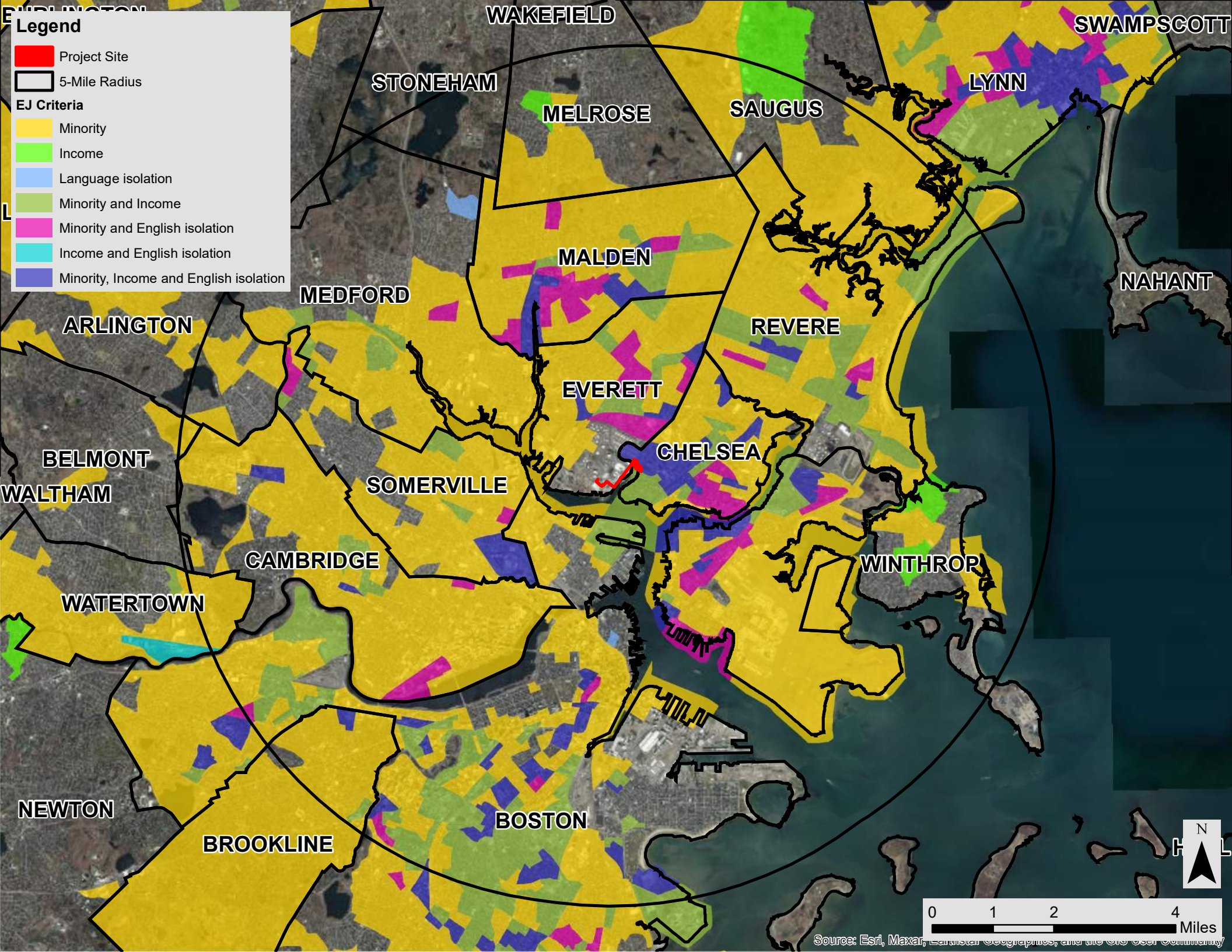
Pral gen enfòmasyon sou pwojè a nan lang Angle, Arab, Panyòl oswa Kreyòl ki baze sou Panyòl, Chinwa, Kreyòl ki baze sou Franse, Pòtigè, oswa Kreyòl Pòtigè sou sit entènèt pi ba la yo :

Pou Vil Chelsea : https://www.chelseama.gov/housing-and-community-development-department

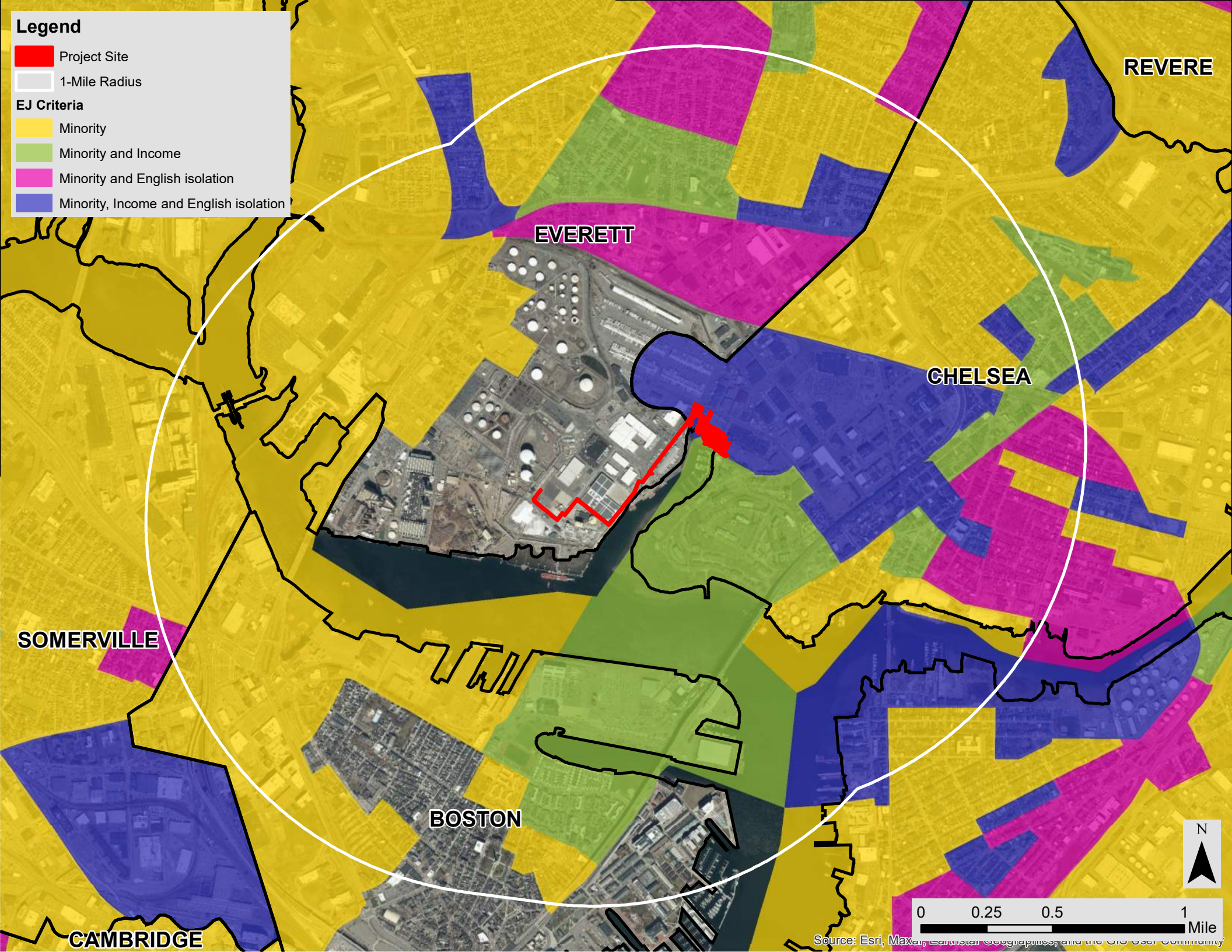
Pou Vil Everett : https://cityofeverett.com/city-hall/departments/planning-development/conservation-commission/

coUrbanize: https://www.islandendriver.com/home

EJ COMMUNITIES WITHIN 5 MILES OF THE PROJECT SITE


Legend
Project Site
5-Mile Radius
EJ Criteria
Minority
Income
Language isolation
Minority and Income
Minority and English isolation
Income and English isolation
Minority, Income and English isolation
WAKEFIELD
SWAMPSCOTT
STONEHAM
LYNN
MELROSE
SAUGUS
MALDEN
NAHANT
MEDFORD
ARLINGTON
REVERE
EVERETT
BELMONT
CHELSEA
WALTHAM
SOMERVILLE
CAMBRIDGE
WINTHROP
WATERTOWN
NEWTON
BOSTON
BROOKLINE
N
0
1
2
4
Miles
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

EJ COMMUNITIES WITHIN 1 MILE OF THE PROJECT SITE


Legend
Project Site
1-Mile Radius
EJ Criteria
Minority
Minority and Income
Minority and English isolation
Minority, Income and English isolation
REVERE
EVERETT
CHELSEA
SOMERVILLE
BOSTON
CAMBRIDGE
N
0
0.25
0.5
1
Mile
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

ATTACHMENT D: SUMMARY OF ENVIRONMENTAL JUSTICE CHARACTERISTICS

Block Group	EJ Criteria	% Minority Population	Median Household Income	% of MA Median Income	% Households with Language Isolation
Block Group 2, Census Tract 3424.02, Middlesex County, Massachusetts	Minority	61%	$93,850.00	111%	14%
Block Group 1, Census Tract 3514.03, Middlesex County, Massachusetts	Minority and English Isolation	48%	$66,964.00	79%	32%
Block Group 1, Census Tract 3426, Middlesex County, Massachusetts	Minority	74%	$80,603.00	96%	6%
Block Group 2, Census Tract 3426, Middlesex County, Massachusetts	Minority, income and English isolation	74%	$51,108.00	61%	33%
Block Group 3, Census Tract 3426, Middlesex County, Massachusetts	Minority	68%	$58,849.00	70%	13%
Block Group 1, Census Tract 3398.03, Middlesex County, Massachusetts	Minority	59%	$96,250.00	114%	10%
Block Group 1, Census Tract 3501.06, Middlesex County, Massachusetts	Minority	44%	$109,234.00	129%	9%
Block Group 1, Census Tract 3501.07,	Minority	51%	$107,315.00	127%	1%

Block Group	EJ Criteria	% Minority Population	Median Household Income	% of MA Median Income	% Households with Language Isolation
Middlesex County, Massachusetts					
Block Group 1, Census Tract 3421.01, Middlesex County, Massachusetts	Minority and income	70%	$49,299.00	58%	22%
Block Group 1, Census Tract 3424.01, Middlesex County, Massachusetts	Minority	65%	$71,250.00	84%	1%
Block Group 3, Census Tract 3424.01, Middlesex County, Massachusetts	Minority	70%	$89,387.00	106%	1%
Block Group 2, Census Tract 3425.01, Middlesex County, Massachusetts	Minority and income	69%	$55,182.00	65%	4%
Block Group 2, Census Tract 3424.01, Middlesex County, Massachusetts	Minority, income and English isolation	72%	$33,806.00	40%	31%
Block Group 1, Census Tract 3424.02, Middlesex County, Massachusetts	Minority	58%	$135,500.00	161%	2%
Block Group 3, Census Tract 3424.02, Middlesex County, Massachusetts	Minority and English isolation	58%	$65,852.00	78%	38%
Block Group 1, Census Tract 3425.01, Middlesex County, Massachusetts	Minority and English isolation	69%	$95,515.00	113%	28%

Block Group	EJ Criteria	% Minority Population	Median Household Income	% of MA Median Income	% Households with Language Isolation
Block Group 1, Census Tract 3425.02, Middlesex County, Massachusetts	Minority and English isolation	65%	$94,500.00	112%	28%
Block Group 2, Census Tract 3421.01, Middlesex County, Massachusetts	Minority	62%	$135,781.00	161%	2%
Block Group 4, Census Tract 3421.01, Middlesex County, Massachusetts	Minority and English isolation	61%	$99,181.00	118%	25%
Block Group 3, Census Tract 1605.01, Suffolk County, Massachusetts	Minority	91%	$101,875.00	121%	16%
Block Group 4, Census Tract 1605.01, Suffolk County, Massachusetts	Minority, income and English isolation	81%	$11,630.00	14%	55%
Block Group 5, Census Tract 1605.01, Suffolk County, Massachusetts	Minority and income	87%	$49,464.00	59%	0%
Block Group 1, Census Tract 1605.02, Suffolk County, Massachusetts	Minority, income and English isolation	87%	$28,333.00	34%	31%
Block Group 5, Census Tract 1605.02, Suffolk County, Massachusetts	Minority	78%	$67,818.00	80%	24%
Block Group 4, Census Tract	Minority	75%	$111,932.00	133%	19%

Block Group	EJ Criteria	% Minority Population	Median Household Income	% of MA Median Income	% Households with Language Isolation
1606.01, Suffolk County, Massachusetts					
Block Group 2, Census Tract 1603, Suffolk County, Massachusetts	Minority and income	43%	$51,429.00	61%	18%
Block Group 1, Census Tract 1604, Suffolk County, Massachusetts	Minority, income and English isolation	88%	$47,330.00	56%	37%
Block Group 2, Census Tract 1604, Suffolk County, Massachusetts	Minority, income and English isolation	90%	$35,069.00	42%	53%
Block Group 1, Census Tract 1606.01, Suffolk County, Massachusetts	Minority and income	26%	$53,200.00	63%	0%
Block Group 1, Census Tract 1606.02, Suffolk County, Massachusetts	Minority	79%	$62,708.00	74%	21%
Block Group 1, Census Tract 1601.02, Suffolk County, Massachusetts	Minority and English isolation	80%	$59,201.00	70%	26%
Block Group 2, Census Tract 1601.02, Suffolk County, Massachusetts	Minority and English isolation	96%	$63,469.00	75%	39%
Block Group 3, Census Tract 1601.02, Suffolk County, Massachusetts	Minority	90%	$81,313.00	96%	7%
Block Group 4, Census Tract	Minority, income and	89%	$25,451.00	30%	34%

Block Group	EJ Criteria	% Minority Population	Median Household Income	% of MA Median Income	% Households with Language Isolation
1601.02, Suffolk County, Massachusetts	English isolation				
Block Group 1, Census Tract 1601.03, Suffolk County, Massachusetts	Minority and English isolation	92%	$-	0%	40%
Block Group 2, Census Tract 1601.03, Suffolk County, Massachusetts	Minority and English isolation	93%	$69,713.00	83%	68%
Block Group 3, Census Tract 1601.03, Suffolk County, Massachusetts	Minority	76%	$65,865.00	78%	14%
Block Group 4, Census Tract 1601.03, Suffolk County, Massachusetts	Minority and English isolation	75%	$198,000.00	235%	32%
Block Group 1, Census Tract 1602, Suffolk County, Massachusetts	Minority and English isolation	93%	$61,679.00	73%	46%
Block Group 2, Census Tract 1602, Suffolk County, Massachusetts	Minority, income and English isolation	94%	$40,450.00	48%	59%
Block Group 3, Census Tract 1602, Suffolk County, Massachusetts	Minority and English isolation	91%	$58,688.00	70%	49%
Block Group 4, Census Tract 1602, Suffolk County, Massachusetts	Minority and income	83%	$51,827.00	61%	22%
Block Group 1, Census Tract 1603,	Minority	49%	$78,427.00	93%	21%

Block Group	EJ Criteria	% Minority Population	Median Household Income	% of MA Median Income	% Households with Language Isolation
Suffolk County, Massachusetts					
Block Group 3, Census Tract 1604, Suffolk County, Massachusetts	Minority	45%	$105,880.00	125%	6%
Block Group 4, Census Tract 1604, Suffolk County, Massachusetts	Minority and income	90%	$25,125.00	30%	22%
Block Group 1, Census Tract 1605.01, Suffolk County, Massachusetts	Minority	90%	$75,156.00	89%	14%
Block Group 2, Census Tract 1605.01, Suffolk County, Massachusetts	Minority and income	86%	$47,188.00	56%	8%
Block Group 1, Census Tract 406, Suffolk County, Massachusetts	Minority	28%	$127,344.00	151%	0%
Block Group 2, Census Tract 501.01, Suffolk County, Massachusetts	Minority, income and English isolation	76%	$22,910.00	27%	38%
Block Group 1, Census Tract 408.01, Suffolk County, Massachusetts	Minority and income	87%	$12,116.00	14%	24%
Block Group 1, Census Tract 501.01, Suffolk County, Massachusetts	Minority	77%	$82,583.00	98%	24%
Block Group 3, Census Tract 501.01, Suffolk	Minority	72%	$71,053.00	84%	23%

Block Group	EJ Criteria	% Minority Population	Median Household Income	% of MA Median Income	% Households with Language Isolation
County, Massachusetts					
Block Group 2, Census Tract 408.01, Suffolk County, Massachusetts	Minority and income	83%	$31,151.00	37%	8%
Block Group 1, Census Tract 503, Suffolk County, Massachusetts	Minority	55%	$66,250.00	79%	10%
Block Group 3, Census Tract 509.01, Suffolk County, Massachusetts	Minority, income and English isolation	74%	$37,333.00	44%	43%
Block Group 1, Census Tract 402, Suffolk County, Massachusetts	Minority and income	81%	$16,250.00	19%	12%
Block Group 2, Census Tract 402, Suffolk County, Massachusetts	Minority	25%	$179,266.00	212%	3%
Block Group 1, Census Tract 403, Suffolk County, Massachusetts	Minority	72%	$-	0%	4%
Block Group 1, Census Tract 404.01, Suffolk County, Massachusetts	Minority	29%	$86,734.00	103%	7%

Attachment E

DPA SITE PLANS & STAKEHOLDER COORDINATION TABLE

KEY MAP
SCALE: 1"=500'

LEGEND

PROPERTY LINE
MYSTIC RIVER DESIGNATED PORT AREA
PROPOSED FLOOD BARRIER

PRIOR CHAPTER 91 AUTHORIZATIONS

AUTHORIZATION	DATE
1908	OCTOBER 28, 1937
2990	MAY 7, 1992
3037	JUNE 26, 1992

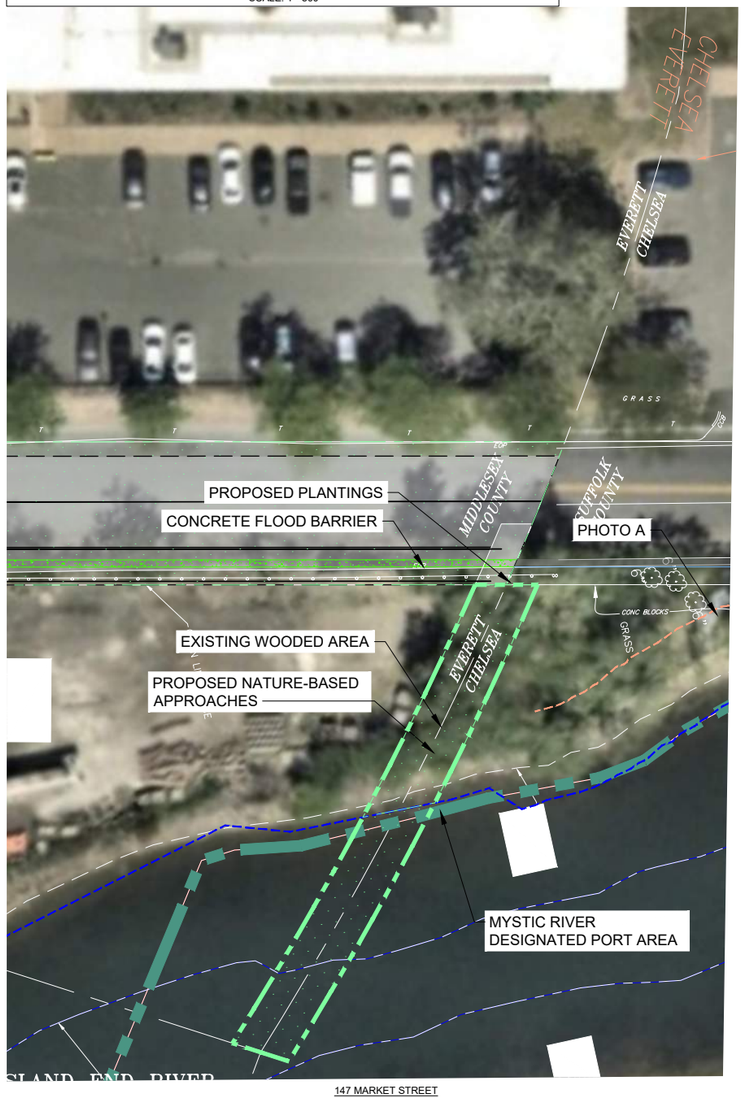
NOTES:

1. EXISTING CONDITIONS SHOWN ARE PROVIDED FROM PLANS TITLED "EXISTING CONDITIONS" PREPARED BY BEALS AND THOMAS, INC, DATED JUNE 28, 2023.
2. HORIZONTAL DATA SHOWN HEREON REFER TO NORTH AMERICAN DATUM OF 1983 (NAD83).
3. CHAPTER 91 JURISDICTIONAL LINE IS DETERMINED BY THE HISTORIC HIGH WATER LINE (SOURCE: MASSGIS).
4. 147 MARKET STREET IS OWNED BY THE COMMONWEALTH OF MASSACHUSETTS. THE PROPERTY IS CURRENTLY VACANT OF APPARENT LAND USE.
5. 145 MARKET STREET, 359 BEACHAM STREET, AND 100 COMMANDANTS WAY ARE OWNED IN COMMON OWNERSHIP BY DEVELOPMENT & MARKET GROUP LLC. THE PROPERTY IS CURRENTLY VACANT OF APPARENT LAND USE.
6. THE 147 MARKET STREET PROPERTY IS LOCATED WITHIN THE DESIGNATED PORT AREA. A PORTION OF THE 145 MARKET STREET PROPERTY IS WITHIN THE DESIGNATED PORT AREA.
7. BOTH 145 & 147 MARKET STREET PROPERTIES ARE LOCATED ENTIRELY BELOW THE HISTORIC HIGH TIDE LINE.
8. 145 AND 147 MARKET STREET ARE NOT CURRENTLY ACCESSED DIRECTLY BY VEHICULAR TRAFFIC.

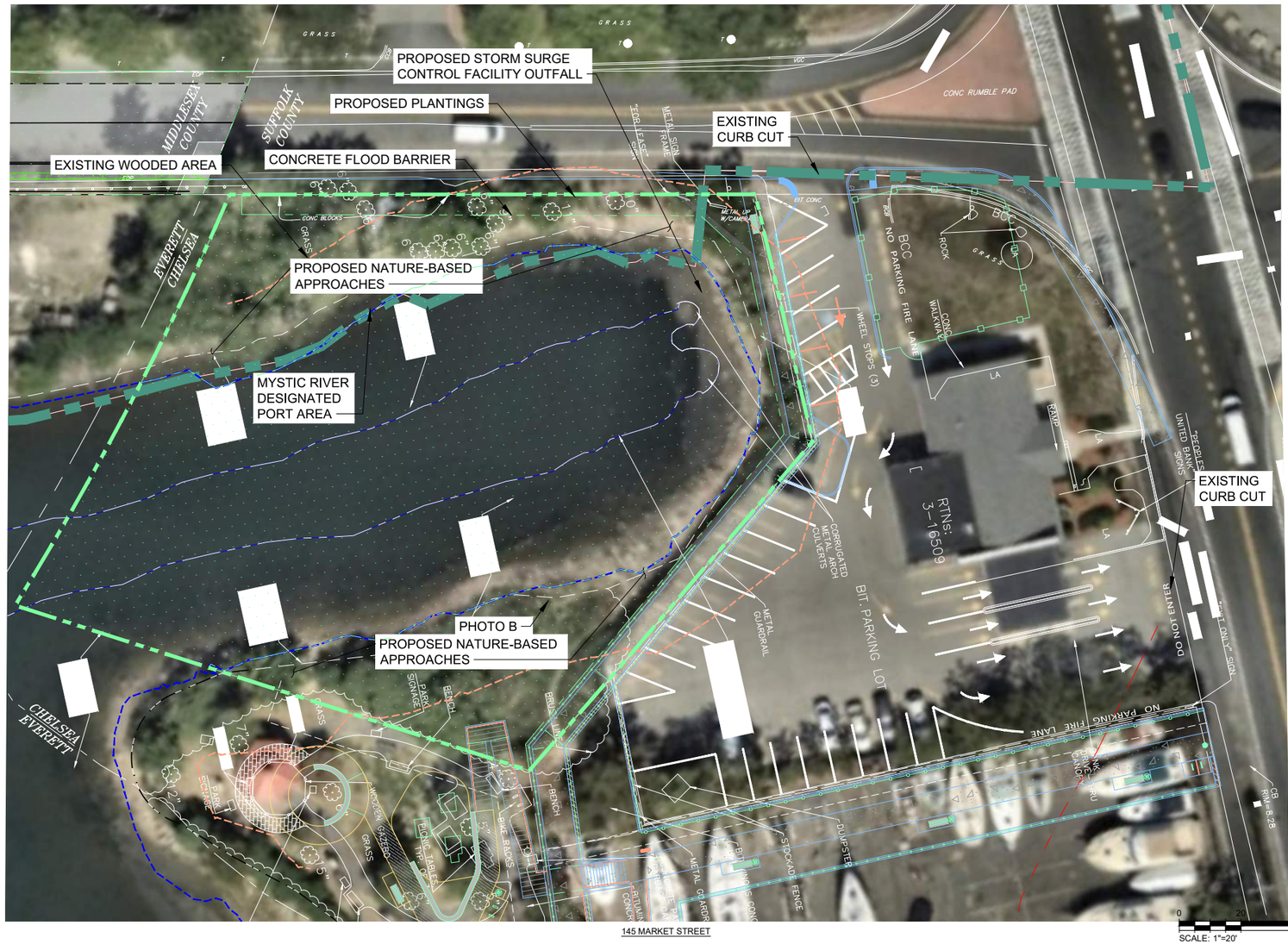
EXISTING CONDITIONS

PHOTO A

PHOTO B



147 MARKET STREET



145 MARKET STREET

SCALE: 1"=20'

Bar Measures 1 inch

TETRA TECH
www.tetratech.com
31 State Street, 3rd Floor
Boston, MA 02109
PHONE: (617) 357-7044

MARK	DATE	DESCRIPTION	BY

Client: Cities of Chelsea & Everett
Proj.Loc.: Chelsea & Everett, Massachusetts

ISLAND END RIVER FLOOD RESILIENCE PROJECT

DESIGNATED PORT AREA SITE PLAN
145 & 147 MARKET STREET

Project No.:	143-12588-23001
Designed By:	BC
Drawn By:	BC
Checked By:	KM

DPA-1
Sheet ## of ###

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KEY MAP
SCALE: 1"=500'

EXISTING CONDITIONS

PHOTO A

PHOTO B

PHOTO C

LEGEND

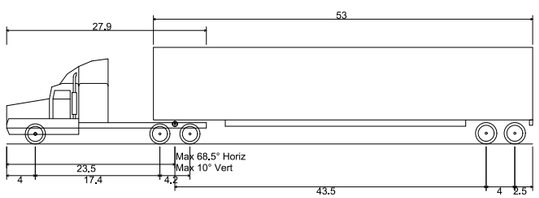
- PROPERTY LINE
- HISTORIC HIGH TIDE LINE
- APPROX. PARKING AREA
- PROPOSED FLOOD BARRIER
- PROPOSED FLOOD GATE (AS NOTED)

PRIOR CHAPTER 91 AUTHORIZATIONS

AUTHORIZATION	DATE
2083	DECEMBER 10, 1897
2250	JANUARY 19, 1899
434	MAY 29, 1924
11280	MARCH 10, 2006

NOTES:

1. EXISTING CONDITIONS SHOWN ARE PROVIDED FROM PLANS TITLED "EXISTING CONDITIONS" PREPARED BY BEALS AND THOMAS, INC, DATED JUNE 28, 2023.
2. HORIZONTAL DATA SHOWN HEREON REFER TO NORTH AMERICAN DATUM OF 1983 (NAD83).
3. CHAPTER 91 JURISDICTIONAL LINE IS DETERMINED BY THE HISTORIC HIGH WATER LINE (SOURCE: MASSGIS).
4. 95 BEHEN STREET IS OWNED BY SPS NEW ENGLAND, A MARINE CONSTRUCTION STORAGE AND BERTHING FACILITY.
5. THE PROPERTY IN ITS ENTIRETY IS LOCATED WITHIN THE DESIGNATED PORT AREA.
6. VEHICULAR ACCESS TO 95 BEHEN STREET IS PROVIDED FROM BEHEN AND MARKET STREETS.



WB-67 - Interstate Semi-Trailer	
Overall Length	73.501ft
Overall Width	8.500ft
Overall Body Height	13.500ft
Min Body Ground Clearance	1.334ft
Max Track Width	8.500ft
Lock-to-lock time	6.00s
Max Steering Angle (Virtual)	28.40°

WB-67 SECTION VIEW DETAIL

0 30 60
SCALE: 1"=30'

Bar Measures 1 inch

TETRA TECH
www.tetratech.com
31 State Street, 3rd Floor
Boston, MA 02109
PHONE: (617) 357-7044

MARK	DATE	DESCRIPTION

BY

Client: Cities of Chelsea & Everett
Proj. Loc.: Chelsea & Everett, Massachusetts

ISLAND END RIVER FLOOD RESILIENCE PROJECT

DESIGNATED PORT AREA SITE PLAN
95 BEHEN STREET

Project No.:	143-12588-23001
Designed By:	BC
Drawn By:	BC
Checked By:	KM

DPA-2
Sheet ## of ###

KEY MAP
SCALE: 1"=500'

LEGEND

- PROPERTY LINE
- HISTORIC HIGH TIDE LINE
- APPROX. PARKING AREA
- PROPOSED FLOOD BARRIER
- PROPOSED FLOOD GATE (AS NOTED)

PRIOR CHAPTER 91 AUTHORIZATIONS

AUTHORIZATION	DATE
2083	DECEMBER 10, 1897
2250	JANUARY 19, 1899
434	MAY 29, 1924
11280	MARCH 10, 2006

NOTES:

1. EXISTING CONDITIONS SHOWN ARE PROVIDED FROM PLANS TITLED "EXISTING CONDITIONS" PREPARED BY BEALS AND THOMAS, INC, DATED JUNE 28, 2023.
2. HORIZONTAL DATA SHOWN HEREON REFER TO NORTH AMERICAN DATUM OF 1983 (NAD83).
3. CHAPTER 91 JURISDICTIONAL LINE IS DETERMINED BY THE HISTORIC HIGH WATER LINE (SOURCE: MASSGIS)
4. 87 BEHEN STREET, 8 COMMERCIAL STREET, AND 26 COMMERCIAL STREET ARE OWNED IN COMMON OWNERSHIP BY PAUL W. MARKS COMPANY. PW MARKS CO. INC. IS A FAMILY-OWNED DAIRY DISTRIBUTION FACILITY.
5. THE PROPERTY IN ITS ENTIRETY IS LOCATED WITHIN THE DESIGNATED PORT AREA
6. VEHICULAR ACCESS TO 87 BEHEN STREET IS PROVIDED THROUGH ADJACENT PARCELS AT 8 COMMERCIAL STREET AND RAILROAD RIGHT-OF-WAY.

EXISTING CONDITIONS

PHOTO A

PHOTO B

WB-67 - Interstate Semi-Trailer

Overall Length	73.501ft
Overall Width	8.500ft
Overall Body Height	13.500ft
Min Body Ground Clearance	1.334ft
Max Track Width	8.500ft
Lock-to-lock time	6.00s
Max Steering Angle (Virtual)	28.40°

WB-67 SECTION VIEW DETAIL

0 30 60
SCALE: 1"=30'

Bar Measures 1 inch

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Boston, MA 02109
PHONE: (617) 357-7044

MARK	DATE	DESCRIPTION	BY

Client: Cities of Chelsea & Everett
Proj. Loc.: Chelsea & Everett, Massachusetts

ISLAND END RIVER FLOOD RESILIENCE PROJECT

DESIGNATED PORT AREA SITE PLAN
87 BEHEN STREET

Project No.:	143-12588-23001
Designed By:	BC
Drawn By:	BC
Checked By:	KM

DPA-3
Sheet ## of ###

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KEY MAP
SCALE: 1"=500'

LEGEND

- PROPERTY LINE
- HISTORIC HIGH TIDE LINE
- PROPOSED FLOOD BARRIER
- PROPOSED FLOOD GATE (AS NOTED)

PRIOR CHAPTER 91 AUTHORIZATIONS

AUTHORIZATION	DATE
12100	APRIL 1, 2008

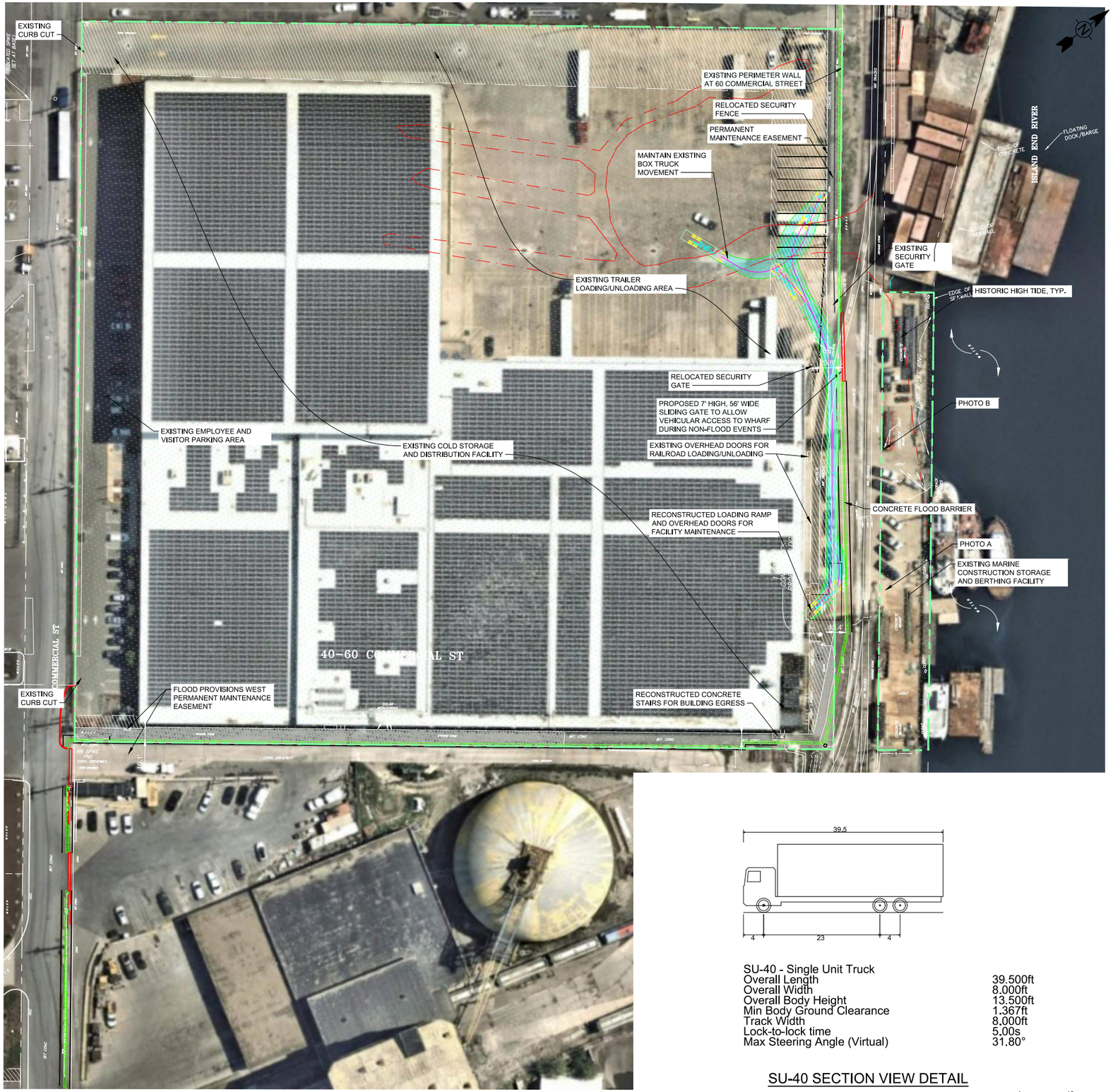
NOTES:

1. EXISTING CONDITIONS SHOWN ARE PROVIDED FROM PLANS TITLED "EXISTING CONDITIONS" PREPARED BY BEALS AND THOMAS, INC, DATED JUNE 28, 2023.
2. HORIZONTAL DATA SHOWN HEREON REFER TO NORTH AMERICAN DATUM OF 1983 (NAD83).
3. CHAPTER 91 JURISDICTIONAL LINE IS DETERMINED BY THE HISTORIC HIGH WATER LINE (SOURCE: MASSGIS)
4. 40-60 COMMERCIAL STREET IS OWNED BY EVERY BEAR INVESTMENTS, LLC, WITH A TENANT OF SMITH MARINE. LINEAGE LOGISTICS OPERATES THE MAJORITY OF THE SITE AS A COLD STORAGE AND DISTRIBUTION FACILITY AND SMITH MARINE OPERATES A MARINE CONSTRUCTION COMPANY ALONG THE PROPERTY'S WHARF.
5. THE PROPERTY IN ITS ENTIRETY IS LOCATED WITHIN THE DESIGNATED PORT AREA.
6. VEHICULAR ACCESS TO 40-60 COMMERCIAL STREET IS PROVIDED FROM COMMERCIAL STREET.

EXISTING CONDITIONS

PHOTO A

PHOTO B



SU-40 - Single Unit Truck	
Overall Length	39.500ft
Overall Width	8.000ft
Overall Body Height	13.500ft
Min Body Ground Clearance	1.367ft
Track Width	8.000ft
Lock-to-lock time	5.00s
Max Steering Angle (Virtual)	31.80°

SU-40 SECTION VIEW DETAIL

SCALE: 1"=40'

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Boston, MA 02109
PHONE: (617) 357-7044

MARK	DATE	DESCRIPTION	BY

Client: Cities of Chelsea & Everett
Proj.Loc.: Chelsea & Everett, Massachusetts

ISLAND END RIVER FLOOD RESILIENCE PROJECT

DESIGNATED PORT AREA SITE PLAN
40-60 COMMERCIAL STREET

Project No.	143-12588-23001
Designed By:	BC
Drawn By:	BC
Checked By:	KM

DPA-4

Sheet ## of ###

Bar Measures 1 inch

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KEY MAP
SCALE: 1"=500'

LEGEND

- PROPERTY LINE
- HISTORIC HIGH TIDE LINE
- PROPOSED FLOOD BARRIER
- PROPOSED FLOOD GATE (AS NOTED)

PRIOR CHAPTER 91 AUTHORIZATIONS

AUTHORIZATION	DATE
12100	APRIL 1, 2008

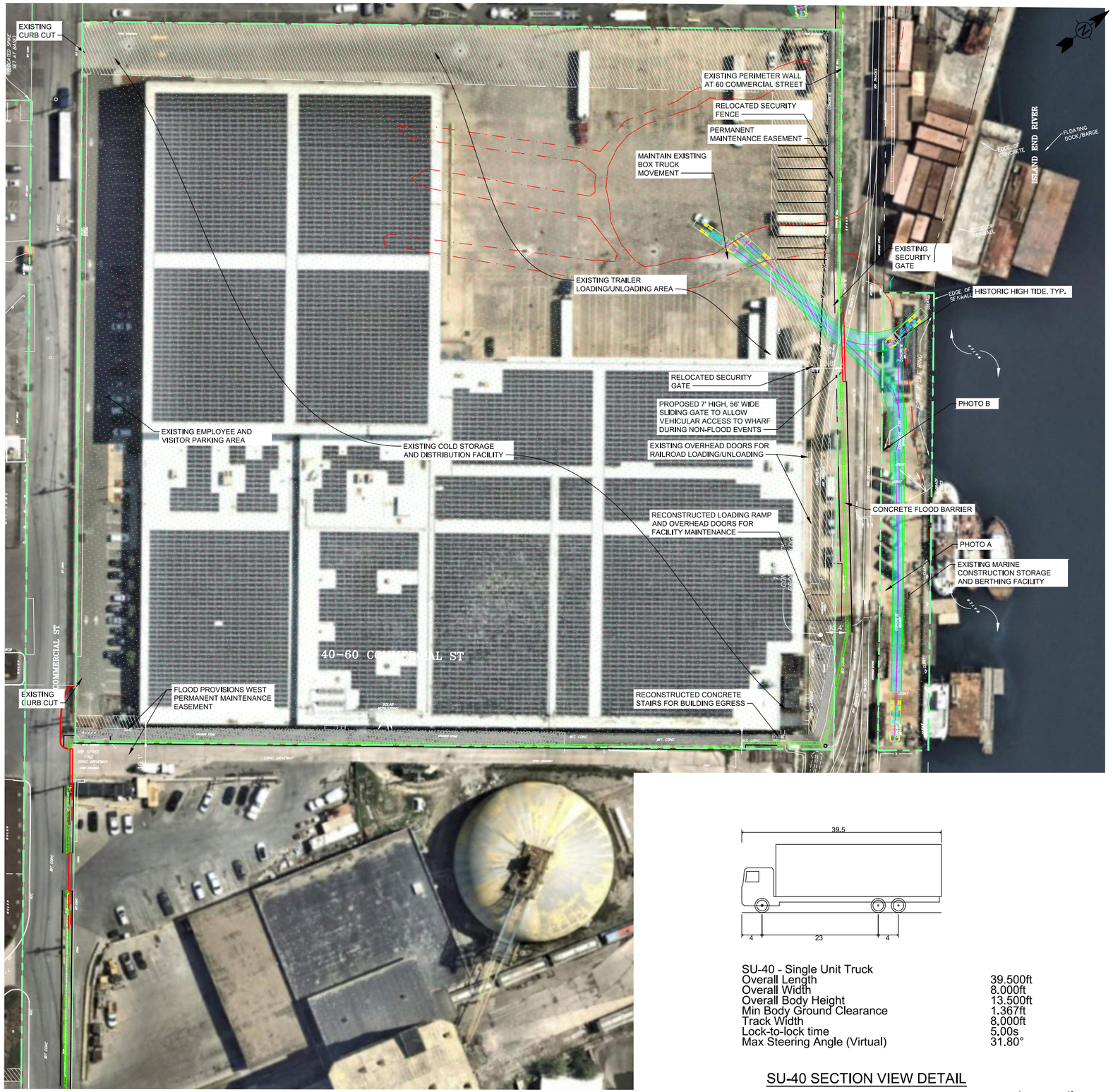
NOTES:

1. EXISTING CONDITIONS SHOWN ARE PROVIDED FROM PLANS TITLED "EXISTING CONDITIONS" PREPARED BY BEALS AND THOMAS, INC, DATED JUNE 28, 2023.
2. HORIZONTAL DATA SHOWN HEREON REFER TO NORTH AMERICAN DATUM OF 1983 (NAD83).
3. CHAPTER 91 JURISDICTIONAL LINE IS DETERMINED BY THE HISTORIC HIGH WATER LINE (SOURCE: MASSGIS).
4. 40-60 COMMERCIAL STREET IS OWNED BY EVERY BEAR INVESTMENTS, LLC, WITH A TENANT OF SMITH MARINE. LINEAGE LOGISTICS OPERATES THE MAJORITY OF THE SITE AS A COLD STORAGE AND DISTRIBUTION FACILITY AND SMITH MARINE OPERATES A MARINE CONSTRUCTION COMPANY ALONG THE PROPERTY'S WHARF.
5. THE PROPERTY IN ITS ENTIRETY IS LOCATED WITHIN THE DESIGNATED PORT AREA.
6. VEHICULAR ACCESS TO 40-60 COMMERCIAL STREET IS PROVIDED FROM COMMERCIAL STREET.

EXISTING CONDITIONS

PHOTO A

PHOTO B



SU-40 - Single Unit Truck	
Overall Length	39.500ft
Overall Width	8.000ft
Overall Body Height	13.500ft
Min Body Ground Clearance	1.367ft
Track Width	8.000ft
Lock-to-lock time	5.00s
Max Steering Angle (Virtual)	31.80°

SU-40 SECTION VIEW DETAIL

0 40 80
SCALE: 1"=40'

Bar Measures 1 inch

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31 State Street, 3rd Floor
Boston, MA 02109
PHONE: (617) 357-7044

MARK	DATE	DESCRIPTION	BY

Client: Cities of Chelsea & Everett
Proj.Loc.: Chelsea & Everett, Massachusetts

ISLAND END RIVER FLOOD RESILIENCE PROJECT

DESIGNATED PORT AREA SITE PLAN 40-60 COMMERCIAL STREET (TENANT)

Project No.	143-12588-23001
Designed By:	BC
Drawn By:	BC
Checked By:	KM

DPA-5

Sheet ## of ###

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KEY MAP
SCALE: 1"=500'

LEGEND

- PROPERTY LINE
- HISTORIC HIGH TIDE LINE
- PROPOSED FLOOD BARRIER
- PROPOSED FLOOD GATE (AS NOTED)

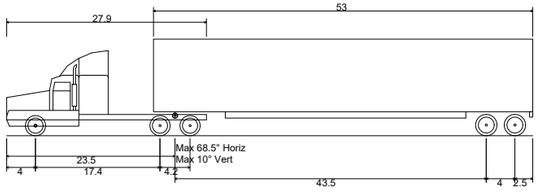
NOTES:

1. EXISTING CONDITIONS SHOWN ARE PROVIDED FROM PLANS TITLED "EXISTING CONDITIONS" PREPARED BY BEALS AND THOMAS, INC, DATED JUNE 28, 2023.
2. HORIZONTAL DATA SHOWN HEREON REFER TO NORTH AMERICAN DATUM OF 1983 (NAD83).
3. CHAPTER 91 JURISDICTIONAL LINE IS DETERMINED BY THE HISTORIC HIGH WATER LINE.
4. 61 COMMERCIAL STREET, 101 COMMERCIAL STREET, AND 18 ROVER STREET ARE OWNED IN COMMON OWNERSHIP BY CONSTELLATION ENERGY. THE FACILITY OPERATED BY CONSTELLATION ENERGY IS A LIQUIFIED NATURAL GAS DISTRIBUTION FACILITY AND THE 101 COMMERCIAL STREET PROPERTY CONTAINS A VISITOR CENTER AND PARKING AREAS.
5. THE PROPERTY IS LOCATED ENTIRELY WITHIN THE DESIGNATED PORT AREA.
6. VEHICULAR ACCESS TO 40-60 COMMERCIAL STREET IS PROVIDED FROM COMMERCIAL STREET.

EXISTING CONDITIONS

PHOTO A

PHOTO B



WB-67 - Interstate Semi-Trailer	
Overall Length	73.501ft
Overall Width	8.500ft
Overall Body Height	13.500ft
Min Body Ground Clearance	1.334ft
Max Track Width	8.500ft
Lock-to-lock time	6.00s
Max Steering Angle (Virtual)	28.40°

WB-67 SECTION VIEW DETAIL

0 30 60
SCALE: 1"=30'

Bar Measures 1 inch

TETRA TECH
www.tetratech.com
31 State Street, 3rd Floor
Boston, MA 02109
PHONE: (617) 357-7044

MARK	DATE	DESCRIPTION

Client: Cities of Chelsea & Everett
Proj. Loc.: Chelsea & Everett, Massachusetts

ISLAND END RIVER FLOOD RESILIENCE PROJECT

DESIGNATED PORT AREA SITE PLAN
18 ROVER STREET

Project No.:	143-12588-23001
Designed By:	BC
Drawn By:	BC
Checked By:	KM

DPA-6

Sheet ## of ###

STAKEHOLDER COORDINATION SUMMARY TABLE

Date	Description	Property	Organization(s) Represented
September 9, 2020	HMP Kickoff Meeting - SWG	N/A	Tetra Tech
		N/A	Everett Community Growers
		N/A	Eversource
		292 Second Street	Middlesex Gases
		N/A	National Grid
		N/A	Mystic River Watershed Association (MyRWA)
		N/A	Resilient Mystic Collaborative
		69 Rover Street	Schnitzer Steel
		1 Broadway	Wynn Design & Development, Encore Boston Harbor
December 10, 2020	HMP Workshop #1 – LPC & SWG	N/A	Tetra Tech
		N/A	Everett Community Growers
		N/A	Eversource
		292 2nd Street	Middlesex Gases
		N/A	National Grid
		N/A	Mystic River Watershed Association (MyRWA)
		N/A	Resilient Mystic Collaborative
		69 Rover Street	Schnitzer Steel
		1 Broadway	Wynn Design & Development, Encore Boston Harbor
July 8, 2021	HMP Workshop #2 – Everett Community Growers	N/A	Tetra Tech
		N/A	Everett Community Growers
July 13, 2021	HMP Mitigation Working Session - SWG/LPC	N/A	Tetra Tech
		N/A	Everett Community Growers
		N/A	Eversource
		292 2nd Street	Middlesex Gases
		N/A	National Grid
		N/A	Mystic River Watershed Association (MyRWA)
		N/A	Resilient Mystic Collaborative

Date	Description	Property	Organization(s) Represented
		69 Rover Street	Schnitzer Steel
		1 Broadway	Wynn Design & Development, Encore Boston Harbor
July 15, 2021	HMP Public Meeting – Everett Conservation Commission	N/A	Tetra Tech
		N/A	City of Everett
September 8, 2021	SWG Meeting #1 – Kickoff Meeting (Virtual)	N/A	Tetra Tech
		N/A	City of Everett
		Various	Chamber of Commerce
		201 Rover Street	Eastern Salt
		95 Behen Street	SPS New England
		N/A	National Grid
		87 Behen Street	PW Marks
October 7, 2021	SWG Meeting #2 – Site Walk	N/A	Tetra Tech
		N/A	City of Everett
		N/A	EEA
		1 Broadway	Wynn Design & Development, Encore Boston Harbor
		69 Rover Street	Schnitzer Steel
		95 Behen Street	SPS New England
		N/A	National Grid
		87 Behen Street	PW Marks
		40-60 Commercial Street	Lineage Logistics
October 20, 2021	Stakeholder (Quebec Ciment) Meeting	N/A	Tetra Tech
		100 Commercial Street	Quebec Ciment
October 21, 2021	SWG Meeting (Coastal)	N/A	Tetra Tech
		N/A	City of Everett
		1 Broadway	Wynn Development
		69 Rover Street	Schnitzer
October 21, 2021	SWG Meeting (Inland)	N/A	Tetra Tech
		34 Market Street	Davis Companies
		N/A	National Grid
		69 Rover Street	Schnitzer
		40-60 Commercial Street	Lineage Logistics
November 18, 2021	SWG Meeting #3 (Virtual)	N/A	Tetra Tech
		N/A	City of Everett
		Various	Chamber of Commerce
		N/A	National Grid
		69 Rover Street	Schnitzer

Date	Description	Property	Organization(s) Represented
		100 Commercial Street	Quebec Ciment
		201 Rover Street	Eastern Salt
		8 & 26 Commercial Street, 87 Behen Street	PW Marks
		40-60 Commercial Street	Lineage Logistics
		307 Beacham Street, 138 Market Street	USPS
		201 Beacham Street	Sheehan Company/Craft New England
November 30, 2021	Stakeholder (Paul W Marks) Meeting	N/A	Tetra Tech
		8 & 26 Commercial Street, 87 Behen Street	PW Marks
November 30, 2021	Stakeholder (Lineage Logistics) Meeting	N/A	Tetra Tech
		40-60 Commercial Street	Lineage Logistics
January 6, 2022	Stakeholder (Lineage Logistics) Meeting	N/A	Tetra Tech
		40-60 Commercial Street	Lineage Logistics
January 20, 2022	SWG Meeting #4 (Virtual)	N/A	Tetra Tech
		N/A	City of Everett
		18 Rover Street	Constellation Energy
		40-60 Commercial Street	Lineage Logistics
		8 & 26 Commercial Street, 87 Behen Street	PW Marks
		N/A	National Grid
		201 Beacham Street	Sheehan Company/Craft New England
January 28, 2022	Stakeholder (Constellation Energy) Meeting	N/A	Tetra Tech
		18 Rover Street	Constellation Energy
January 31, 2022	Stakeholder (National Grid) Meeting	N/A	Tetra Tech
		N/A	National Grid
February 3, 2022	Stakeholder (Lineage Logistics) Meeting	N/A	Tetra Tech
		40-60 Commercial Street	Lineage Logistics
February 9, 2022	Stakeholder (Lineage Logistics) Meeting	N/A	Tetra Tech
		40-60 Commercial Street	Lineage Logistics
March 24, 2022	Stakeholder (155 Market Street) Meeting	N/A	Tetra Tech
		155 Market Street	155 Market Street Trustee
		155 Market Street	Lyne, Woodworth & Evarts, LLP

Date	Description	Property	Organization(s) Represented
March 25, 2022	Stakeholder (Constellation Energy) Meeting	N/A	Tetra Tech
		18 Rover Street	Constellation Energy
		N/A	Beals + Thomas
April 1, 2022	Stakeholder (SPS New England) Meeting	N/A	Tetra Tech
		95 Behen Street	SPS New England
April 12, 2022	Stakeholder (National Grid) Meeting	N/A	Tetra Tech
		N/A	City of Everett
		N/A	National Grid
April 14, 2022	SWG Meeting #5 – Site Walk	N/A	Tetra Tech
		N/A	City of Everett
		N/A	Weston & Sampson
		12 Justin Drive	City of Chelsea
		8 & 26 Commercial Street, 87 Behen Street	PW Marks
		40-60 Commercial Street	Lineage Logistics
		N/A	National Grid
		FCTPF	de maximis, inc.
		155 Market Street	155 Market Street Trustee
		155 Market Street	Lyne, Woodworth & Evarts, LLP
		201 Beacham Street	Sheehan Company/Craft New England
		34 Market Street	Davis Companies
		95 Behen Street	SPS New England
April 14, 2022	Stakeholder (SPS New England) Meeting	N/A	Tetra Tech
		95 Behen Street	SPS New England
		FCTPF	de maximis, inc.
		N/A	National Grid
May 19, 2022	Stakeholder (Constellation Energy) Meeting	N/A	Tetra Tech
		18 Rover Street	Constellation Energy
June 2, 2022	Stakeholder (KHB Venture LLC) Meeting	N/A	Tetra Tech
		N/A	National Grid
		FCTPF	Honeywell
		FCTPF	Anderson Krieger LLP
		FCTPF	Beazer East
		FCTPF	de maximis, inc.
June 14, 2022	Stakeholder (Lineage Logistics) Meeting	N/A	Tetra Tech
		40-60 Commercial Street	Lineage Logistics
June 20, 2022	Stakeholder (SPS New England) Meeting	N/A	Tetra Tech
		95 Behen Street	SPS New England

Date	Description	Property	Organization(s) Represented
June 21, 2022	SWG Meeting #6 (Virtual)	N/A	Tetra Tech
		40-60 Commercial Street	Lineage Logistics
		1 Broadway	Wynn Development
		8 & 26 Commercial Street, 87 Behen Street	PW Marks
		N/A	National Grid
		95 Behen Street	SPS New England
		69 Rover Street	Schnitzer
		155 Market Street	155 Market Street Trustee
		155 Market Street	Lyne, Woodworth & Evarts, LLP
		FCTPF	de maximis, inc.
		FCTPF	Anderson Krieger LLP
		18 Rover Street	Constellation Energy
February 9, 2023	SWG Meeting #7 (Virtual)	N/A	Tetra Tech
		N/A	Lineage Logistics
		8 & 26 Commercial Street, 87 Behen Street	P.W. Marks
		N/A	National Grid
		155 Market Street	155 Market Street Trustee
		155 Market Street	Lyne, Woodworth & Evarts, LLP
		FCTPF	Beazer East, Inc.
		FCTPF	Anderson Krieger LLP
		18 Rover Street	Constellation Energy
		201 Beacham Street	Sheehan Company/Craft New England
March 9, 2023	SWG Meeting #8 – Field Work Site Walk	N/A	Tetra Tech
		N/A	City of Everett
		N/A	Beals + Thomas
		N/A	Northeast Geotechnical
		N/A	DrilEx Environmental
		95 Behen Street	SPS New England
		18 Rover Street	Constellation Energy
		N/A	National Grid
		FCTPF	de maximis, inc.
March 10, 2023	Stakeholder (SPS New England) Field Work Meeting	N/A	Tetra Tech
		N/A	KP Law
		N/A	City of Everett
		95 Behen Street	SPS New England

Date	Description	Property	Organization(s) Represented
March 13, 2023	Stakeholder (KHB Venture LLC) Field Work Meeting	N/A	Tetra Tech
		N/A	KP Law
		N/A	City of Everett
		N/A	National Grid
		FCTPF	Honeywell
		FCTPF	Anderson Krieger
		FCTPF	Beazer East
		FCTPF	de maximis, inc.
March 14, 2023	Stakeholder (Lineage Logistics) Field Work Meeting	N/A	Tetra Tech
		N/A	KP Law
		N/A	City of Everett
		40-60 Commercial Street	Lineage Logistics
April 13, 2023	SWG Meeting #8 – Site Walk	N/A	Tetra Tech
		N/A	City of Everett
		N/A	Weston & Sampson
		N/A	KP Law
		8 & 36 Commercial Street, 87 Behen Street	PW Marks
		FCTPF	de maximis, inc.
		100 Justin Drive	Westbrook Partners
		155 Market Street	Lyne, Woodworth & Evarts, LLP
		201 Beacham Street	Sheehan Company/Craft New England
		FCTPF	Anderson Krieger LLP
		95 Behen Street	SPS New England
April 19, 2023	Stakeholder (SPS New England) Meeting	N/A	Tetra Tech
		N/A	City of Everett
		95 Behen Street	SPS New England
July 26, 2023	Stakeholder (Constellation Energy) Meeting	N/A	Tetra Tech
		N/A	City of Everett
		18 Rover Street	Constellation Energy
July 26, 2023	Stakeholder (Lineage Logistics) Meeting	N/A	Tetra Tech
		N/A	City of Everett
		40-60 Commercial Street	Lineage Logistics
August 1, 2023	Stakeholder (PW Marks) Meeting	N/A	Tetra Tech
		N/A	City of Everett
		8 & 26 Commercial Street, 87 Behen Street	PW Marks

Date	Description	Property	Organization(s) Represented
September 7, 2023	Stakeholder (Lineage Logistics) Meeting	N/A	Tetra Tech
		N/A	City of Everett
		40-60 Commercial Street	Lineage Logistics
September 7, 2023	Stakeholder (PW Marks) Meeting	N/A	Tetra Tech
		N/A	City of Everett
		8 & 26 Commercial Street, 87 Behen Street	PW Marks
October 17, 2023	SWG Meeting #9 (Virtual)	N/A	Tetra Tech
		N/A	City of Everett
		12 Justin Drive	City of Chelsea
		N/A	Weston & Sampson
		N/A	KP Law
		N/A	Blatman, Bobrowski, Haverty & Silverstein, LLC
		FCTPF	de maximis, inc.
		100 Justin Drive	Westbrook Partners
		155 Market Street	Lyne, Woodworth & Evarts, LLP
		201 Beacham Street	Sheehan Company/Craft New England
		FCTPF	Anderson Krieger LLP
		95 Behen Street	SPS New England
		40-60 Commercial Street	Lineage Logistics
		8 & 26 Commercial Street, 87 Behen Street	P.W. Marks
		N/A	National Grid
		155 Market Street	155 Market Street Trustee
		155 Market Street	Lyne, Woodworth & Evarts, LLP
		FCTPF	Beazer East, Inc.
		18 Rover Street	Constellation Energy
		201 Beacham Street	Sheehan Company/Craft New England
		1 Broadway	Wynn Development
		145 Market Street 359 Beacham Street	Development & Marketing Group LLC
		34 Market Street	Davis Companies
		357 Beacham Street	M&T Bank
		69 Rover Street	Schnitzer

Date	Description	Property	Organization(s) Represented
		40-60 Commercial Street	Smith Marine
October 25, 2023	Stakeholder (PW Marks) Meeting	18 Rover Street	Constellation Energy
		8 & 26 Commercial Street, 87 Behen Street	PW Marks
November 7, 2023	Stakeholder (Constellation Energy) Meeting	N/A	Tetra Tech
		N/A	City of Everett
		18 Rover Street	Constellation Energy

Attachment F

WETLANDS DELINEATION REPORT

Weston & Sampson

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Reading, MA 01867
tel: 978.532.1900

Wetland Delineation Report

May 2022
(Updated September 2023)

Island End River
Chelsea, MA

Wetland Delineation Conducted By:
Devin Batchelder, CWS on 5/2/2022 and 5/10/2022

Delineation Report Reviewed By:
Mel Higgins, PWS

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1.0 SITE DESCRIPTION

On May 2 and May 10, 2022, the presence of wetland resources was investigated near the Island End River in Chelsea, MA. This investigation area is located in a developed area adjacent to commercial properties and a small public park. Please see Figure 1 (Wetlands Field Map) and Figure 2 (USGS Topographic Map) of this report for the investigation area.

Wetland resource areas including, a salt marsh, coastal beach/tidal flats, coastal bank, land under ocean, a designated port area, riverfront area and land subject to coastal storm flowage, were identified by a Weston & Sampson employee who is trained in the wetland delineation process using the Massachusetts Department of Environmental Protection (MassDEP) and the US Army Corps of Engineers methodology. Further descriptions of these wetland resource areas are presented in the following sections.

2.0 DELINEATION OF WETLAND RESOURCES

2.1 Site Observations

The Weston & Sampson wetland scientist, trained in the ACOE Wetland Delineation Manual and Massachusetts Department of Environmental Protection (MassDEP) Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetland Protection Act guidance document, observed the following protected wetland resources at the site:

- Salt Marsh
- Coastal Beach/Tidal Flats
- Coastal Bank
- Land Under Ocean (LUO)
- Designated Port Area (DPA)
- Riverfront Area
- Land Subject to Coastal Storm Flowage (LSCSF)

Field data were recorded on US Army Corps of Engineers (ACOE) Wetland Determination Data Forms. See Appendix A for completed data forms and Appendix B for site photographs.

2.2 Wetland Delineation Methodology

A wetland delineation assessment was conducted in accordance with the guidance provided in the Coastal Manual otherwise known as "*Applying the Massachusetts Coastal Wetlands Regulations: A Practical Manual for Conservation Commissions to Protect the Storm Damage Prevention and Flood Control Functions of Coastal Resource Areas*". The Coastal Manual was developed by the Massachusetts Office of Coastal Zone Management (CZM) and Massachusetts Department of Environmental Protection (MassDEP) to provide technical guidance on the coastal resource areas under the WPA. These coastal resource areas include land under the ocean, designated port areas, coastal beaches, coastal dunes, barrier beaches, coastal banks, rocky intertidal shores, and salt marshes.

2.3 Salt Marsh (SM)

The Massachusetts Wetland Protection Act defines a salt marsh (SM) as a "coastal wetland that extends landward up to the highest high tide line, that is, the highest spring tide of the year, and is characterized

by plants that are well adapted to or prefer living in, saline soils. Dominant plants within salt marshes typically include salt meadow cord grass (*Spartina patens*) and/or salt marsh cord grass (*Spartina alterniflora*), but may also include, without limitation, spike grass (*Distichlis spicata*), high-tide bush (*Iva frutescens*), black grass (*Juncus gerardii*), and common reedgrass (*Phragmites*). A salt marsh may contain tidal creeks, ditches and pools." (310 CMR 10.32).

Per 310 CMR 10.04 Spring Tide is defined as "the tide of the greatest amplitude during the approximately 14-day tidal cycle. It occurs at or near the time when the gravitational forces of the sun and the moon are in phase (new and full moons)." Based on the NOAA Annual Tide Table for Boston the highest high tide of the year (2022) will occur on June 16, 2022 and is 6.5' NAVD88.

Based on elevation, a portion of the salt marsh is located landward of the highest high tide line. This is due to material which has accumulated on top of the salt marsh surface. This accumulated material is composed of phragmites detritus, trash, debris which have accumulated over the years from seasonal and tidal cycles, as well as compacted urban fill material which is located in some areas under the existing boardwalk and is likely the result of years of adjacent roadway uses such as snowplowing. Based on the site conditions it is our opinion that this area should be most appropriately classified as salt marsh due to the conditions that would be present if not for this accumulated material. As such, the landward limit of salt marsh has been determined based on the presence of wetland vegetation and hydrology including sulfur odor, water staining and saturation.

The seaward limit of the SM resource area was determined based on the presence of salt tolerant wetland vegetation and/or the presence of peat which once supported low marsh vegetation.

The SM area observed on site is associated with the tidal Island End River. Dominant vegetation within the salt marsh included *Distichlis spicata, Spartina alterniflora, Spartina patens* and *Phragmites*. Soils within the SM were composed of a thick organic layer. Other indicators of wetland hydrology included sulfur odor, high water table and saturation.

Wetland flags were left along the SM landward boundary and included:

- WET-A1 through WET-A32

A 100-foot buffer zone is associated with the SM resource area based on 310 CMR 10.02 ((2)(b) of the Massachusetts Wetlands Protection Act.

2.4 Coastal Beach/Tidal Flats

The Massachusetts Wetland Protection Act defines a Coastal Beach as ""unconsolidated sediment subject to wave, tidal and coastal storm action which forms the gently sloping shore of a body of salt water and includes tidal flats. Coastal beaches extend from the mean low water line landward to the dune line, coastal bank line or the seaward edge of existing man-made structures, when these structures replace one of the above lines, whichever is closest to the ocean." 310 CMR 10.27(2).

Tidal Flat means "any nearly level part of a coastal beach which usually extends from the mean low water line landward to the more steeply sloping face of the coastal beach or which may be separated from the beach by land under the ocean." 310 CMR 10.27(2).

The seaward limit of a Coastal Beach/Tidal Flat is the mean low water line which is defined as "the line where the arithmetic mean of the low water heights observed over a specific 19-year Metonic Cycle (the National Tidal Datum Epoch) meets the shore and shall be determined using hydrographic survey data of the National Ocean Survey of the U.S. Department of Commerce". The most recent National Tidal Datum Epoch hydrographic survey data is available through National Oceanic and Atmospheric Administration (NOAA) tidal datums. The closest tidal datum to the investigation area is Station 8443970 located in Boston MA. According to the Boston tidal datum the mean low water is located at -5.16 NAVD88. Since mean low water is determined using an elevation it cannot be delineated in the field.

The landward limit of a Coastal Beach is seaward edge of any adjacent Coastal Dune, Coastal Bank, or existing man-made structures. Within the investigation area, the coastal resource areas adjacent to the coastal beach included coastal bank and salt marsh. When the line of demarcation between these resources is unclear, the dominant processes should be observed and utilized in coordination with the highest high tide line or Spring Tide as the landward limit of Coastal Beach as it is the limit of the tidal influence and the intertidal zone.

Coastal Beach/Tidal flat was observed at the site however, wetland flags were not left in the field along the landward limit in order to prevent the flags from entering the river due to the tidal inundation.

A 100-foot buffer zone is associated with the Coastal Beach resource area based on 310 CMR 10.02 (2)(b) of the Massachusetts Wetlands Protection Act.

2.5 Coastal Bank

The Massachusetts Wetland Protection Act defines a Coastal Bank as "the seaward face or side of any elevated landform, other than a coastal dune. Which lies at the landward edge of a coastal beach, land subject to tidal action or other wetland" (310 CMR 10.30).

The seaward edge (or bottom) of the coastal bank begins at the toe of the coastal bank slope, where other coastal wetland resource areas end. Within this investigation area adjacent resources included the landward edge of a coastal beach and the landward edge of a salt marsh. The landward edge of the coastal beach occurs where there an abrupt change in topography to a steep, seaward-facing slope primarily of glacial origin (coastal bank). The landward edge of the salt marsh is the highest high tide line.

The landward edge of the Coastal Bank is generally the top of, or the first major break in, the face of the Coastal Bank however the Coastal Manual Appendix D - Massachusetts Department of Environmental Protection Coastal Banks Policy, has issued the following additional standards for delineation of the "top of coastal bank":

A. The slope of a coastal bank must be ≥10:1.

B. For a coastal bank with a slope of ≥4:1, the "top of coastal bank" is that point above the 100-year flood elevation where the slope becomes <4:1.

C. For a coastal bank with a slope ≥10:1 but <4:1, the top of coastal bank is the 100-year flood elevation.

D. A "top of coastal bank" will fall below the 100-year flood elevation and is the point where the slope ceases to be ≥10:1.

E. There can be multiple coastal banks within the same site. This can occur where the coastal banks are separated by land subject to coastal storm flowage [an area <10:1].

When a landform, other than a coastal dune, has a slope that is so gentle and continuous that it does not act as a vertical buffer and confine elevated storm waters, that landform does not qualify as a coastal bank. Rather, gently sloping landforms at or below the 100-year flood elevation which have a slope <10:1 shall be regulated as "land subject to coastal storm flowage" and not as coastal bank. Land subject to coastal storm flowage may overlap other wetland resource areas such as coastal beaches and dunes.

Within the investigation area the slope of the Coastal Bank varies from <10:1 to ≥4:1. As such the landward boundary of Coastal Bank varies from no Coastal Bank present to the point above the 100-year flood elevation where the slope becomes <4:1. Per the recommended guidance in the Coastal Manual the following figures from the "Wetlands Program Policy 92-1: Coastal Banks" best represent the Coastal Bank conditions observed on site and were utilized to determine the landward limits of the Coastal Bank:

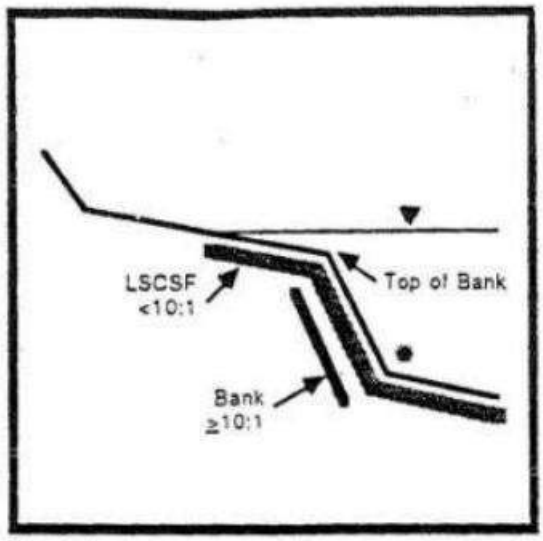

Figure 4

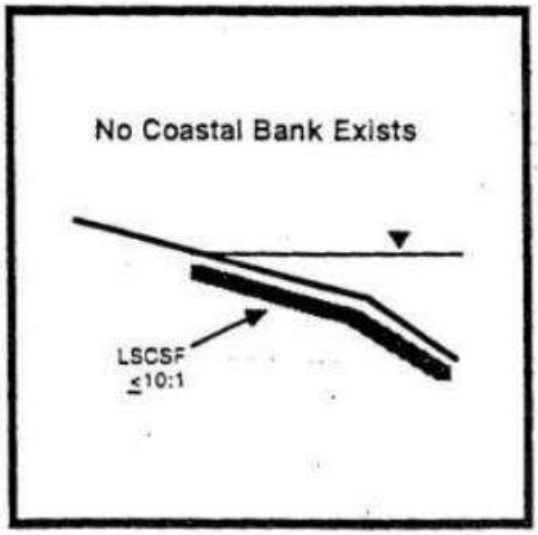

Figure 7

Due to the variable nature of the Coastal Bank slopes observed on site, no flags were left in the field however GPS locations of the flags were marked. The first observed break in slope was GPS located

and utilized in combination with the slope requirements described above in order to determine and accurate landward limit of Coastal Bank. GPS locations taken in the field included:

- TOB-A1 through TOB-A42
- TOB-B1 through TOB-B7
- TOB-C1 through TOB-C25

A 100-foot buffer zone is associated with the Coastal Bank resource area based on 310 CMR 10.02 (2)(b) of the Massachusetts Wetlands Protection Act.

2.6 Land Under the Ocean (LUO)

The Massachusetts Wetland Protection Act defines Land Under the Ocean (LUO) as "the land extending from the mean low water line seaward to the boundary of the municipality's jurisdiction and includes land under estuaries." (310 CMR 10.25).

The mean low water line is defined as "the line where the arithmetic mean of the low water heights observed over a specific 19-year Metonic Cycle (the National Tidal Datum Epoch) meets the shore and shall be determined using hydrographic survey data of the National Ocean Survey of the U.S. Department of Commerce". The most recent National Tidal Datum Epoch hydrographic survey data is available through National Oceanic and Atmospheric Administration (NOAA) tidal datums. The closest tidal datum to the investigation area is Station 8443970 located in Boston MA. According to the Boston tidal datum the mean low water is located at -5.16 NAVD88. Since mean low water is determined using an elevation it cannot be delineated in the field.

There is no buffer zone is associated with the LUO resource area based on 310 CMR 10.02 (2)(b) of the Massachusetts Wetlands Protection Act.

2.7 Designated Port Area (DPA)

The Massachusetts Wetland Protection Act defines Designated Port Areas (DPAs) as "those areas designated in 301 CMR 25.00: Designation of Port Areas." (310 CMR 10.26) and 301 CMR 25.02 further

defines a DPA as "an area of contiguous lands and waters in the coastal zone that has been so designated by CZM in accordance with 301 CMR 25.00."

Per the Coastal Manual "official copies of the maps and official descriptions of the most current Designated Port Area boundaries are available from the Massachusetts Office of Coastal Zone Management on their Designated Port Area website (www.mass.gov/service-details/czm-port-and-harbor-planningprogram-designated-port-areas)."

A portion of the investigation area is located within the Mystic River Designated Port Area. Since the limits of the DPA are based on available maps this resource area cannot be delineated in the field.

There is no buffer zone is associated with the DPA resource area based on 310 CMR 10.02 (2)(b) of the Massachusetts Wetlands Protection Act.

2.8 Riverfront Area

The Massachusetts Wetland Protection Act defines Riverfront Area as "the area of land between a river's mean annual high water line and a parallel line measured horizontally." (310 CMR 10.58). Furthermore, per 310 CMR 10.58(2)(c) "In tidal rivers, the mean annual high-water line is coincident with the mean high water line determined under 310 CMR 10.23."

Per 310 CMR 10.23 Mean High Water Line means " the line where the arithmetic mean of the high water heights observed over a specific 19-year metonic cycle (the National Tidal Datum Epoch) meets the shore and shall be determined using hydrographic survey data of the National Ocean Survey of the U.S. Department of Commerce". The most recent National Tidal Datum Epoch hydrographic survey data is available through National Oceanic and Atmospheric Administration (NOAA) tidal datums. The closest tidal datum to the investigation area is Station 8443970 located in Boston MA. According to the Boston tidal datum the mean high water is located at 4.33 NAVD88. As a result, the Riverfront Area shall be a parallel line measured horizontally offset from 4.33 NAVD88.

Perennial streams are normally subject to a 200-foot Riverfront Area under the Massachusetts Wetland Protection Act per 301 CMR 10.58(2)(a)(2)(c) however, the City of Chelsea is a municipality that is identified in 310 CMR 10.58(2)(a)3.a. as having a 25-foot Riverfront Area due to development.

Since the limits of the Riverfront Area are based on elevation this resource area cannot be delineated in the field and was added to the maps based on survey.

2.9 Land Subject to Coastal Storm Flowage (LSCSF)

The Massachusetts Wetland Protection Act defines Land Subject to Coastal Storm Flowage (LSCSF) as "land subject to any inundation caused by coastal storms up to and including that caused by the 100-year storm, surge of record or storm of record, whichever is greater." (310 CMR 10.04).

FEMA Flood Insurance Rate Maps (FIRM) were created online from the FEMA website to determine if there is a 100-year flood zone at the site. See Figure 3 for FIRM map. Based on FEMA flood maps the investigation area is located within the 100-year flood zone at elevation 10.0' NAVD88. The Massachusetts Wetland Protection Act does not place a buffer zone on the 100-year flood zone. This coastal flood zone is referred to as Land Subject to Coastal Storm Flowage (LSCSF) in the WPA. Since the 100-year floodplain is determined using FEMA FIRM maps and/or an elevation it cannot be delineated in the field and may be updated based on survey.

2.10 Other Protected Areas

Weston & Sampson created environmental resources maps (see Figure 4) of the site to determine the presence of other protected areas. The data source of these map layers was the Massachusetts Geographic Information System (MassGIS). These areas included:

- NHESP Priority Habitats of Rare Species
- NHESP Estimated Habitats of Rare Wildlife
- NHESP Certified and Potential Vernal Pools
- Areas of Critical Environmental Concern (ACEC)
- Outstanding Resource Waters (ORW)
- Coldwater Fisheries

- Shellfish Suitability Area
- Article 97 Land

Wetland resources identified in the field were also added to these maps. Based on the MassGIS information, a portion of the investigation area is located within a Shellfish Suitability Area for Soft Shelled Clams and located within Article 97 Land.

3.0 SUMMARY

On May 2 and May 10, 2022, the presence of wetland resources was investigated near the Island End River in Chelsea, MA. A salt marsh, coastal beach/tidal flats, coastal bank, land under ocean, a designated port area, riverfront area and land subject to coastal storm flowage, were identified on site.

Additional environmental mapping was conducted using MassGIS data layers and FEMA FIRM mapping. This additional mapping indicates that a portion of the investigation area is located within a Shellfish Suitability Area for Soft Shelled Clams and Article 97 Land.

4.0 REFERENCES

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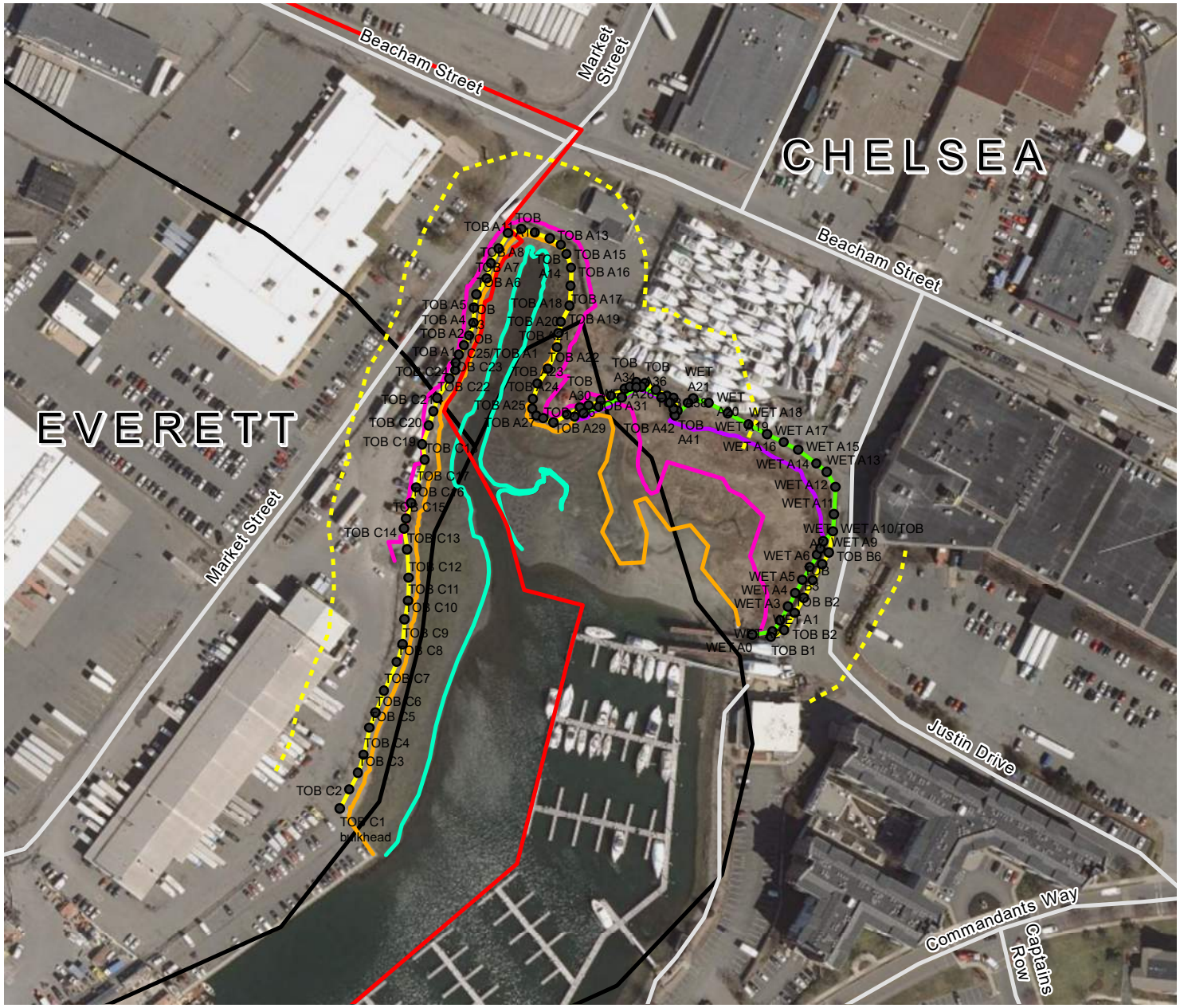


Legend

- Wetland Flags
- Mystic River Designated Port Area
- Salt Marsh
- Approx Highest High Tide Line
- Approx 100 Foot Buffer to Coastal Bank
- Approx Coastal Bank
- Approx Coastal Beach Tidal Flats
- Approx Land Under Ocean
- Approx 25 Foot Riverfront Area
- MassDOT Roads
- MA Towns

N W E S

200 100 0 200 Feet

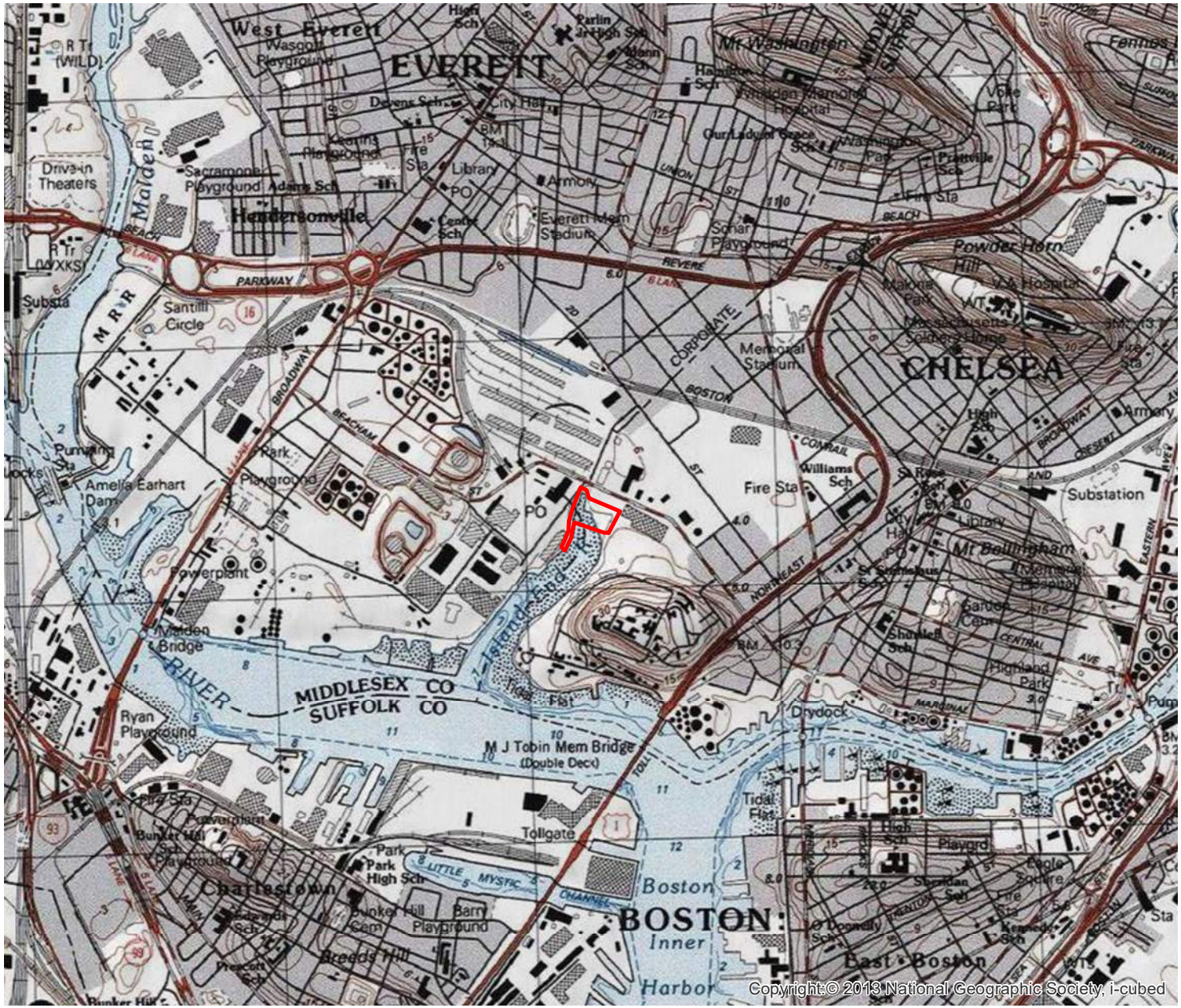
Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

FIGURE 1

ISLAND END RIVER
CHELSEA MA

WETLANDS FIELD MAP

Weston & Sampson



N
W E
S

1,000 500 0 1,000
Feet

Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

Legend

Investigation Area

FIGURE 2

ISLAND END RIVER
CHELSEA MA

USGS TOPOGRAPHIC MAP

Weston & Sampson

National Flood Hazard Layer FIRMette

FEMA

71°3'15"W 42°23'50"N

71°2'38"W 42°23'23"N

0 250 500 1,000 1,500 2,000 Feet

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

- **SPECIAL FLOOD HAZARD AREAS**
  - Without Base Flood Elevation (BFE) — Zone A, V, A99
  - With BFE or Depth — Zone AE, AO, AH, VE, AR
  - Regulatory Floodway
- **OTHER AREAS OF FLOOD HAZARD**
  - 0.2% Annual Chance Flood Hazard. Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile — Zone X
  - Future Conditions 1% Annual Chance Flood Hazard — Zone X
  - Area with Reduced Flood Risk due to Levee. See Notes. — Zone X
  - Area with Flood Risk due to Levee — Zone D
- **OTHER AREAS**
  - NO SCREEN — Area of Minimal Flood Hazard — Zone X
  - Effective LOMRs
  - Area of Undetermined Flood Hazard — Zone D
- **GENERAL STRUCTURES**
  - Channel, Culvert, or Storm Sewer
  - Levee, Dike, or Floodwall
- **OTHER FEATURES**
  - 20.2 / 17.5 — Cross Sections with 1% Annual Chance / Water Surface Elevation
  - Coastal Transect
  - Base Flood Elevation Line (BFE)
  - Limit of Study
  - Jurisdiction Boundary
  - Coastal Transect Baseline
  - Profile Baseline
  - Hydrographic Feature
- **MAP PANELS**
  - Digital Data Available
  - No Digital Data Available
  - Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/31/2022 at 12:40 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Legend

Investigation Area

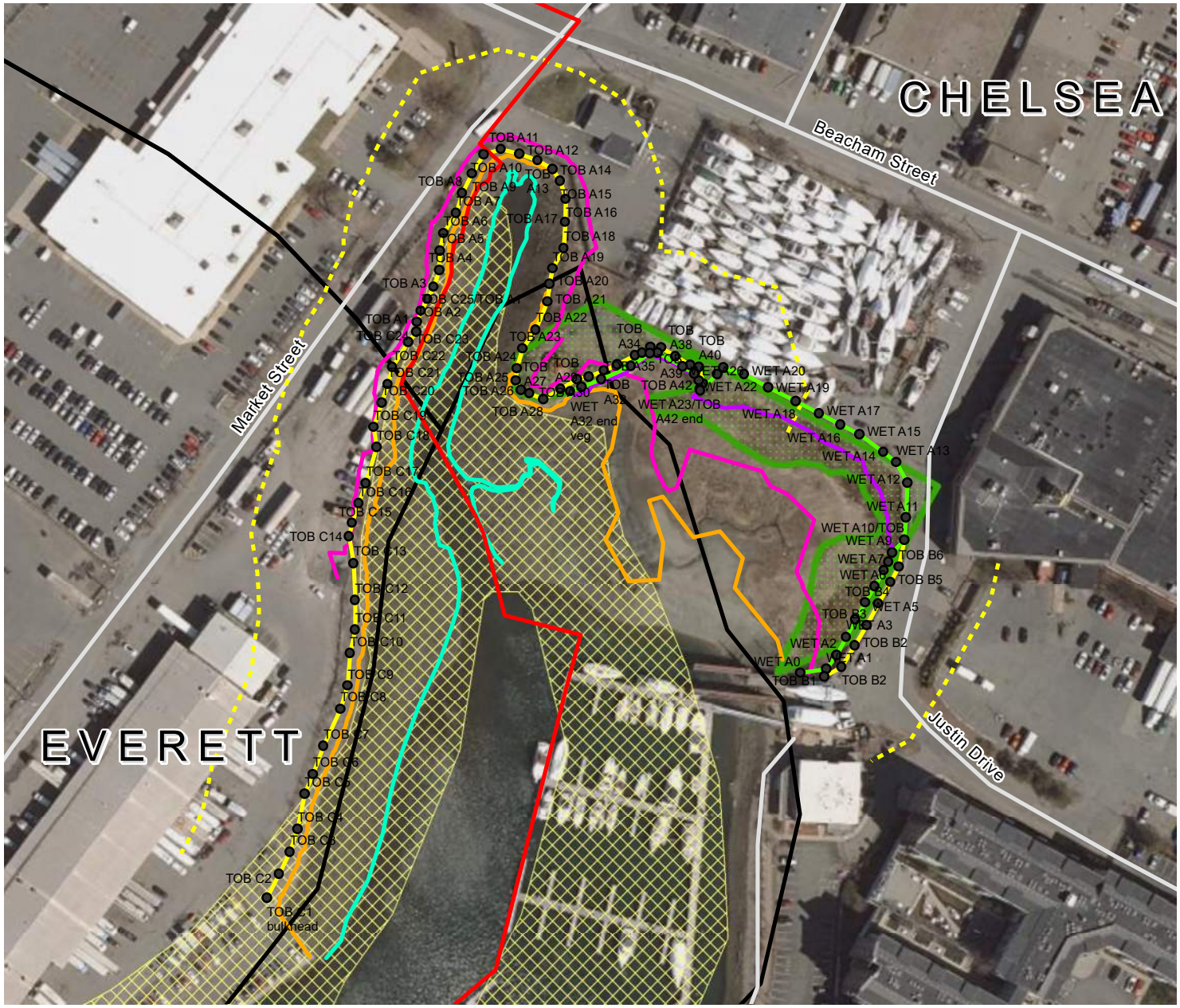
FIGURE 3

ISLAND END RIVER
CHELSEA MA

FEMA MAP

Weston & Sampson

Path: \\wse03.local\WSE\Projects\MA\Chelsea MA\MVP Action Grant - Coastal Barrier\Task 5 Permits\Wetland Delineation\2023 Delineation_Update\GIS\Maps\Environmental Receptor.mxd **User:** Herrick.Devin **Saved:** 9/27/2023 10:20:48 PM **Opened:** 9/27/2023 10:21:07 PM



Legend

- Wetland Flags
- Mystic River Designated Port Area
- Salt Marsh
- Approx Highest High Tide Line
- Approx 100 Foot Buffer to Coastal Bank
- Approx Coastal Bank
- Approx Coastal Beach Tidal Flats
- Approx Land Under Ocean
- Approx 25 Foot Riverfront Area
- MassDOT Roads
- MA Towns

Shellfish Suitability Areas

HABITAT

- American Oyster
- Blue Mussel
- Bay Scallop
- European Oyster
- Ocean Quahog
- Quahog
- Razor Clam
- Surf Clam
- Sea Scallop
- Soft-Shelled Clam
- ACECs
- NHESP Estimated Habitats of Rare Wildlife
- NHESP Priority Habitats of Rare Species
- NHESP Certified Vernal Pools
- NHESP Potential Vernal Pools
- Public Water Supply Contributor
- ORW for ACEC
- ORW for both Water Supply and Other
- Article 97 Land

N W E S

200 100 0 200 Feet

Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

FIGURE 4
ISLAND END RIVER
CHELSEA MA

ENVIRONMENTAL RESOURCES MAP

Weston & Sampson

APPENDIX A

ACOE Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Justin Drive City/County: Chelsea Sampling Date: 5/2/2022

Applicant/Owner: City of Chelsea State: MA Sampling Point: WET A WET

Investigator(s): Devin Herrick, CWS Section, Township, Range:

Landform (hillside, terrace, etc.): Local relief (concave, convex, none): Slope (%): 0-3

Subregion (LRR or MLRA): LRR R Lat: 42°23'36.97"N Long: 71° 2'53.91"W Datum:

Soil Map Unit Name: Urban land, wet substratum NWI classification: E2EM5

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil X , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation X , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
Upland composed of commerical property and roadway.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- X Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes X	No	Depth (inches): 6
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 2

Wetland Hydrology Present? **Yes** X **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Bordering vegetated wetland adjacent to salt marsh.

VEGETATION – Use scientific names of plants.

Sampling Point: WET A WET

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft radius)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size: 5 ft radius)			
1. *Phragmites*	75	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	75 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	75	x 2 =	150
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	75 (A)		150 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Bordering vegetated wetland adjacent to salt marsh. Invasive species prevalence.

SOIL

Sampling Point: WET A WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	2.5Y 2.5/1	100					Mucky Sand	With fill debris
4-12	2.5Y 4/1	95	2.5Y 5/6	5	C	M	Mucky Sand	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- X Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- X Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ? Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Bordering vegetated wetland adjacent to salt marsh. Fill material present in soil profile.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Justin Drive City/County: Chelsea Sampling Date: 5/2/2022

Applicant/Owner: City of Chelsea State: MA Sampling Point: WET A UP

Investigator(s): Devin Herrick, CWS Section, Township, Range:

Landform (hillside, terrace, etc.): Local relief (concave, convex, none): Slope (%): 0-3

Subregion (LRR or MLRA): LRR R Lat: 42°23'36.97"N Long: 71° 2'53.91"W Datum:

Soil Map Unit Name: Urban land, wet substratum NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area**	
Hydric Soil Present?	Yes	No X	**within a Wetland?**	**Yes** **No** X
Wetland Hydrology Present?	Yes	No X	If yes, optional Wetland Site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)
Upland composed of commerical property and roadway.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? **Yes** **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Upland composed of commerical property and roadway. No evidence of hydology on the surface.

VEGETATION – Use scientific names of plants.

Sampling Point: WET A UP

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft radius)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size: 5 ft radius)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	=Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Upland composed of commerical property and roadway. No vegetation present.

SOIL

Sampling Point: WET A UP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Pavement

Depth (inches): 0

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Upland composed of commerical property and roadway. Pavement prevents soil access.

APPENDIX B

Site Photographs

Photo 1: Public Boardwalk

Photo 2: Island End River Culverts

Photo 3: Island End River Facing South

Photo 4: Salt Marsh

Photo 5: Adjacent Commercial Property

Photo 6: Hydric Soils Observed Within BVW

Attachment G

SEDIMENT SAMPLING PLAN

DESIGNATED PORT AREA

DISPOSAL CHARACTERIZATION CELL #3 – 400 CY SEE NOTE 3

MEAN LOW WATER LINE/LAND UNDER OCEAN EL. –5.16'

WATER LINE OBSERVED IN 2019 SURVEY

LIMIT OF DREDGING; MATCH EXISTING AT APPROX. ELEVATION 2.0 AT BANK SIDES

HIGHEST HIGH TIDE LINE EL. 6.5

NAD83

CORNER OF SLAB BOTTOM EL. –14. BEGIN RIP RAP APRON AT ELEVATION –13.0. SLOPE UP TO SIDE OF BANK AND RIVER MOUTH

MEAN HIGH WATER (EL 4.33)

LIMIT OF DREDGING; MATCH EXISTING AT APPROX. ELEVATION 2.0 AT BANK SIDES

DISPOSAL CHARACTERIZATION CELL #2 – 290 CY

CORNER OF SLAB BOTTOM EL. –14. BEGIN RIP RAP APRON AT ELEVATION –13.0. SLOPE UP TO SIDE OF BANK AND RIVER MOUTH

DISPOSAL CHARACTERIZATION CELL #1 – 405 CY

COASTAL BANK

25–FT RIVERFRONT AREA

DESIGNATED PORT AREA

MEAN LOW WATER LINE/LAND UNDER OCEAN EL. –5.16'

BORDERING VEGETATED WETLAND

HIGHEST HIGH TIDE LINE/SALT MARSH (EL 6.5)

100–FT BUFFER TO COASTAL BEACH/TIDAL FLAT

COASTAL BEACH/TIDAL FLAT

MEAN HIGH WATER (EL 4.33)

DISPOSAL CHARACTERIZATION CELL #4 – 75 CY SEE NOTE 4

STA-6 STA-7 STA-8 STA-9 STA-10 STA-11 STA-12 STA-13 STA-14 STA-15 STA-16 STA-17 STA-18 STA-19 STA-20

KEY MAP
SCALE: 1" = 200'

LEGEND:

- MEAN LOW WATER LINE/LAND UNDER OCEAN EL. -5.16'
- BORDERING WETLANDS VEGETATION
- MEAN HIGH WATER EL. 4.33'
- COASTAL BEACH/TIDAL FLATS
- 25-FT RIVERFRONT AREA
- COASTAL BANK
- DESIGNATED PORT AREA
- 100-FT BUFFER TO SALT MARSH/BVW
- 100-FT BUFFER TO COASTAL BEACH/TIDAL FLAT
- 100-FT BUFFER TO COASTAL BANK
- PROJECT LIMITS
- 100-YR FLOOD PLAIN
- HIGHEST HIGH TIDE LINE EL. 6.5'
- SALT MARSH/BVW
- APPROX. MHHW EL. 4.77'
- LIVING SHORELINE
- CHAP. 91 JURISDICTIONAL LIMIT
- SHELLFISH SUITABILITY AREA
- GRAB SAMPLE LOCATION COLLECTED USING VIBROCORE
- GRAB SAMPLE LOCATION COLLECTED USING HAND AUGER
- DISPOSAL CHARACTERIZATION CELL BOUNDARY

NOTES:

1. ALL ELEVATIONS ARE IN NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
2. APPROXIMATE TOTAL DREDGING VOLUME OF 1,095 CY.
3. NO SAMPLES COLLECTED DUE TO REFUSAL (RIPRAP/CONCRETE).
4. CELL #4 SUPPLEMENTED WITH 3 HAND AUGER SMAPLES TO APPROX. 3-FT BELOW GRADE FOR 5 TOTAL LOCATIONS.

Weston & Sampson

FIGURE 1
ISLAND END RIVER FLOOD RESILIENCE PROVISIONS EAST
CHELSEA, MASSACHUSETTS
SEDIMENT SAMPLING LOCATIONS
SCALE: 1"=40'

0 40 80

P:\MA\Everett\Island End River Area\CAD\60% DESIGN\PLOT\04 - Resource Limits Impact Plan COLOR and Impact Polygons - ENV Report.dwg

Rev: 1.7 Date: 08/12/2019

Table 1
Summary of Sediment Analytical Results
Island End River
Chelsea, Massachusetts

Analytes	Units	Reportable Concentrations	COMM-94-007 Maximum Allowable Contaminant Levels for Sediment Reuse and Disposal at Massachusetts Landfills	COMM97-001 Reuse and Disposal of Contaminanted Soil at Massachusetts Landfills		Toxicity Characteristic Leaching Procedure (TCLP)	Sampling ID and Date		
		RCS-1	Lined Landfill	Lined Landfill	Unlined Landfill	20x Rule	Disp Cell 1 10/24/23	Disp Cell 2 10/24/23	Disp Cell 4 10/24/23
Volatile Organic Compounds (VOCs)									
Acetone	mg/Kg	6	~	~	~	~	<9.9	<11	<9.8
tert-Amyl Methyl Ether (TAME)	mg/Kg	~	~	~	~	~	<0.099	<0.11	<0.098
Benzene	mg/Kg	2	~	~	~	10	<0.20	<0.22	<0.20
Bromobenzene	mg/Kg	100	~	~	~	~	<0.20	<0.22	<0.20
Bromochloromethane	mg/Kg	~	~	~	~	~	<0.20	<0.22	<0.20
Bromodichloromethane	mg/Kg	0	~	~	~	~	<0.20	<0.22	<0.20
Bromoform	mg/Kg	0	~	~	~	~	<0.20	<0.22	<0.20
Bromomethane	mg/Kg	1	~	~	~	~	<0.39	<0.45	<0.39
2-Butanone (MEK)	mg/Kg	4	~	~	~	4,000	<3.9	<4.5	<3.9
n-Butylbenzene	mg/Kg	~	~	~	~	~	<0.20	<0.22	<0.20
sec-Butylbenzene	mg/Kg	~	~	~	~	~	<0.20	<0.22	<0.20
tert-Butylbenzene	mg/Kg	100	~	~	~	~	<0.20	<0.22	<0.20
tert-Butyl Ethyl Ether (TBEE)	mg/Kg	~	~	~	~	~	<0.099	<0.11	<0.098
Carbon Disulfide	mg/Kg	100	~	~	~	~	<2.0	<2.2	<2.0
Carbon Tetrachloride	mg/Kg	5	~	~	~	10	<0.20	<0.22	<0.20
Chlorobenzene	mg/Kg	1	~	~	~	2,000	<0.20	<0.22	<0.20
Chlorodibromomethane	mg/Kg	0	~	~	~	~	<0.099	<0.11	<0.098
Chloroethane	mg/Kg	100	~	~	~	~	<0.39	<0.45	<0.39
Chloroform	mg/Kg	0	~	~	~	120	<0.39	<0.45	<0.39
Chloromethane	mg/Kg	100	~	~	~	~	<0.39	<0.45	<0.39
2-Chlorotoluene	mg/Kg	100	~	~	~	~	<0.20	<0.22	<0.20
4-Chlorotoluene	mg/Kg	100	~	~	~	~	<0.20	<0.22	<0.20
1,2-Dibromo-3-chloropropane (DBCP)	mg/Kg	10	~	~	~	~	<0.79	<0.89	<0.79
1,2-Dibromoethane (EDB)	mg/Kg	0	~	~	~	~	<0.099	<0.11	<0.098
Dibromomethane	mg/Kg	500	~	~	~	~	<0.20	<0.22	<0.20
1,2-Dichlorobenzene	mg/Kg	9	~	~	~	~	<0.20	<0.22	<0.20
1,3-Dichlorobenzene	mg/Kg	3	~	~	~	~	<0.20	<0.22	<0.20
1,4-Dichlorobenzene	mg/Kg	1	~	~	~	150	<0.20	<0.22	<0.20
Dichlorodifluoromethane (Freon 12)	mg/Kg	1,000	~	~	~	~	<0.39	<0.45	<0.39
1,1-Dichloroethane	mg/Kg	0	~	~	~	~	<0.20	<0.22	<0.20
1,2-Dichloroethane	mg/Kg	0	~	~	~	10	<0.20	<0.22	<0.20
1,1-Dichloroethylene	mg/Kg	3	~	~	~	14	<0.20	<0.22	<0.20
cis-1,2-Dichloroethylene	mg/Kg	0	~	~	~	~	<0.20	<0.22	<0.20
trans-1,2-Dichloroethylene	mg/Kg	1	~	~	~	~	<0.20	<0.22	<0.20
1,2-Dichloropropane	mg/Kg	0	~	~	~	~	<0.20	<0.22	<0.20
1,3-Dichloropropane	mg/Kg	500	~	~	~	~	<0.099	<0.11	<0.098
2,2-Dichloropropane	mg/Kg	0	~	~	~	~	<0.20	<0.22	<0.20
1,1-Dichloropropene	mg/Kg	0	~	~	~	~	<0.39	<0.45	<0.39
cis-1,3-Dichloropropene	mg/Kg	0	~	~	~	~	<0.099	<0.11	<0.098
trans-1,3-Dichloropropene	mg/Kg	0	~	~	~	~	<0.099	<0.11	<0.098
Diethyl Ether	mg/Kg	100	~	~	~	~	<0.39	<0.45	<0.39
Diisopropyl Ether (DIPE)	mg/Kg	100	~	~	~	~	<0.099	<0.11	<0.098
1,4-Dioxane	mg/Kg	0	~	~	~	~	<9.9	<11	<9.8
Ethylbenzene	mg/Kg	40	~	~	~	~	<0.20	<0.22	<0.20
Hexachlorobutadiene	mg/Kg	30	~	~	~	~	<0.20	<0.22	<0.20
2-Hexanone (MBK)	mg/Kg	100	~	~	~	~	<2.0	<2.2	<2.0
Isopropylbenzene (Cumene)	mg/Kg	1,000	~	~	~	~	<0.20	<0.22	<0.20
p-Isopropyltoluene (p-Cymene)	mg/Kg	100	~	~	~	~	<0.20	<0.22	<0.20
Methyl tert-Butyl Ether (MTBE)	mg/Kg	0	~	~	~	~	<0.20	<0.22	<0.20
Methylene Chloride	mg/Kg	0	~	~	~	~	<0.99	<1.1	<0.98
4-Methyl-2-pentanone (MIBK)	mg/Kg	0	~	~	~	~	<2.0	<2.2	<2.0
Naphthalene	mg/Kg	4	~	~	~	~	<0.39	<0.45	<0.39
n-Propylbenzene	mg/Kg	100	~	~	~	~	<0.20	<0.22	<0.20
Styrene	mg/Kg	3	~	~	~	~	<0.20	<0.22	<0.20
1,1,1,2-Tetrachloroethane	mg/Kg	0	~	~	~	~	<0.20	<0.22	<0.20
1,1,2,2-Tetrachloroethane	mg/Kg	0	~	~	~	~	<0.099	<0.11	<0.098
Tetrachloroethylene	mg/Kg	1	~	~	~	14	<0.20	<0.22	<0.20
Tetrahydrofuran	mg/Kg	500	~	~	~	~	<0.79	<0.89	<0.79
Toluene	mg/Kg	30	~	~	~	~	<0.20	<0.22	<0.20
1,2,3-Trichlorobenzene	mg/Kg	~	~	~	~	~	<0.79	<0.89	<0.79
1,2,4-Trichlorobenzene	mg/Kg	2	~	~	~	~	<0.20	<0.22	<0.20
1,1,1-Trichloroethane	mg/Kg	30	~	~	~	~	<0.20	<0.22	<0.20
1,1,2-Trichloroethane	mg/Kg	0	~	~	~	~	<0.20	<0.22	<0.20
Trichloroethylene	mg/Kg	0	~	~	~	10	<0.20	<0.22	<0.20
Trichlorofluoromethane (Freon 11)	mg/Kg	1,000	~	~	~	~	<0.39	<0.45	<0.39
1,2,3-Trichloropropane	mg/Kg	100	~	~	~	~	<0.39	<0.45	<0.39
1,2,4-Trimethylbenzene	mg/Kg	1,000	~	~	~	~	<0.20	<0.22	<0.20
1,3,5-Trimethylbenzene	mg/Kg	10	~	~	~	~	<0.20	<0.22	<0.20
Vinyl Chloride	mg/Kg	1	~	~	~	4	<0.39	<0.45	<0.39
m+p Xylene	mg/Kg	~	~	~	~	~	<0.39	<0.45	<0.39
o-Xylene	mg/Kg	~	~	~	~	~	<0.20	<0.22	<0.20
Total Xylenes	mg/Kg	100	~	~	~	~	ND	ND	ND
Total VOCs	mg/Kg	~	10	10	4	~	ND	ND	ND
Total Petroleum Hydrocarbons (TPH)									
TPH (C9-C36)	mg/Kg	1,000	5,000	5,000	2,500	~	**14,000**	**7,600**	**22,000**
Extractable Petroleum Hydrocarbons (EPH)									
C9-C18 Aliphatics	mg/Kg	1,000	~	~	~		**3,900**	**2,000**	**7,500**
C19-C36 Aliphatics	mg/Kg	3,000	~	~	~		**4,500**	**3,600**	**12,000**
C11-C22 Aromatics	mg/Kg	1,000	~	~	~		**3,800**	**2,600**	**7,900**
Acenaphthene	mg/Kg	4	~	~	~		**5.8**	**1.2**	**18**
Acenaphthylene	mg/Kg	1	~	~	~		**1.1**	**0.84**	**2.3**
Anthracene	mg/Kg	1,000	~	~	~		**23**	**3.8**	**49**
Benzo(a)anthracene	mg/Kg	7	~	~	~		**52**	**11**	**35**
Benzo(a)pyrene	mg/Kg	2	~	~	~		**48**	**13**	**25**
Benzo(b)fluoranthene	mg/Kg	7	~	~	~		**57**	**16**	**36**
Benzo(g,h,i)perylene	mg/Kg	1,000	~	~	~		**23**	**6.4**	**15**
Benzo(k)fluoranthene	mg/Kg	70	~	~	~		**22**	**6.1**	**15**
Chrysene	mg/Kg	70	~	~	~		**54**	**11**	**43**
Dibenz(a,h)anthracene	mg/Kg	1	~	~	~		**7.7**	**1.9**	**4.9**
Fluoranthene	mg/Kg	1,000	~	~	~		**100**	**15**	**120**
Fluorene	mg/Kg	1,000	~	~	~		**1.5**	<0.13	**50**
Indeno(1,2,3-cd)pyrene	mg/Kg	7	~	~	~		**24**	**7.0**	**15**
2-Methylnaphthalene	mg/Kg	1	~	~	~		**1.3**	**1.0**	**3.0**
Naphthalene	mg/Kg	4	~	~	~		**4.2**	**2.5**	**12**
Phenanthrene	mg/Kg	10	~	~	~		**36**	**5.3**	**75**
Pyrene	mg/Kg	1,000	~	~	~		**92**	**29**	**95**
Total PAHs	mg/Kg	~	100	~	~		**552.60**	**131.04**	**613.20**
Total PAHs	%	~	~	~	~		**0.5526%**	**0.1310%**	**0.6132%**
Total Metals									
Arsenic	mg/Kg	20	40	40	40	100	**12**	**8.2**	**8.3**
Barium	mg/Kg	1,000	~	~	~	2,000	**190**	**330**	**71**
Cadmium	mg/Kg	70	80	80	30	20	**2.6**	**3.0**	**0.95**
Chromium	mg/Kg	100	1,000	1,000	1,000	100	**82**	**85**	**33**
Copper	mg/Kg	1,000	~	~	~	~	**320**	**420**	**100**
Lead	mg/Kg	200	2,000	2,000	1,000	100	**690**	**800**	**290**
Mercury	mg/Kg	20	10	10	10	4	**0.41**	**0.57**	**0.65**
Selenium	mg/Kg	400	~	~	~	20	<1.5	<1.4	<1.1
Silver	mg/Kg	100	~	~	~	100	<0.30	**0.53**	<0.23
Zinc	mg/Kg	1,000	~	~	~	~	**530**	**780**	**190**

Table 1
Summary of Sediment Analytical Results
Island End River
Chelsea, Massachusetts

Analytes	Units	Reportable Concentrations	COMM-94-007 Maximum Allowable Contaminant Levels for Sediment Reuse and Disposal at Massachusetts Landfills	COMM97-001 Reuse and Disposal of Contaminanted Soil at Massachusetts Landfills		Toxicity Characteristic Leaching Procedure (TCLP)	Sampling ID and Date		
		RCS-1	Lined Landfill	Lined Landfill	Unlined Landfill	20x Rule	Disp Cell 1 10/24/23	Disp Cell 2 10/24/23	Disp Cell 4 10/24/23
Semi-volatile Organic Compounds (SVOCs)									
Biphenyl	mg/Kg	0	~	~	~	~	**0.49**	<0.19	**1.5**
Acenaphthene	mg/Kg	4	~	~	~	~	**1.9**	**0.42**	**5.7**
Acenaphthylene	mg/Kg	1	~	~	~	~	**2.9**	**1.4**	**6.0**
Acetophenone	mg/Kg	1,000	~	~	~	~	<0.26	<0.24	<0.20
Aniline	mg/Kg	1,000	~	~	~	~	<0.23	<0.21	<0.17
Anthracene	mg/Kg	1,000	~	~	~	~	**8.6**	**2.4**	**19**
Benzo(a)anthracene	mg/Kg	7	~	~	~	~	**15**	**6.8**	**23**
Benzo(a)pyrene	mg/Kg	2	~	~	~	~	**14**	**7.5**	**18**
Benzo(b)fluoranthene	mg/Kg	7	~	~	~	~	**18**	**10**	**29**
Benzo(g,h,i)perylene	mg/Kg	1,000	~	~	~	~	**9.0**	**4.6**	**10**
Benzo(k)fluoranthene	mg/Kg	70	~	~	~	~	**6.5**	**3.7**	**11**
Bis(2-chloroethoxy)methane	mg/Kg	500	~	~	~	~	<0.26	<0.24	<0.20
Bis(2-chloroethyl)ether	mg/Kg	1	~	~	~	~	<0.28	<0.25	<0.21
Bis(2-chloroisopropyl)ether	mg/Kg	1	~	~	~	~	<0.56	<0.51	<0.43
Bis(2-Ethylhexyl)phthalate	mg/Kg	90	~	~	~	~	**28**	**21**	**39**
4-Bromophenylphenylether	mg/Kg	100	~	~	~	~	<0.28	<0.25	<0.21
Butylbenzylphthalate	mg/Kg	100	~	~	~	~	<0.25	**0.27**	**1.4**
4-Chloroaniline	mg/Kg	1	~	~	~	~	<0.24	<0.21	<0.18
2-Chloronaphthalene	mg/Kg	1,000	~	~	~	~	<0.24	<0.21	<0.18
2-Chlorophenol	mg/Kg	1	~	~	~	~	<0.27	<0.24	<0.20
Chrysene	mg/Kg	70	~	~	~	~	**12**	**5.7**	**25**
Dibenz(a,h)anthracene	mg/Kg	1	~	~	~	~	**2.4**	**1.3**	**2.8**
Dibenzofuran	mg/Kg	100	~	~	~	~	**1.9**	**0.49**	**7.4**
Di-n-butylphthalate	mg/Kg	50	~	~	~	~	<0.24	<0.22	<0.18
1,2-Dichlorobenzene	mg/Kg	9	~	~	~	~	<0.25	<0.23	<0.19
1,3-Dichlorobenzene	mg/Kg	3	~	~	~	~	<0.25	<0.22	<0.19
1,4-Dichlorobenzene	mg/Kg	1	~	~	~	~	<0.25	<0.23	<0.19
3,3-Dichlorobenzidine	mg/Kg	3	~	~	~	~	<0.18	<0.16	<0.13
2,4-Dichlorophenol	mg/Kg	1	~	~	~	~	<0.26	<0.23	<0.20
Diethylphthalate	mg/Kg	10	~	~	~	~	<0.26	<0.23	<0.20
2,4-Dimethylphenol	mg/Kg	1	~	~	~	~	<0.35	<0.31	**0.27**
Dimethylphthalate	mg/Kg	1	~	~	~	~	<0.27	<0.25	<0.21
2,4-Dinitrophenol	mg/Kg	3	~	~	~	~	<1.2	<1.1	<0.89
2,4-Dinitrotoluene	mg/Kg	1	~	~	~	2.6	<0.27	<0.24	<0.20
2,6-Dinitrotoluene	mg/Kg	100	~	~	~	~	<0.30	<0.27	<0.23
Di-n-octylphthalate	mg/Kg	1,000	~	~	~	~	**0.88**	**0.40**	**1.6**
1,2-Diphenylhydrazine (Azobenzene)	mg/Kg	50	~	~	~	~	<0.26	<0.23	<0.20
Fluoranthene	mg/Kg	1,000	~	~	~	~	**42**	**10**	**82**
Fluorene	mg/Kg	1,000	~	~	~	~	**2.5**	**0.56**	**7.7**
Hexachlorobenzene	mg/Kg	1	~	~	~	2.6	<0.28	<0.25	<0.21
Hexachlorobutadiene	mg/Kg	30	~	~	~	10	<0.27	<0.24	<0.20
Hexachloroethane	mg/Kg	1	~	~	~	60	<0.26	<0.24	<0.20
Indeno(1,2,3-cd)pyrene	mg/Kg	7	~	~	~	~	**9.8**	**5.2**	**17**
Isophorone	mg/Kg	100	~	~	~	~	<0.27	<0.25	<0.21
2-Methylnaphthalene	mg/Kg	1	~	~	~	~	**1.3**	**0.56**	**3.1**
2-Methylphenol (O-Cresol)	mg/Kg	500	~	~	~	4,000	<0.27	<0.24	<0.20
3/4-Methylphenol (M/P-Cresol)	mg/Kg	500	~	~	~	4,000	<0.29	<0.26	**0.24**
Naphthalene	mg/Kg	4	~	~	~	~	**3.9**	**1.6**	**8.7**
Nitrobenzene	mg/Kg	500	~	~	~	40	<0.29	<0.26	<0.22
2-Nitrophenol	mg/Kg	100	~	~	~	~	<0.28	<0.25	<0.21
4-Nitrophenol	mg/Kg	100	~	~	~	~	<0.56	<0.50	<0.42
Pentachlorophenol	mg/Kg	3	~	~	~	2,000	<0.60	<0.54	<0.46
Phenanthrene	mg/Kg	10	~	~	~	~	**9.8**	**3.8**	**37**
Phenol	mg/Kg	1	~	~	~	~	<0.31	<0.28	<0.24
Pyrene	mg/Kg	1,000	~	~	~	~	**44**	**18**	**69**
Pyridine	mg/Kg	500	~	~	~	100	<0.21	<0.19	<0.16
1,2,4-Trichlorobenzene	mg/Kg	2	~	~	~	~	<0.26	<0.23	<0.20
2,4,5-Trichlorophenol	mg/Kg	4	~	~	~	8,000	<0.26	<0.23	<0.20
2,4,6-Trichlorophenol	mg/Kg	1	~	~	~	40	<0.25	<0.23	<0.19
Total SVOCs	mg/Kg	~	~	100	100	~	**234.87**	**105.70**	**425.41**
Total PAHs	mg/Kg	~	100	~	~	~	**203.60**	**83.54**	**374.00**
Total PAHs	%	~	~	~	~	~	**0.2036%**	**0.0835%**	**0.3740%**
Polychlorinated Biphenyl (PCB) Congeners									
Cl1-BZ#1	µg/Kg	~	~	~	~	~	<4.5	<4.3	<3.5
Cl1-BZ#2	µg/Kg	~	~	~	~	~	<3.6	<3.4	<2.8
Cl1-BZ#3	µg/Kg	~	~	~	~	~	<3.7	**28**	<2.9
Cl2-BZ#4/#10	µg/Kg	~	~	~	~	~	<5.9	**25**	<4.5
Cl2-BZ#9	µg/Kg	~	~	~	~	~	<9.4	**38**	<7.2
Cl2-BZ#7	µg/Kg	~	~	~	~	~	<4.0	<3.7	<3.0
Cl2-BZ#6	µg/Kg	~	~	~	~	~	<3.8	**19**	<2.9
Cl2-BZ#5	µg/Kg	~	~	~	~	~	<4.0	<3.8	<3.1
Cl2-BZ#8	µg/Kg	~	~	~	~	~	**96**	**75**	<3.7
Cl3-BZ#19	µg/Kg	~	~	~	~	~	<4.1	<3.8	<3.1
Cl2-BZ#14	µg/Kg	~	~	~	~	~	<3.5	**13**	<2.7
Cl3-BZ#30	µg/Kg	~	~	~	~	~	<3.3	<3.1	<2.6
Cl3-BZ#18	µg/Kg	~	~	~	~	~	**160**	**140**	<3.8
Cl2-BZ#11	µg/Kg	~	~	~	~	~	<8.6	<8.0	<6.5
Cl3-BZ#17	µg/Kg	~	~	~	~	~	**67**	**55**	<3.3
Cl2-BZ#12	µg/Kg	~	~	~	~	~	<2.7	<2.6	<2.1
Cl3-BZ#27	µg/Kg	~	~	~	~	~	<3.5	<3.3	<2.7
Cl2-BZ#13	µg/Kg	~	~	~	~	~	<2.9	<2.7	<2.2
Cl3-BZ#24	µg/Kg	~	~	~	~	~	<3.3	<3.1	<2.5
Cl3-BZ#16	µg/Kg	~	~	~	~	~	<4.0	**59**	<3.0
Cl3-BZ#32	µg/Kg	~	~	~	~	~	<3.0	**36**	<2.3
Cl2-BZ#15	µg/Kg	~	~	~	~	~	<3.8	**47**	<2.9
Cl3-BZ#34	µg/Kg	~	~	~	~	~	<3.5	<3.3	<2.7
Cl4-BZ#54	µg/Kg	~	~	~	~	~	<5.5	<5.2	<4.2
Cl3-BZ#23	µg/Kg	~	~	~	~	~	<2.8	<2.6	<2.1
Cl3-BZ#29	µg/Kg	~	~	~	~	~	<3.1	<2.9	<2.4
Cl4-BZ#50	µg/Kg	~	~	~	~	~	<5.6	<5.3	<4.3
Cl3-BZ#26	µg/Kg	~	~	~	~	~	<4.4	<4.2	<3.4
Cl3-BZ#25	µg/Kg	~	~	~	~	~	<3.2	<3.0	<2.5
Cl4-BZ#53	µg/Kg	~	~	~	~	~	**29**	**29**	<4.5
Cl3-BZ#31	µg/Kg	~	~	~	~	~	**160**	**130**	<3.8
Cl3-BZ#28	µg/Kg	~	~	~	~	~	**160**	**160**	<3.7
Cl3-BZ#33/#21/#20	µg/Kg	~	~	~	~	~	<11	**66**	<8.7
Cl4-BZ#51	µg/Kg	~	~	~	~	~	<5.9	**8**	<4.5
Cl4-BZ#45	µg/Kg	~	~	~	~	~	<5.3	**25**	<4.0
Cl3-BZ#22	µg/Kg	~	~	~	~	~	**75**	**59**	<2.8
Cl4-BZ#46	µg/Kg	~	~	~	~	~	**35**	**25**	<4.7
Cl4-BZ#73	µg/Kg	~	~	~	~	~	<4.7	<4.4	<3.6
Cl4-BZ#69	µg/Kg	~	~	~	~	~	<6.0	<5.6	<4.6
Cl4-BZ#43	µg/Kg	~	~	~	~	~	<6.8	**28**	<5.2
Cl3-BZ#36	µg/Kg	~	~	~	~	~	<3.4	<3.2	<2.6
Cl4-BZ#52	µg/Kg	~	~	~	~	~	**210**	**240**	<5.1
Cl4-BZ#48	µg/Kg	~	~	~	~	~	**34**	**26**	<4.4
Cl4-BZ#49	µg/Kg	~	~	~	~	~	**110**	**110**	<4.3
Cl5-BZ#104	µg/Kg	~	~	~	~	~	<4.5	<4.3	<3.5
Cl4-BZ#47/#65/#62	µg/Kg	~	~	~	~	~	**35**	**37**	<13
Cl4-BZ#75	µg/Kg	~	~	~	~	~	<5.3	7.6	<4.1
Cl3-BZ#39	µg/Kg	~	~	~	~	~	<3.6	<3.4	<2.8
Cl3-BZ#38	µg/Kg	~	~	~	~	~	<5.1	<4.8	<3.9
Cl4-BZ#44	µg/Kg	~	~	~	~	~	**150**	**150**	<4.6
Cl4-BZ#59	µg/Kg	~	~	~	~	~	<5.6	<5.2	<4.3
Cl4-BZ#42	µg/Kg	~	~	~	~	~	**36**	**36**	<6.0
Cl4-BZ#71	µg/Kg	~	~	~	~	~	**33**	**33**	**170**
Cl3-BZ#35	µg/Kg	~	~	~	~	~	<3.1	<2.9	<2.3
Cl4-BZ#41	µg/Kg	~	~	~	~	~	**19**	**16**	<4.1
Cl5-BZ#96	µg/Kg	~	~	~	~	~	<5.6	<5.2	<4.3
Cl4-BZ#72	µg/Kg	~	~	~	~	~	<6.4	<6.0	<4.9
Cl5-BZ#103	µg/Kg	~	~	~	~	~	<5.9	<5.5	<4.5
Cl4-BZ#64	µg/Kg	~	~	~	~	~	**58**	**57**	<4.3
Cl4-BZ#40/#68	µg/Kg	~	~	~	~	~	<13	<13	<10
Cl3-BZ#37	µg/Kg	~	~	~	~	~	<18	<17	<14
Cl5-BZ#100	µg/Kg	~	~	~	~	~	<5.8	<5.5	<4.4
Cl5-BZ#94	µg/Kg	~	~	~	~	~	<5.4	<5.1	<4.1
Cl4-BZ#57	µg/Kg	~	~	~	~	~	<5.6	<5.2	<4.3
Cl4-BZ#67/#58	µg/Kg	~	~	~	~	~	<11	<11	<8.7
Cl5-BZ#102	µg/Kg	~	~	~	~	~	**5.4**	**9.9**	<3.9
Cl4-BZ#61	µg/Kg	~	~	~	~	~	<6.2	<5.8	<4.7
Cl5-BZ#98	µg/Kg	~	~	~	~	~	**13**	**14**	<4.2
Cl5-BZ#93	µg/Kg	~	~	~	~	~	<14	<13	<11
Cl4-BZ#76	µg/Kg	~	~	~	~	~	<6.3	<5.9	<4.8
Cl4-BZ#63	µg/Kg	~	~	~	~	~	<5.7	<5.4	<4.4
Cl5-BZ#88/#95	µg/Kg	~	~	~	~	~	**160**	**220**	<9.0
Cl5-BZ#121	µg/Kg	~	~	~	~	~	<5.0	<4.7	**68**
Cl4-BZ#74	µg/Kg	~	~	~	~	~	**45**	**51**	<4.9
Cl6-BZ#155	µg/Kg	~	~	~	~	~	<5.4	<5.1	<4.1
Cl4-BZ#70	µg/Kg	~	~	~	~	~	**92**	**130**	<4.8

Table 1
Summary of Sediment Analytical Results
Island End River
Chelsea, Massachusetts

Analytes	Units	Reportable Concentrations	COMM-94-007 Maximum Allowable Contaminant Levels for Sediment Reuse and Disposal at Massachusetts Landfills	COMM97-001 Reuse and Disposal of Contaminanted Soil at Massachusetts Landfills		Toxicity Characteristic Leaching Procedure (TCLP)	Sampling ID and Date		
		RCS-1	Lined Landfill	Lined Landfill	Unlined Landfill	20x Rule	Disp Cell 1 10/24/23	Disp Cell 2 10/24/23	Disp Cell 4 10/24/23
Polychlorinated Biphenyl (PCB) Congeners continued…									
Cl5-BZ#91	µg/Kg	~	~	~	~	~	**24**	**33**	<4.1
Cl4-BZ#66	µg/Kg	~	~	~	~	~	**70**	**100**	<4.8
Cl4-BZ#80/#55	µg/Kg	~	~	~	~	~	<10	<9.7	<7.9
Cl5-BZ#92	µg/Kg	~	~	~	~	~	**28**	**41**	<4.2
Cl5-BZ#89/#84	µg/Kg	~	~	~	~	~	**44**	**65**	**23**
Cl4-BZ#56	µg/Kg	~	~	~	~	~	**26**	**38**	<5.0
Cl5-BZ#90/#101	µg/Kg	~	~	~	~	~	**150**	**210**	<10
Cl5-BZ#113	µg/Kg	~	~	~	~	~	<4.8	<4.5	**99**
Cl4-BZ#60	µg/Kg	~	~	~	~	~	**13**	**20**	<4.1
Cl5-BZ#99	µg/Kg	~	~	~	~	~	**56**	**83**	**39**
Cl6-BZ#150	µg/Kg	~	~	~	~	~	<5.8	<5.5	<4.5
Cl6-BZ#152	µg/Kg	~	~	~	~	~	<5.3	<5.0	<4.1
Cl5-BZ#119/#83	µg/Kg	~	~	~	~	~	<11	<10	<8.3
Cl5-BZ#125/#112/#86	µg/Kg	~	~	~	~	~	<17	<16	<13
Cl5-BZ#109	µg/Kg	~	~	~	~	~	<5.7	<5.3	<4.3
Cl6-BZ#145	µg/Kg	~	~	~	~	~	<5.3	<4.9	<4.0
Cl5-BZ#97	µg/Kg	~	~	~	~	~	**50**	**71**	<4.5
Cl6-BZ#148	µg/Kg	~	~	~	~	~	<5.5	<5.2	<4.2
Cl4-BZ#79	µg/Kg	~	~	~	~	~	<5.4	<5.1	<4.2
Cl5-BZ#116	µg/Kg	~	~	~	~	~	<12	<11	<9.1
Cl5-BZ#87	µg/Kg	~	~	~	~	~	**73**	**100**	**55**
Cl4-BZ#78	µg/Kg	~	~	~	~	~	<5.6	<5.2	<4.3
Cl6-BZ#154/#136	µg/Kg	~	~	~	~	~	**22**	**30**	**13**
Cl5-BZ#111/#117/#115	µg/Kg	~	~	~	~	~	<16	<15	<12
Cl5-BZ#85	µg/Kg	~	~	~	~	~	**24**	**37**	<5.6
Cl5-BZ#120/#110	µg/Kg	~	~	~	~	~	**160**	**240**	**110**
Cl4-BZ#81	µg/Kg	~	~	~	~	~	<6.5	<6.1	<5.0
Cl6-BZ#151	µg/Kg	~	~	~	~	~	**29**	**42**	**17**
Cl6-BZ#135	µg/Kg	~	~	~	~	~	**17**	**22**	<5.0
Cl5-BZ#82	µg/Kg	~	~	~	~	~	**19**	**25**	<4.4
Cl6-BZ#144	µg/Kg	~	~	~	~	~	**8.1**	**11**	<4.6
Cl6-BZ#147/#149	µg/Kg	~	~	~	~	~	**110**	**150**	<9.3
Cl4-BZ#77	µg/Kg	~	~	~	~	~	<6.4	<6.0	<4.9
Cl6-BZ#143/#139	µg/Kg	~	~	~	~	~	<11	<11	<8.8
Cl6-BZ#140	µg/Kg	~	~	~	~	~	<5.2	<4.9	<4.0
Cl5-BZ#124	µg/Kg	~	~	~	~	~	<5.4	**9.8**	<4.1
Cl5-BZ#108	µg/Kg	~	~	~	~	~	<4.8	<4.5	<3.7
Cl5-BZ#123/#107	µg/Kg	~	~	~	~	~	<13	**14**	<10
Cl7-BZ#188	µg/Kg	~	~	~	~	~	<5.2	<4.9	<4.0
Cl6-BZ#134	µg/Kg	~	~	~	~	~	**10**	**14**	<4.5
Cl5-BZ#106	µg/Kg	~	~	~	~	~	<8.2	<7.7	<6.3
Cl6-BZ#142	µg/Kg	~	~	~	~	~	<5.6	<5.3	<4.3
Cl6-BZ#133/#131	µg/Kg	~	~	~	~	~	<13	<12	<9.9
Cl5-BZ#118	µg/Kg	~	~	~	~	~	**150**	**210**	**99**
Cl7-BZ#184	µg/Kg	~	~	~	~	~	<5.8	<5.4	<4.4
Cl6-BZ#165	µg/Kg	~	~	~	~	~	<6.1	<5.7	<4.6
Cl6-BZ#146	µg/Kg	~	~	~	~	~	**20**	**26**	**14**
Cl5-BZ#122	µg/Kg	~	~	~	~	~	<5.8	<5.4	<4.4
Cl6-BZ#161	µg/Kg	~	~	~	~	~	<6.5	<6.1	<5.0
Cl5-BZ#114	µg/Kg	~	~	~	~	~	<6.1	<5.7	<4.7
Cl6-BZ#168	µg/Kg	~	~	~	~	~	<5.9	<5.5	<4.5
Cl6-BZ#153	µg/Kg	~	~	~	~	~	**120**	**170**	**72**
Cl6-BZ#132	µg/Kg	~	~	~	~	~	**52**	**75**	**31**
Cl7-BZ#179	µg/Kg	~	~	~	~	~	**16**	**21**	<4.4
Cl6-BZ#141	µg/Kg	~	~	~	~	~	**28**	**39**	<5.7
Cl7-BZ#176	µg/Kg	~	~	~	~	~	<6.2	**6.9**	<4.7
Cl5-BZ#105	µg/Kg	~	~	~	~	~	**48**	**71**	<4.5
Cl6-BZ#137	µg/Kg	~	~	~	~	~	**10**	**13**	<4.6
Cl7-BZ#186	µg/Kg	~	~	~	~	~	<6.8	<6.4	<5.2
Cl5-BZ#127	µg/Kg	~	~	~	~	~	<5.8	<5.5	<4.5
Cl6-BZ#130/#164	µg/Kg	~	~	~	~	~	**20**	**30**	<10
Cl7-BZ#178	µg/Kg	~	~	~	~	~	**8.6**	**10**	<4.8
Cl6-BZ#138	µg/Kg	~	~	~	~	~	**120**	**160**	**81**
Cl6-BZ#160/#129/#163	µg/Kg	~	~	~	~	~	**30**	**44**	**25**
Cl6-BZ#158	µg/Kg	~	~	~	~	~	**19**	**23**	<4.9
Cl7-BZ#182/#175	µg/Kg	~	~	~	~	~	<12	<11	<8.8
Cl7-BZ#187	µg/Kg	~	~	~	~	~	**45**	**57**	**28**
Cl7-BZ#183	µg/Kg	~	~	~	~	~	**22**	**27**	**13**
Cl6-BZ#166	µg/Kg	~	~	~	~	~	<6.9	<6.4	<5.2
Cl6-BZ#159	µg/Kg	~	~	~	~	~	<7.0	<6.6	<5.4
Cl5-BZ#126	µg/Kg	~	~	~	~	~	<6.5	<6.1	<4.9
Cl7-BZ#185	µg/Kg	~	~	~	~	~	<7.6	<7.2	<5.8
Cl6-BZ#128/#162	µg/Kg	~	~	~	~	~	**27**	**37**	<11
Cl7-BZ#174	µg/Kg	~	~	~	~	~	**37**	**47**	**18**
Cl8-BZ#202	µg/Kg	~	~	~	~	~	<9.6	<9.0	<7.3
Cl6-BZ#167	µg/Kg	~	~	~	~	~	**7.5**	**10**	<5.4
Cl7-BZ#181	µg/Kg	~	~	~	~	~	<7.5	<7.0	<5.7
Cl7-BZ#177	µg/Kg	~	~	~	~	~	**19**	**28**	<5.4
Cl8-BZ#200/#204	µg/Kg	~	~	~	~	~	<19	<17	<14
Cl7-BZ#171	µg/Kg	~	~	~	~	~	**11**	**14**	<4.9
Cl7-BZ#173	µg/Kg	~	~	~	~	~	<7.5	<7.1	<5.8
Cl8-BZ#197	µg/Kg	~	~	~	~	~	<8.9	<8.4	<6.8
Cl7-BZ#172	µg/Kg	~	~	~	~	~	<32	<30	<24
Cl6-BZ#156	µg/Kg	~	~	~	~	~	**23**	**30**	<5.1
Cl7-BZ#192	µg/Kg	~	~	~	~	~	<25	<23	<19
Cl6-BZ#157	µg/Kg	~	~	~	~	~	<6.3	<5.9	<4.8
Cl7-BZ#180	µg/Kg	~	~	~	~	~	**88**	**110**	**54**
Cl7-BZ#193	µg/Kg	~	~	~	~	~	<6.9	<6.4	<5.2
Cl8-BZ#199	µg/Kg	~	~	~	~	~	<9.8	<9.2	<7.5
Cl7-BZ#191	µg/Kg	~	~	~	~	~	<6.2	<5.8	<4.7
Cl8-BZ#198	µg/Kg	~	~	~	~	~	<11	<10	<8.5
Cl8-BZ#201	µg/Kg	~	~	~	~	~	<12	<11	<8.9
Cl7-BZ#170	µg/Kg	~	~	~	~	~	**33**	**44**	<5.7
Cl7-BZ#190	µg/Kg	~	~	~	~	~	**8.2**	<6.7	<5.4
Cl8-BZ#196	µg/Kg	~	~	~	~	~	<11	<11	<8.7
Cl8-BZ#203	µg/Kg	~	~	~	~	~	<13	<12	<10
Cl6-BZ#169	µg/Kg	~	~	~	~	~	<7.3	<6.9	<5.6
Cl9-BZ#208	µg/Kg	~	~	~	~	~	<7.8	<7.3	<6.0
Cl9-BZ#207	µg/Kg	~	~	~	~	~	<5.3	<5.0	<4.1
Cl7-BZ#189	µg/Kg	~	~	~	~	~	<5.3	<4.9	<4.0
Cl8-BZ#195	µg/Kg	~	~	~	~	~	**130**	**120**	<5.9
Cl8-BZ#194	µg/Kg	~	~	~	~	~	**31**	**39**	<5.6
Cl8-BZ#205	µg/Kg	~	~	~	~	~	<6.5	<6.1	<5.0
Cl9-BZ#206	µg/Kg	~	~	~	~	~	<7.8	**21**	<5.9
Cl10-BZ#209	µg/Kg	~	~	~	~	~	<8.6	**11**	<6.6
Total PCBs	µg/Kg	1000	<2000	<2000	<2000	~	**3838.8**	**5052.2**	**1029.0**
General Chemistry Parameters									
% Solids	% Weight	~	~	~	~	~	**51**	**55**	**67**
Specific Conductance	µmhos/cm	~	~	8,000	4,000	~	**350**	**430**	**220**
Reactive Cyanide	mg/Kg	~	~	~	~	~	**92**	**83**	**43**
Reactive Sulfide	mg/Kg	~	~	~	~	~	**120**	**140**	**66**
Total Organic Carbon	mg/Kg	~	~	~	~	~	**150,000**	**100,000**	**92,000**
Ignitability	present/absent	~	~	~	~	~	Absent	Absent	Absent

QC by LMK 11.6.2023

Notes:
1. Analytical results are screened against Massachusetts Contingency Plan Reportable Concentrations S-1 (RCS-1) Standards for comparison purposes only; last revised in March 2020.
2. Analytical results are compared to Interim Policy for Sampling, Analysis, Handling and Tracking Requimrents for Dredged Sediment Reused or Disposed as Massachusetts Permitted Landfill (Interim Polcy # COMM-94-007) Maximum Allowable Contaminant Levels (last revised in for Sediment Reuse and Disposal at Lined Landfills; last revised in July 2000.
3. Analytical results are compared to Reuse and Disposal of Contaminated Soil at Massachusetts Landfills (Policy # COMM-97-001); last revised in August 1997.

<VALUE	= Analyte detected below laboratory detection limits.
VALUE	= Analyte detected equals or exceeds laboratory detection limits.
VALUE	= Analyte detected exceeds RCS-1 Standards.
VALUE	= Analyte detected exceeds RCS-1 Standards and TCLP 20x Rule.
VALUE	= Analyte detected exceeds COMM-94-007 Standards.
VALUE	= Analyte detected exceeds RCS-1, COMM-94-007, and COMM-97-001 Standards.

Abbreviations:
µmhos/cm = microSiemens per centimeter
mg/Kg = milligrams per kilogram

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

November 6, 2023

Lee Koska
Weston & Sampson Engineers MA
55 Walkers Brook Drive
Reading, MA 01867

Project Location: Chelsea, MA
Client Job Number:
Project Number: ENG23-0300
Laboratory Work Order Number: 23J3373

Enclosed are results of analyses for samples as received by the laboratory on October 25, 2023. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

DRAFT REPORT
Project Manager

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Weston & Sampson Engineers MA
55 Walkers Brook Drive
Reading, MA 01867
ATTN: Lee Koska

REPORT DATE: 11/6/2023

PURCHASE ORDER NUMBER:

PROJECT NUMBER: ENG23-0300

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 23J3373

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: Chelsea, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
Disp Cell 1	23J3373-01	Soil		MADEP EPH rev 2.1	
				SM 2540G	
				SM D 422-63	GAI-LAP-20-1996/AASHTO
				SM21-23 2510B Modified	
				SW 846 9060A	
				SW-846 1030	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8100 Modified	
				SW-846 8260D	
				SW-846 8270E	
				SW-846 9014	
				SW-846 9030A	
				SW-846-8270M	
Disp Cell 2	23J3373-02	Soil		MADEP EPH rev 2.1	
				SM 2540G	
				SM D 422-63	GAI-LAP-20-1996/AASHTO
				SM21-23 2510B Modified	
				SW 846 9060A	
				SW-846 1030	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8100 Modified	
				SW-846 8260D	
				SW-846 8270E	
				SW-846 9014	
				SW-846 9030A	
				SW-846-8270M	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Weston & Sampson Engineers MA
55 Walkers Brook Drive
Reading, MA 01867
ATTN: Lee Koska

REPORT DATE: 11/6/2023

PURCHASE ORDER NUMBER:

PROJECT NUMBER: ENG23-0300

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 23J3373

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: Chelsea, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
Disp Cell 4	23J3373-03	Soil		MADEP EPH rev 2.1	
				SM 2540G	
				SM D 422-63	GAI-LAP-20-1996/AASHTO
				SM21-23 2510B Modified	
				SW 846 9060A	
				SW-846 1030	
				SW-846 6010D	
				SW-846 7471B	
				SW-846 8100 Modified	
				SW-846 8260D	
				SW-846 8270E	
				SW-846 9014	
				SW-846 9030A	
				SW-846-8270M	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

MADEP EPH rev 2.1

Qualifications:

R-05

Laboratory fortified blank duplicate RPD is outside of control limits. Reduced precision is anticipated for any reported value for this compound.

Analyte & Samples(s) Qualified:

Benzo(g,h,i)perylene
B356430-BLK1, B356430-BS1, B356430-BSD1

Dibenz(a,h)anthracene
B356430-BLK1, B356430-BS1, B356430-BSD1

S-01

The surrogate recovery for this sample is not available due to sample dilution below the surrogate reporting limit required from high analyte concentration and/or matrix interferences.

Analyte & Samples(s) Qualified:

Chlorooctadecane (COD)
23J3373-03RE1[Disp Cell 4]

o-Terphenyl (OTP)
23J3373-03RE1[Disp Cell 4]

S-15

Surrogate recovery outside of control limits due to suspected sample matrix interference. Chromatogram(s) is attached.

Analyte & Samples(s) Qualified:

o-Terphenyl (OTP)
23J3373-03[Disp Cell 4]

V-06

Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side for this compound.

Analyte & Samples(s) Qualified:

Acenaphthylene
S095557-CCV2

SW-846 6010D

Qualifications:

B-07

Data is not affected by elevated level in laboratory blank since sample result is >10x level found in the blank.

Analyte & Samples(s) Qualified:

Copper
23J3373-01[Disp Cell 1], 23J3373-02[Disp Cell 2], 23J3373-03[Disp Cell 4]

M-10

The reporting limit verification for the AIHA lead program is outside of control limits for this element. Any reported result at or near the detection limit may be biased on the high side.

Analyte & Samples(s) Qualified:

Lead
23J3373-01[Disp Cell 1], 23J3373-02[Disp Cell 2], 23J3373-03[Disp Cell 4], B356399-SRM2

SW-846 8100 Modified

Qualifications:

MS-19

Sample to spike ratio is greater than or equal to 4:1. Spiked amount is not representative of the native amount in the sample. Appropriate or meaningful recoveries cannot be calculated.

Analyte & Samples(s) Qualified:

TPH (C9-C36)
B356432-MS1, B356432-MSD1

S-01

The surrogate recovery for this sample is not available due to sample dilution below the surrogate reporting limit required from high analyte concentration and/or matrix interferences.

Analyte & Samples(s) Qualified:

2-Fluorobiphenyl
23J3373-01[Disp Cell 1], 23J3373-02[Disp Cell 2], 23J3373-03[Disp Cell 4], B356432-MS1, B356432-MSD1

SW-846 8260D

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Qualifications:

L-04

Laboratory fortified blank/laboratory control sample recovery and duplicate recovery are outside of control limits. Reported value for this compound is likely to be biased on the low side.

Analyte & Samples(s) Qualified:

Vinyl Chloride

23J3373-01[Disp Cell 1], 23J3373-02[Disp Cell 2], 23J3373-03[Disp Cell 4], B356331-BLK1, B356331-BS1, B356331-BSD1, S095491-CCV1

RL-14

Elevated reporting limit due to foaming sample matrix. MA CAM reporting limit not met.

Analyte & Samples(s) Qualified:

23J3373-01[Disp Cell 1], 23J3373-02[Disp Cell 2], 23J3373-03[Disp Cell 4]

V-05

Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.

Analyte & Samples(s) Qualified:

Acetone

23J3373-01[Disp Cell 1], 23J3373-02[Disp Cell 2], 23J3373-03[Disp Cell 4], B356331-BLK1, B356331-BS1, B356331-BSD1, S095491-CCV1

Bromomethane

23J3373-01[Disp Cell 1], 23J3373-02[Disp Cell 2], 23J3373-03[Disp Cell 4], B356331-BLK1, B356331-BS1, B356331-BSD1, S095491-CCV1

Chloromethane

23J3373-01[Disp Cell 1], 23J3373-02[Disp Cell 2], 23J3373-03[Disp Cell 4], B356331-BLK1, B356331-BS1, B356331-BSD1, S095491-CCV1

Vinyl Chloride

23J3373-01[Disp Cell 1], 23J3373-02[Disp Cell 2], 23J3373-03[Disp Cell 4], B356331-BLK1, B356331-BS1, B356331-BSD1, S095491-CCV1

V-16

Response factor is less than method specified minimum acceptable value. Reduced precision and accuracy may be associated with reported result.

Analyte & Samples(s) Qualified:

1,4-Dioxane

S095491-CCV1

V-34

Initial calibration verification (ICV) did not meet method specifications and was biased on the low side for this compound. Reported result is estimated.

Analyte & Samples(s) Qualified:

Bromomethane

23J3373-01[Disp Cell 1], 23J3373-02[Disp Cell 2], 23J3373-03[Disp Cell 4], B356331-BLK1, B356331-BS1, B356331-BSD1, S095491-CCV1

Chloromethane

23J3373-01[Disp Cell 1], 23J3373-02[Disp Cell 2], 23J3373-03[Disp Cell 4], B356331-BLK1, B356331-BS1, B356331-BSD1, S095491-CCV1

V-35

Initial calibration verification (ICV) did not meet method specifications and was biased on the high side for this compound. Reported result is estimated.

Analyte & Samples(s) Qualified:

Acetone

B356331-BS1, B356331-BSD1, S095491-CCV1

Carbon Disulfide

B356331-BS1, B356331-BSD1, S095491-CCV1

SW-846 8270E

Qualifications:

MS-07A

Matrix spike and spike duplicate recovery is outside of control limits. Analysis is in control based on laboratory fortified blank recovery. Possibility of matrix effects that lead to low bias or non-homogeneous sample aliquot cannot be eliminated.

Analyte & Samples(s) Qualified:

2,4-Dinitrophenol

B356433-MS1, B356433-MSD1

Aniline

B356433-MS1, B356433-MSD1

Fluoranthene

B356433-MS1, B356433-MSD1

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MS-22

Either matrix spike or MS duplicate is outside of control limits, but the other is within limits. RPD between the two MS/MSD results is within method specified criteria.

Analyte & Samples(s) Qualified:

Benzo(a)anthracene
B356433-MS1

Benzo(b)fluoranthene
B356433-MS1

Chrysene
B356433-MS1

Indeno(1,2,3-cd)pyrene
B356433-MS1

Pyrene
B356433-MS1

MS-23

Either matrix spike or MS duplicate is outside of control limits, but the other is within limits. RPD between the two MS/MSD results is outside of the method specified criteria. Reduced precision anticipated for any reported result for this compound.

Analyte & Samples(s) Qualified:

Hexachloroethane
B356433-MSD1

R-06

Matrix spike duplicate RPD is outside of control limits. Reduced precision is anticipated for reported result for this compound in this sample.

Analyte & Samples(s) Qualified:

Hexachloroethane
B356433-MS1

Pentachlorophenol
B356433-MS1, B356433-MSD1

V-05

Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.

Analyte & Samples(s) Qualified:

Aniline
S095827-CCV1

Di-n-octylphthalate
23J3373-01[Disp Cell 1], 23J3373-02[Disp Cell 2], 23J3373-03[Disp Cell 4], B356433-BLK1, B356433-BS1, B356433-BSD1, B356433-MS1, B356433-MSD1, S095822-CCV1

V-06

Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side for this compound.

Analyte & Samples(s) Qualified:

Indeno(1,2,3-cd)pyrene
23J3373-03RE1[Disp Cell 4], S095827-CCV1

V-34

Initial calibration verification (ICV) did not meet method specifications and was biased on the low side for this compound. Reported result is estimated.

Analyte & Samples(s) Qualified:

Aniline
S095827-CCV1

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SW-846 8100 Modified

TPH (C9-C36) is quantitated against a calibration made with a diesel standard.

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

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Project Location: Chelsea, MA | Sample Description: | Work Order: 23J3373

Date Received: 10/25/2023

Field Sample #: Disp Cell 1 | Sampled: 10/24/2023 11:30

Sample ID: 23J3373-01

Sample Matrix: Soil

Sample Flags: RL-14

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	9.9	mg/Kg dry	2	V-05	SW-846 8260D	10/26/23	10/26/23 17:43	EEH
tert-Amyl Methyl Ether (TAME)	ND	0.099	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Benzene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Bromobenzene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Bromochloromethane	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Bromodichloromethane	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Bromoform	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Bromomethane	ND	0.39	mg/Kg dry	2	V-05, V-34	SW-846 8260D	10/26/23	10/26/23 17:43	EEH
2-Butanone (MEK)	ND	3.9	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
n-Butylbenzene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
sec-Butylbenzene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
tert-Butylbenzene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
tert-Butyl Ethyl Ether (TBEE)	ND	0.099	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Carbon Disulfide	ND	2.0	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Carbon Tetrachloride	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Chlorobenzene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Chlorodibromomethane	ND	0.099	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Chloroethane	ND	0.39	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Chloroform	ND	0.39	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Chloromethane	ND	0.39	mg/Kg dry	2	V-05, V-34	SW-846 8260D	10/26/23	10/26/23 17:43	EEH
2-Chlorotoluene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
4-Chlorotoluene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.79	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
1,2-Dibromoethane (EDB)	ND	0.099	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Dibromomethane	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
1,2-Dichlorobenzene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
1,3-Dichlorobenzene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
1,4-Dichlorobenzene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Dichlorodifluoromethane (Freon 12)	ND	0.39	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
1,1-Dichloroethane	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
1,2-Dichloroethane	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
1,1-Dichloroethylene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
cis-1,2-Dichloroethylene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
trans-1,2-Dichloroethylene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
1,2-Dichloropropane	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
1,3-Dichloropropane	ND	0.099	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
2,2-Dichloropropane	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
1,1-Dichloropropene	ND	0.39	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
cis-1,3-Dichloropropene	ND	0.099	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
trans-1,3-Dichloropropene	ND	0.099	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Diethyl Ether	ND	0.39	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Diisopropyl Ether (DIPE)	ND	0.099	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
1,4-Dioxane	ND	9.9	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Ethylbenzene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH

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Project Location: Chelsea, MA | Sample Description: | Work Order: 23J3373

Date Received: 10/25/2023

Field Sample #: Disp Cell 1 | Sampled: 10/24/2023 11:30

Sample ID: 23J3373-01

Sample Matrix: Soil

Sample Flags: RL-14

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobutadiene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
2-Hexanone (MBK)	ND	2.0	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Isopropylbenzene (Cumene)	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
p-Isopropyltoluene (p-Cymene)	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Methylene Chloride	ND	0.99	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
4-Methyl-2-pentanone (MIBK)	ND	2.0	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Naphthalene	ND	0.39	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
n-Propylbenzene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Styrene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
1,1,1,2-Tetrachloroethane	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
1,1,2,2-Tetrachloroethane	ND	0.099	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Tetrachloroethylene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Tetrahydrofuran	ND	0.79	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Toluene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
1,2,3-Trichlorobenzene	ND	0.79	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
1,2,4-Trichlorobenzene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
1,1,1-Trichloroethane	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
1,1,2-Trichloroethane	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Trichloroethylene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Trichlorofluoromethane (Freon 11)	ND	0.39	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
1,2,3-Trichloropropane	ND	0.39	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
1,2,4-Trimethylbenzene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
1,3,5-Trimethylbenzene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
Vinyl Chloride	ND	0.39	mg/Kg dry	2	L-04, V-05	SW-846 8260D	10/26/23	10/26/23 17:43	EEH
m+p Xylene	ND	0.39	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH
o-Xylene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:43	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	91.4	70-130		10/26/23 17:43
Toluene-d8	105	70-130		10/26/23 17:43
4-Bromofluorobenzene	112	70-130		10/26/23 17:43

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Project Location: Chelsea, MA | Sample Description: | Work Order: 23J3373

Date Received: 10/25/2023

Field Sample #: Disp Cell 1 | Sampled: 10/24/2023 11:30

Sample ID: 23J3373-01

Sample Matrix: Soil

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Biphenyl	0.49	0.26	0.21	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Acenaphthene	1.9	0.67	0.26	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Acenaphthylene	2.9	0.67	0.26	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Acetophenone	ND	1.3	0.26	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Aniline	ND	1.3	0.23	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Anthracene	8.6	0.67	0.26	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Benzo(a)anthracene	15	0.67	0.24	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Benzo(a)pyrene	14	0.67	0.22	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Benzo(b)fluoranthene	18	0.67	0.22	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Benzo(g,h,i)perylene	9.0	0.67	0.28	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Benzo(k)fluoranthene	6.5	0.67	0.24	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Bis(2-chloroethoxy)methane	ND	1.3	0.26	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Bis(2-chloroethyl)ether	ND	1.3	0.28	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Bis(2-chloroisopropyl)ether	ND	1.3	0.56	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Bis(2-Ethylhexyl)phthalate	28	6.7	1.4	mg/Kg dry	5		SW-846 8270E	10/26/23	11/2/23 10:47	BGL
4-Bromophenylphenylether	ND	1.3	0.28	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Butylbenzylphthalate	ND	1.3	0.25	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
4-Chloroaniline	ND	2.6	0.24	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
2-Chloronaphthalene	ND	1.3	0.24	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
2-Chlorophenol	ND	1.3	0.27	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Chrysene	12	0.67	0.24	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Dibenz(a,h)anthracene	2.4	0.67	0.26	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Dibenzofuran	1.9	1.3	0.26	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Di-n-butylphthalate	ND	1.3	0.24	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
1,2-Dichlorobenzene	ND	1.3	0.25	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
1,3-Dichlorobenzene	ND	1.3	0.25	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
1,4-Dichlorobenzene	ND	1.3	0.25	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
3,3-Dichlorobenzidine	ND	0.67	0.18	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
2,4-Dichlorophenol	ND	1.3	0.26	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Diethylphthalate	ND	1.3	0.26	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
2,4-Dimethylphenol	ND	1.3	0.35	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Dimethylphthalate	ND	1.3	0.27	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
2,4-Dinitrophenol	ND	2.6	1.2	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
2,4-Dinitrotoluene	ND	1.3	0.27	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
2,6-Dinitrotoluene	ND	1.3	0.30	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Di-n-octylphthalate	0.88	1.3	0.26	mg/Kg dry	1	V-05, J	SW-846 8270E	10/26/23	11/1/23 18:08	AR2
1,2-Diphenylhydrazine/Azobenzene	ND	1.3	0.26	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Fluoranthene	42	3.3	1.2	mg/Kg dry	5		SW-846 8270E	10/26/23	11/2/23 10:47	BGL
Fluorene	2.5	0.67	0.26	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Hexachlorobenzene	ND	1.3	0.28	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Hexachlorobutadiene	ND	1.3	0.27	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Hexachloroethane	ND	1.3	0.26	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Indeno(1,2,3-cd)pyrene	9.8	0.67	0.29	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Isophorone	ND	1.3	0.27	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2

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Project Location: Chelsea, MA | Sample Description: | Work Order: 23J3373

Date Received: 10/25/2023

Field Sample #: Disp Cell 1 | Sampled: 10/24/2023 11:30

Sample ID: 23J3373-01

Sample Matrix: Soil

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2-Methylnaphthalene	1.3	0.67	0.26	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
2-Methylphenol	ND	1.3	0.27	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
3/4-Methylphenol	ND	1.3	0.29	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Naphthalene	3.9	0.67	0.27	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Nitrobenzene	ND	1.3	0.29	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
2-Nitrophenol	ND	1.3	0.28	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
4-Nitrophenol	ND	2.6	0.56	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Pentachlorophenol	ND	1.3	0.60	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Phenanthrene	9.8	0.67	0.26	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Phenol	ND	1.3	0.31	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
Pyrene	44	3.3	1.3	mg/Kg dry	5		SW-846 8270E	10/26/23	11/2/23 10:47	BGL
Pyridine	ND	1.3	0.21	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
1,2,4-Trichlorobenzene	ND	1.3	0.26	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
2,4,5-Trichlorophenol	ND	1.3	0.26	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2
2,4,6-Trichlorophenol	ND	1.3	0.25	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:08	AR2

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	65.2	30-130		11/1/23 18:08
2-Fluorophenol	79.6	30-130		11/2/23 10:47
Phenol-d6	66.8	30-130		11/1/23 18:08
Phenol-d6	76.2	30-130		11/2/23 10:47
Nitrobenzene-d5	63.8	30-130		11/1/23 18:08
Nitrobenzene-d5	75.2	30-130		11/2/23 10:47
2-Fluorobiphenyl	56.4	30-130		11/1/23 18:08
2-Fluorobiphenyl	77.0	30-130		11/2/23 10:47
2,4,6-Tribromophenol	75.7	30-130		11/1/23 18:08
2,4,6-Tribromophenol	67.1	30-130		11/2/23 10:47
p-Terphenyl-d14	50.6	30-130		11/1/23 18:08
p-Terphenyl-d14	53.4	30-130		11/2/23 10:47

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Project Location: Chelsea, MA | Sample Description: | Work Order: 23J3373

Date Received: 10/25/2023

Field Sample #: Disp Cell 1 | Sampled: 10/24/2023 11:30

Sample ID: 23J3373-01

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
TPH (C9-C36)	14000	1600	1500	mg/Kg dry	50		SW-846 8100 Modified	10/26/23	11/1/23 18:11	GJB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorobiphenyl	*	40-140	S-01	11/1/23 18:11

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Project Location: Chelsea, MA | Sample Description: | Work Order: 23J3373

Date Received: 10/25/2023

Field Sample #: Disp Cell 1 | Sampled: 10/24/2023 11:30

Sample ID: 23J3373-01

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	3900	390	390	mg/Kg dry	10		MADEP EPH rev 2.1	10/26/23	11/1/23 12:53	RDD
C19-C36 Aliphatics	4500	390	390	mg/Kg dry	10		MADEP EPH rev 2.1	10/26/23	11/1/23 12:53	RDD
Unadjusted C11-C22 Aromatics	4400	390	390	mg/Kg dry	10		MADEP EPH rev 2.1	10/26/23	11/1/23 12:53	RDD
C11-C22 Aromatics	3800	390	390	mg/Kg dry	10		MADEP EPH rev 2.1	10/26/23	11/1/23 12:53	RDD
Acenaphthene	5.8	0.39	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 17:48	GJB
Acenaphthylene	1.1	0.39	0.23	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 17:48	GJB
Anthracene	23	0.39	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 17:48	GJB
Benzo(a)anthracene	52	0.39	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 17:48	GJB
Benzo(a)pyrene	48	0.39	0.13	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 17:48	GJB
Benzo(b)fluoranthene	57	0.39	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 17:48	GJB
Benzo(g,h,i)perylene	23	0.39	0.10	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 17:48	GJB
Benzo(k)fluoranthene	22	0.39	0.13	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 17:48	GJB
Chrysene	54	0.39	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 17:48	GJB
Dibenz(a,h)anthracene	7.7	0.39	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 17:48	GJB
Fluoranthene	100	3.9	1.0	mg/Kg dry	10		MADEP EPH rev 2.1	10/26/23	11/1/23 12:53	RDD
Fluorene	1.5	0.39	0.15	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 17:48	GJB
Indeno(1,2,3-cd)pyrene	24	0.39	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 17:48	GJB
2-Methylnaphthalene	1.3	0.39	0.14	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 17:48	GJB
Naphthalene	4.2	0.39	0.22	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 17:48	GJB
Phenanthrene	36	0.39	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 17:48	GJB
Pyrene	92	3.9	1.4	mg/Kg dry	10		MADEP EPH rev 2.1	10/26/23	11/1/23 12:53	RDD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	60.7	40-140		10/31/23 17:48
Chlorooctadecane (COD)	57.7	40-140		11/1/23 12:53
o-Terphenyl (OTP)	101	40-140		10/31/23 17:48
o-Terphenyl (OTP)	99.6	40-140		11/1/23 12:53
2-Bromonaphthalene	51.7	40-140		10/31/23 17:48
2-Fluorobiphenyl	67.6	40-140		10/31/23 17:48

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Project Location: Chelsea, MA | Sample Description: | Work Order: 23J3373

Date Received: 10/25/2023

Field Sample #: Disp Cell 1 | Sampled: 10/24/2023 11:30

Sample ID: 23J3373-01

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	12	6.2	0.91	mg/Kg dry	1		SW-846 6010D	10/26/23	10/30/23 12:48	HNN
Barium	190	3.1	0.40	mg/Kg dry	1		SW-846 6010D	10/26/23	10/30/23 12:48	HNN
Cadmium	2.6	0.62	0.25	mg/Kg dry	1		SW-846 6010D	10/26/23	10/30/23 12:48	HNN
Chromium	82	1.2	0.20	mg/Kg dry	1		SW-846 6010D	10/26/23	10/30/23 12:48	HNN
Copper	320	1.2	0.27	mg/Kg dry	1	B-07	SW-846 6010D	10/26/23	10/31/23 15:17	ATP
Lead	690	0.94	0.54	mg/Kg dry	1	M-10	SW-846 6010D	10/26/23	10/30/23 12:48	HNN
Mercury	0.41	0.042	0.018	mg/Kg dry	1		SW-846 7471B	10/31/23	11/1/23 11:23	AV
Selenium	ND	6.2	1.5	mg/Kg dry	1		SW-846 6010D	10/26/23	10/30/23 12:48	HNN
Silver	ND	0.62	0.30	mg/Kg dry	1		SW-846 6010D	10/26/23	10/31/23 15:17	ATP
Zinc	530	1.2	0.77	mg/Kg dry	1		SW-846 6010D	10/26/23	10/30/23 12:48	HNN

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Project Location: Chelsea, MA | Sample Description: | Work Order: 23J3373

Date Received: 10/25/2023

Field Sample #: Disp Cell 1 | Sampled: 10/24/2023 11:30

Sample ID: 23J3373-01

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	50.8			% Wt	1		SM 2540G	10/26/23	10/26/23 9:20	DV
Ignitability	Absent			present/absent	1		SW-846 1030	10/27/23	10/27/23 14:54	JEC
Reactive Cyanide	92	3.9	3.9	mg/Kg	1		SW-846 9014	10/26/23	10/26/23 15:15	EC
Reactive Sulfide	120	20	20	mg/Kg	1		SW-846 9030A	10/26/23	10/26/23 15:15	EC
Specific conductance @20.6°C	350	2.0		µmhos/cm	1		SM21-23 2510B Modified	10/30/23	10/30/23 19:32	JEC
Total Organic Carbon	150000	200	130	mg/Kg dry	1		SW 846 9060A	11/1/23	11/1/23 13:15	NRH

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Project Location: Chelsea, MA | Sample Description: | Work Order: 23J3373

Date Received: 10/25/2023

Field Sample #: Disp Cell 2 | Sampled: 10/24/2023 12:30

Sample ID: 23J3373-02

Sample Matrix: Soil

Sample Flags: RL-14

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	11	mg/Kg dry	2	V-05	SW-846 8260D	10/26/23	10/26/23 16:48	EEH
tert-Amyl Methyl Ether (TAME)	ND	0.11	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Benzene	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Bromobenzene	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Bromochloromethane	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Bromodichloromethane	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Bromoform	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Bromomethane	ND	0.45	mg/Kg dry	2	V-05, V-34	SW-846 8260D	10/26/23	10/26/23 16:48	EEH
2-Butanone (MEK)	ND	4.5	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
n-Butylbenzene	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
sec-Butylbenzene	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
tert-Butylbenzene	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
tert-Butyl Ethyl Ether (TBEE)	ND	0.11	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Carbon Disulfide	ND	2.2	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Carbon Tetrachloride	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Chlorobenzene	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Chlorodibromomethane	ND	0.11	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Chloroethane	ND	0.45	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Chloroform	ND	0.45	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Chloromethane	ND	0.45	mg/Kg dry	2	V-05, V-34	SW-846 8260D	10/26/23	10/26/23 16:48	EEH
2-Chlorotoluene	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
4-Chlorotoluene	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.89	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
1,2-Dibromoethane (EDB)	ND	0.11	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Dibromomethane	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
1,2-Dichlorobenzene	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
1,3-Dichlorobenzene	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
1,4-Dichlorobenzene	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Dichlorodifluoromethane (Freon 12)	ND	0.45	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
1,1-Dichloroethane	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
1,2-Dichloroethane	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
1,1-Dichloroethylene	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
cis-1,2-Dichloroethylene	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
trans-1,2-Dichloroethylene	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
1,2-Dichloropropane	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
1,3-Dichloropropane	ND	0.11	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
2,2-Dichloropropane	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
1,1-Dichloropropene	ND	0.45	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
cis-1,3-Dichloropropene	ND	0.11	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
trans-1,3-Dichloropropene	ND	0.11	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Diethyl Ether	ND	0.45	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Diisopropyl Ether (DIPE)	ND	0.11	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
1,4-Dioxane	ND	11	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Ethylbenzene	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH

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Project Location: Chelsea, MA | Sample Description: | Work Order: 23J3373

Date Received: 10/25/2023

Field Sample #: Disp Cell 2 | Sampled: 10/24/2023 12:30

Sample ID: 23J3373-02

Sample Matrix: Soil

Sample Flags: RL-14

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobutadiene	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
2-Hexanone (MBK)	ND	2.2	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Isopropylbenzene (Cumene)	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
p-Isopropyltoluene (p-Cymene)	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Methylene Chloride	ND	1.1	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
4-Methyl-2-pentanone (MIBK)	ND	2.2	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Naphthalene	ND	0.45	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
n-Propylbenzene	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Styrene	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
1,1,1,2-Tetrachloroethane	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
1,1,2,2-Tetrachloroethane	ND	0.11	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Tetrachloroethylene	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Tetrahydrofuran	ND	0.89	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Toluene	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
1,2,3-Trichlorobenzene	ND	0.89	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
1,2,4-Trichlorobenzene	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
1,1,1-Trichloroethane	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
1,1,2-Trichloroethane	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Trichloroethylene	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Trichlorofluoromethane (Freon 11)	ND	0.45	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
1,2,3-Trichloropropane	ND	0.45	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
1,2,4-Trimethylbenzene	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
1,3,5-Trimethylbenzene	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
Vinyl Chloride	ND	0.45	mg/Kg dry	2	L-04, V-05	SW-846 8260D	10/26/23	10/26/23 16:48	EEH
m+p Xylene	ND	0.45	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH
o-Xylene	ND	0.22	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 16:48	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	91.7	70-130		10/26/23 16:48
Toluene-d8	106	70-130		10/26/23 16:48
4-Bromofluorobenzene	109	70-130		10/26/23 16:48

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Project Location: Chelsea, MA | Sample Description: | Work Order: 23J3373

Date Received: 10/25/2023

Field Sample #: Disp Cell 2 | Sampled: 10/24/2023 12:30

Sample ID: 23J3373-02

Sample Matrix: Soil

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Biphenyl	ND	0.24	0.19	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Acenaphthene	0.42	0.60	0.23	mg/Kg dry	1	J	SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Acenaphthylene	1.4	0.60	0.24	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Acetophenone	ND	1.2	0.24	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Aniline	ND	1.2	0.21	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Anthracene	2.4	0.60	0.23	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Benzo(a)anthracene	6.8	0.60	0.22	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Benzo(a)pyrene	7.5	0.60	0.20	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Benzo(b)fluoranthene	10	0.60	0.20	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Benzo(g,h,i)perylene	4.6	0.60	0.25	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Benzo(k)fluoranthene	3.7	0.60	0.22	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Bis(2-chloroethoxy)methane	ND	1.2	0.24	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Bis(2-chloroethyl)ether	ND	1.2	0.25	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Bis(2-chloroisopropyl)ether	ND	1.2	0.51	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Bis(2-Ethylhexyl)phthalate	21	6.0	1.2	mg/Kg dry	5		SW-846 8270E	10/26/23	11/2/23 11:11	BGL
4-Bromophenylphenylether	ND	1.2	0.25	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Butylbenzylphthalate	0.27	1.2	0.23	mg/Kg dry	1	J	SW-846 8270E	10/26/23	11/1/23 18:31	AR2
4-Chloroaniline	ND	2.3	0.21	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
2-Chloronaphthalene	ND	1.2	0.21	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
2-Chlorophenol	ND	1.2	0.24	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Chrysene	5.7	0.60	0.22	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Dibenz(a,h)anthracene	1.3	0.60	0.23	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Dibenzofuran	0.49	1.2	0.24	mg/Kg dry	1	J	SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Di-n-butylphthalate	ND	1.2	0.22	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
1,2-Dichlorobenzene	ND	1.2	0.23	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
1,3-Dichlorobenzene	ND	1.2	0.22	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
1,4-Dichlorobenzene	ND	1.2	0.23	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
3,3-Dichlorobenzidine	ND	0.60	0.16	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
2,4-Dichlorophenol	ND	1.2	0.23	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Diethylphthalate	ND	1.2	0.23	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
2,4-Dimethylphenol	ND	1.2	0.31	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Dimethylphthalate	ND	1.2	0.25	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
2,4-Dinitrophenol	ND	2.3	1.1	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
2,4-Dinitrotoluene	ND	1.2	0.24	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
2,6-Dinitrotoluene	ND	1.2	0.27	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Di-n-octylphthalate	0.40	1.2	0.24	mg/Kg dry	1	V-05, J	SW-846 8270E	10/26/23	11/1/23 18:31	AR2
1,2-Diphenylhydrazine/Azobenzene	ND	1.2	0.23	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Fluoranthene	10	0.60	0.21	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Fluorene	0.56	0.60	0.24	mg/Kg dry	1	J	SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Hexachlorobenzene	ND	1.2	0.25	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Hexachlorobutadiene	ND	1.2	0.24	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Hexachloroethane	ND	1.2	0.24	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Indeno(1,2,3-cd)pyrene	5.2	0.60	0.26	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Isophorone	ND	1.2	0.25	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2

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Project Location: Chelsea, MA | Sample Description: | Work Order: 23J3373

Date Received: 10/25/2023

Field Sample #: Disp Cell 2 | Sampled: 10/24/2023 12:30

Sample ID: 23J3373-02

Sample Matrix: Soil

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2-Methylnaphthalene	0.56	0.60	0.24	mg/Kg dry	1	J	SW-846 8270E	10/26/23	11/1/23 18:31	AR2
2-Methylphenol	ND	1.2	0.24	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
3/4-Methylphenol	ND	1.2	0.26	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Naphthalene	1.6	0.60	0.24	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Nitrobenzene	ND	1.2	0.26	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
2-Nitrophenol	ND	1.2	0.25	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
4-Nitrophenol	ND	2.3	0.50	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Pentachlorophenol	ND	1.2	0.54	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Phenanthrene	3.8	0.60	0.24	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Phenol	ND	1.2	0.28	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
Pyrene	18	3.0	1.2	mg/Kg dry	5		SW-846 8270E	10/26/23	11/2/23 11:11	BGL
Pyridine	ND	1.2	0.19	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
1,2,4-Trichlorobenzene	ND	1.2	0.23	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
2,4,5-Trichlorophenol	ND	1.2	0.23	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2
2,4,6-Trichlorophenol	ND	1.2	0.23	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:31	AR2

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	51.5	30-130		11/1/23 18:31
2-Fluorophenol	53.2	30-130		11/2/23 11:11
Phenol-d6	54.6	30-130		11/1/23 18:31
Phenol-d6	50.4	30-130		11/2/23 11:11
Nitrobenzene-d5	45.9	30-130		11/1/23 18:31
Nitrobenzene-d5	49.6	30-130		11/2/23 11:11
2-Fluorobiphenyl	44.8	30-130		11/1/23 18:31
2-Fluorobiphenyl	52.1	30-130		11/2/23 11:11
2,4,6-Tribromophenol	54.7	30-130		11/1/23 18:31
2,4,6-Tribromophenol	44.0	30-130		11/2/23 11:11
p-Terphenyl-d14	49.4	30-130		11/1/23 18:31
p-Terphenyl-d14	42.8	30-130		11/2/23 11:11

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Project Location: Chelsea, MA | Sample Description: | Work Order: 23J3373

Date Received: 10/25/2023

Field Sample #: Disp Cell 2 | Sampled: 10/24/2023 12:30

Sample ID: 23J3373-02

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
TPH (C9-C36)	7600	1500	1400	mg/Kg dry	50		SW-846 8100 Modified	10/26/23	11/1/23 18:43	GJB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorobiphenyl	*	40-140	S-01	11/1/23 18:43

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Project Location: Chelsea, MA | Sample Description: | Work Order: 23J3373

Date Received: 10/25/2023

Field Sample #: Disp Cell 2 | Sampled: 10/24/2023 12:30

Sample ID: 23J3373-02

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	2000	350	350	mg/Kg dry	10		MADEP EPH rev 2.1	10/26/23	11/1/23 13:11	RDD
C19-C36 Aliphatics	3600	350	350	mg/Kg dry	10		MADEP EPH rev 2.1	10/26/23	11/1/23 13:11	RDD
Unadjusted C11-C22 Aromatics	2800	240	240	mg/Kg dry	7		MADEP EPH rev 2.1	10/26/23	11/1/23 13:11	RDD
C11-C22 Aromatics	2600	240	240	mg/Kg dry	7		MADEP EPH rev 2.1	10/26/23	11/1/23 13:11	RDD
Acenaphthene	1.2	0.35	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:07	GJB
Acenaphthylene	0.84	0.35	0.21	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:07	GJB
Anthracene	3.8	0.35	0.13	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:07	GJB
Benzo(a)anthracene	11	0.35	0.10	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:07	GJB
Benzo(a)pyrene	13	0.35	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:07	GJB
Benzo(b)fluoranthene	16	0.35	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:07	GJB
Benzo(g,h,i)perylene	6.4	0.35	0.090	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:07	GJB
Benzo(k)fluoranthene	6.1	0.35	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:07	GJB
Chrysene	11	0.35	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:07	GJB
Dibenz(a,h)anthracene	1.9	0.35	0.10	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:07	GJB
Fluoranthene	15	0.35	0.094	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:07	GJB
Fluorene	ND	0.35	0.13	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:07	GJB
Indeno(1,2,3-cd)pyrene	7.0	0.35	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:07	GJB
2-Methylnaphthalene	1.0	0.35	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:07	GJB
Naphthalene	2.5	0.35	0.20	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:07	GJB
Phenanthrene	5.3	0.35	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:07	GJB
Pyrene	29	0.35	0.12	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:07	GJB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	61.8	40-140		10/31/23 18:07
Chlorooctadecane (COD)	61.5	40-140		11/1/23 13:11
o-Terphenyl (OTP)	94.1	40-140		10/31/23 18:07
o-Terphenyl (OTP)	103	40-140		11/1/23 13:11
2-Bromonaphthalene	101	40-140		10/31/23 18:07
2-Fluorobiphenyl	103	40-140		10/31/23 18:07

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Project Location: Chelsea, MA | Sample Description: | Work Order: 23J3373

Date Received: 10/25/2023

Field Sample #: Disp Cell 2 | Sampled: 10/24/2023 12:30

Sample ID: 23J3373-02

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	8.2	5.9	0.86	mg/Kg dry	1		SW-846 6010D	10/26/23	10/30/23 12:54	HNN
Barium	330	2.9	0.38	mg/Kg dry	1		SW-846 6010D	10/26/23	10/30/23 12:54	HNN
Cadmium	3.0	0.59	0.23	mg/Kg dry	1		SW-846 6010D	10/26/23	10/30/23 12:54	HNN
Chromium	85	1.2	0.19	mg/Kg dry	1		SW-846 6010D	10/26/23	10/30/23 12:54	HNN
Copper	420	1.2	0.26	mg/Kg dry	1	B-07	SW-846 6010D	10/26/23	10/31/23 15:24	ATP
Lead	800	0.88	0.51	mg/Kg dry	1	M-10	SW-846 6010D	10/26/23	10/30/23 12:54	HNN
Mercury	0.57	0.044	0.019	mg/Kg dry	1		SW-846 7471B	10/31/23	11/1/23 11:25	AV
Selenium	ND	5.9	1.4	mg/Kg dry	1		SW-846 6010D	10/26/23	10/30/23 12:54	HNN
Silver	0.53	0.59	0.28	mg/Kg dry	1	J	SW-846 6010D	10/26/23	10/31/23 15:24	ATP
Zinc	780	2.4	1.5	mg/Kg dry	2		SW-846 6010D	10/26/23	11/1/23 17:10	ATP

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Project Location: Chelsea, MA | Sample Description: | Work Order: 23J3373

Date Received: 10/25/2023

Field Sample #: Disp Cell 2 | Sampled: 10/24/2023 12:30

Sample ID: 23J3373-02

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	55.2			% Wt	1		SM 2540G	10/26/23	10/26/23 9:20	DV
Ignitability	Absent			present/absent	1		SW-846 1030	10/27/23	10/27/23 14:54	JEC
Reactive Cyanide	83	3.9	3.9	mg/Kg	1		SW-846 9014	10/26/23	10/26/23 15:15	EC
Reactive Sulfide	140	20	20	mg/Kg	1		SW-846 9030A	10/26/23	10/26/23 15:15	EC
Specific conductance @21.1°C	430	2.0		µmhos/cm	1		SM21-23 2510B Modified	10/30/23	10/30/23 19:32	JEC
Total Organic Carbon	100000	180	120	mg/Kg dry	1		SW 846 9060A	11/1/23	11/1/23 14:26	NRH

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Project Location: Chelsea, MA | Sample Description: | Work Order: 23J3373

Date Received: 10/25/2023

Field Sample #: Disp Cell 4 | Sampled: 10/24/2023 13:30

Sample ID: 23J3373-03

Sample Matrix: Soil

Sample Flags: RL-14

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	ND	9.8	mg/Kg dry	2	V-05	SW-846 8260D	10/26/23	10/26/23 17:15	EEH
tert-Amyl Methyl Ether (TAME)	ND	0.098	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Benzene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Bromobenzene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Bromochloromethane	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Bromodichloromethane	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Bromoform	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Bromomethane	ND	0.39	mg/Kg dry	2	V-05, V-34	SW-846 8260D	10/26/23	10/26/23 17:15	EEH
2-Butanone (MEK)	ND	3.9	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
n-Butylbenzene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
sec-Butylbenzene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
tert-Butylbenzene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
tert-Butyl Ethyl Ether (TBEE)	ND	0.098	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Carbon Disulfide	ND	2.0	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Carbon Tetrachloride	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Chlorobenzene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Chlorodibromomethane	ND	0.098	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Chloroethane	ND	0.39	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Chloroform	ND	0.39	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Chloromethane	ND	0.39	mg/Kg dry	2	V-05, V-34	SW-846 8260D	10/26/23	10/26/23 17:15	EEH
2-Chlorotoluene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
4-Chlorotoluene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.79	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
1,2-Dibromoethane (EDB)	ND	0.098	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Dibromomethane	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
1,2-Dichlorobenzene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
1,3-Dichlorobenzene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
1,4-Dichlorobenzene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Dichlorodifluoromethane (Freon 12)	ND	0.39	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
1,1-Dichloroethane	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
1,2-Dichloroethane	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
1,1-Dichloroethylene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
cis-1,2-Dichloroethylene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
trans-1,2-Dichloroethylene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
1,2-Dichloropropane	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
1,3-Dichloropropane	ND	0.098	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
2,2-Dichloropropane	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
1,1-Dichloropropene	ND	0.39	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
cis-1,3-Dichloropropene	ND	0.098	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
trans-1,3-Dichloropropene	ND	0.098	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Diethyl Ether	ND	0.39	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Diisopropyl Ether (DIPE)	ND	0.098	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
1,4-Dioxane	ND	9.8	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Ethylbenzene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH

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Project Location: Chelsea, MA | Sample Description: | Work Order: 23J3373

Date Received: 10/25/2023

Field Sample #: Disp Cell 4 | Sampled: 10/24/2023 13:30

Sample ID: 23J3373-03

Sample Matrix: Soil

Sample Flags: RL-14

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Hexachlorobutadiene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
2-Hexanone (MBK)	ND	2.0	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Isopropylbenzene (Cumene)	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
p-Isopropyltoluene (p-Cymene)	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Methyl tert-Butyl Ether (MTBE)	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Methylene Chloride	ND	0.98	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
4-Methyl-2-pentanone (MIBK)	ND	2.0	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Naphthalene	ND	0.39	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
n-Propylbenzene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Styrene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
1,1,1,2-Tetrachloroethane	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
1,1,2,2-Tetrachloroethane	ND	0.098	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Tetrachloroethylene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Tetrahydrofuran	ND	0.79	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Toluene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
1,2,3-Trichlorobenzene	ND	0.79	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
1,2,4-Trichlorobenzene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
1,1,1-Trichloroethane	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
1,1,2-Trichloroethane	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Trichloroethylene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Trichlorofluoromethane (Freon 11)	ND	0.39	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
1,2,3-Trichloropropane	ND	0.39	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
1,2,4-Trimethylbenzene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
1,3,5-Trimethylbenzene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
Vinyl Chloride	ND	0.39	mg/Kg dry	2	L-04, V-05	SW-846 8260D	10/26/23	10/26/23 17:15	EEH
m+p Xylene	ND	0.39	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH
o-Xylene	ND	0.20	mg/Kg dry	2		SW-846 8260D	10/26/23	10/26/23 17:15	EEH

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	91.4	70-130		10/26/23 17:15
Toluene-d8	104	70-130		10/26/23 17:15
4-Bromofluorobenzene	111	70-130		10/26/23 17:15

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Project Location: Chelsea, MA | Sample Description: | Work Order: 23J3373

Date Received: 10/25/2023

Field Sample #: Disp Cell 4 | Sampled: 10/24/2023 13:30

Sample ID: 23J3373-03

Sample Matrix: Soil

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Biphenyl	1.5	0.20	0.16	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
Acenaphthene	5.7	0.51	0.19	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
Acenaphthylene	6.0	0.51	0.20	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
Acetophenone	ND	1.0	0.20	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
Aniline	ND	1.0	0.17	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
Anthracene	19	5.1	2.0	mg/Kg dry	10		SW-846 8270E	10/26/23	11/2/23 11:34	BGL
Benzo(a)anthracene	23	5.1	1.8	mg/Kg dry	10		SW-846 8270E	10/26/23	11/2/23 11:34	BGL
Benzo(a)pyrene	18	5.1	1.7	mg/Kg dry	10		SW-846 8270E	10/26/23	11/2/23 11:34	BGL
Benzo(b)fluoranthene	29	5.1	1.7	mg/Kg dry	10		SW-846 8270E	10/26/23	11/2/23 11:34	BGL
Benzo(g,h,i)perylene	10	0.51	0.21	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
Benzo(k)fluoranthene	11	0.51	0.18	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
Bis(2-chloroethoxy)methane	ND	1.0	0.20	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
Bis(2-chloroethyl)ether	ND	1.0	0.21	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
Bis(2-chloroisopropyl)ether	ND	1.0	0.43	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
Bis(2-Ethylhexyl)phthalate	39	10	2.1	mg/Kg dry	10		SW-846 8270E	10/26/23	11/2/23 11:34	BGL
4-Bromophenylphenylether	ND	1.0	0.21	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
Butylbenzylphthalate	1.4	1.0	0.19	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
4-Chloroaniline	ND	2.0	0.18	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
2-Chloronaphthalene	ND	1.0	0.18	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
2-Chlorophenol	ND	1.0	0.20	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
Chrysene	25	5.1	1.8	mg/Kg dry	10		SW-846 8270E	10/26/23	11/2/23 11:34	BGL
Dibenz(a,h)anthracene	2.8	0.51	0.20	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
Dibenzofuran	7.4	1.0	0.20	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
Di-n-butylphthalate	ND	1.0	0.18	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
1,2-Dichlorobenzene	ND	1.0	0.19	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
1,3-Dichlorobenzene	ND	1.0	0.19	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
1,4-Dichlorobenzene	ND	1.0	0.19	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
3,3-Dichlorobenzidine	ND	0.51	0.13	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
2,4-Dichlorophenol	ND	1.0	0.20	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
Diethylphthalate	ND	1.0	0.20	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
2,4-Dimethylphenol	0.27	1.0	0.26	mg/Kg dry	1	J	SW-846 8270E	10/26/23	11/1/23 18:55	AR2
Dimethylphthalate	ND	1.0	0.21	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
2,4-Dinitrophenol	ND	2.0	0.89	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
2,4-Dinitrotoluene	ND	1.0	0.20	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
2,6-Dinitrotoluene	ND	1.0	0.23	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
Di-n-octylphthalate	1.6	1.0	0.20	mg/Kg dry	1	V-05	SW-846 8270E	10/26/23	11/1/23 18:55	AR2
1,2-Diphenylhydrazine/Azobenzene	ND	1.0	0.20	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
Fluoranthene	82	5.1	1.8	mg/Kg dry	10		SW-846 8270E	10/26/23	11/2/23 11:34	BGL
Fluorene	7.7	0.51	0.20	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
Hexachlorobenzene	ND	1.0	0.21	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
Hexachlorobutadiene	ND	1.0	0.20	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
Hexachloroethane	ND	1.0	0.20	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
Indeno(1,2,3-cd)pyrene	17	5.1	2.2	mg/Kg dry	10	V-06	SW-846 8270E	10/26/23	11/2/23 11:34	BGL
Isophorone	ND	1.0	0.21	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2

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Project Location: Chelsea, MA | Sample Description: | Work Order: 23J3373

Date Received: 10/25/2023

Field Sample #: Disp Cell 4 | Sampled: 10/24/2023 13:30

Sample ID: 23J3373-03

Sample Matrix: Soil

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
2-Methylnaphthalene	3.1	0.51	0.20	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
2-Methylphenol	ND	1.0	0.20	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
3/4-Methylphenol	0.24	1.0	0.22	mg/Kg dry	1	J	SW-846 8270E	10/26/23	11/1/23 18:55	AR2
Naphthalene	8.7	0.51	0.20	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
Nitrobenzene	ND	1.0	0.22	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
2-Nitrophenol	ND	1.0	0.21	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
4-Nitrophenol	ND	2.0	0.42	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
Pentachlorophenol	ND	1.0	0.46	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
Phenanthrene	37	5.1	2.0	mg/Kg dry	10		SW-846 8270E	10/26/23	11/2/23 11:34	BGL
Phenol	ND	1.0	0.24	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
Pyrene	69	5.1	2.0	mg/Kg dry	10		SW-846 8270E	10/26/23	11/2/23 11:34	BGL
Pyridine	ND	1.0	0.16	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
1,2,4-Trichlorobenzene	ND	1.0	0.20	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
2,4,5-Trichlorophenol	ND	1.0	0.20	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2
2,4,6-Trichlorophenol	ND	1.0	0.19	mg/Kg dry	1		SW-846 8270E	10/26/23	11/1/23 18:55	AR2

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	56.8	30-130		11/1/23 18:55
2-Fluorophenol	56.2	30-130		11/2/23 11:34
Phenol-d6	58.1	30-130		11/1/23 18:55
Phenol-d6	52.9	30-130		11/2/23 11:34
Nitrobenzene-d5	52.9	30-130		11/1/23 18:55
Nitrobenzene-d5	53.8	30-130		11/2/23 11:34
2-Fluorobiphenyl	54.1	30-130		11/1/23 18:55
2-Fluorobiphenyl	55.4	30-130		11/2/23 11:34
2,4,6-Tribromophenol	53.4	30-130		11/1/23 18:55
2,4,6-Tribromophenol	49.7	30-130		11/2/23 11:34
p-Terphenyl-d14	45.8	30-130		11/1/23 18:55
p-Terphenyl-d14	50.0	30-130		11/2/23 11:34

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Project Location: Chelsea, MA | Sample Description: | Work Order: 23J3373

Date Received: 10/25/2023

Field Sample #: Disp Cell 4 | Sampled: 10/24/2023 13:30

Sample ID: 23J3373-03

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
TPH (C9-C36)	22000	1200	1100	mg/Kg dry	50		SW-846 8100 Modified	10/26/23	11/1/23 18:11	GJB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorobiphenyl	*	40-140	S-01	11/1/23 18:11

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Project Location: Chelsea, MA | Sample Description: | Work Order: 23J3373

Date Received: 10/25/2023

Field Sample #: Disp Cell 4 | Sampled: 10/24/2023 13:30

Sample ID: 23J3373-03

Sample Matrix: Soil

Petroleum Hydrocarbons Analyses - EPH

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
C9-C18 Aliphatics	7500	880	880	mg/Kg dry	30		MADEP EPH rev 2.1	10/26/23	11/1/23 14:30	RDD
C19-C36 Aliphatics	12000	880	880	mg/Kg dry	30		MADEP EPH rev 2.1	10/26/23	11/1/23 14:30	RDD
Unadjusted C11-C22 Aromatics	8500	880	880	mg/Kg dry	30		MADEP EPH rev 2.1	10/26/23	11/1/23 14:30	RDD
C11-C22 Aromatics	7900	880	880	mg/Kg dry	30		MADEP EPH rev 2.1	10/26/23	11/1/23 14:30	RDD
Acenaphthene	18	0.29	0.093	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:25	GJB
Acenaphthylene	2.3	0.29	0.17	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:25	GJB
Anthracene	49	0.29	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:25	GJB
Benzo(a)anthracene	35	0.29	0.086	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:25	GJB
Benzo(a)pyrene	25	0.29	0.10	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:25	GJB
Benzo(b)fluoranthene	36	0.29	0.092	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:25	GJB
Benzo(g,h,i)perylene	15	0.29	0.076	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:25	GJB
Benzo(k)fluoranthene	15	0.29	0.10	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:25	GJB
Chrysene	43	0.29	0.10	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:25	GJB
Dibenz(a,h)anthracene	4.9	0.29	0.085	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:25	GJB
Fluoranthene	120	8.8	2.4	mg/Kg dry	30		MADEP EPH rev 2.1	10/26/23	11/1/23 14:30	RDD
Fluorene	50	0.29	0.11	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:25	GJB
Indeno(1,2,3-cd)pyrene	15	0.29	0.089	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:25	GJB
2-Methylnaphthalene	3.0	0.29	0.10	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:25	GJB
Naphthalene	12	0.29	0.16	mg/Kg dry	1		MADEP EPH rev 2.1	10/26/23	10/31/23 18:25	GJB
Phenanthrene	75	8.8	2.8	mg/Kg dry	30		MADEP EPH rev 2.1	10/26/23	11/1/23 14:30	RDD
Pyrene	95	8.8	3.1	mg/Kg dry	30		MADEP EPH rev 2.1	10/26/23	11/1/23 14:30	RDD

Surrogates	% Recovery		Recovery Limits	Flag/Qual	
Chlorooctadecane (COD)	92.0		40-140		10/31/23 18:25
Chlorooctadecane (COD)		*	40-140	S-01	11/1/23 14:30
o-Terphenyl (OTP)	**311**	*	40-140	S-15	10/31/23 18:25
o-Terphenyl (OTP)		*	40-140	S-01	11/1/23 14:30
2-Bromonaphthalene	80.4		40-140		10/31/23 18:25
2-Fluorobiphenyl	113		40-140		10/31/23 18:25

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Chelsea, MA | Sample Description: | Work Order: 23J3373

Date Received: 10/25/2023

Field Sample #: Disp Cell 4 | Sampled: 10/24/2023 13:30

Sample ID: 23J3373-03

Sample Matrix: Soil

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	8.3	4.7	0.69	mg/Kg dry	1		SW-846 6010D	10/26/23	10/30/23 13:01	HNN
Barium	71	2.4	0.31	mg/Kg dry	1		SW-846 6010D	10/26/23	10/30/23 13:01	HNN
Cadmium	0.95	0.47	0.19	mg/Kg dry	1		SW-846 6010D	10/26/23	10/30/23 13:01	HNN
Chromium	33	0.95	0.15	mg/Kg dry	1		SW-846 6010D	10/26/23	10/30/23 13:01	HNN
Copper	100	0.95	0.21	mg/Kg dry	1	B-07	SW-846 6010D	10/26/23	10/31/23 15:44	ATP
Lead	290	0.71	0.41	mg/Kg dry	1	M-10	SW-846 6010D	10/26/23	10/30/23 13:01	HNN
Mercury	0.65	0.037	0.016	mg/Kg dry	1		SW-846 7471B	10/31/23	11/1/23 11:27	AV
Selenium	ND	4.7	1.1	mg/Kg dry	1		SW-846 6010D	10/26/23	10/30/23 13:01	HNN
Silver	ND	0.47	0.23	mg/Kg dry	1		SW-846 6010D	10/26/23	10/31/23 15:44	ATP
Zinc	190	0.95	0.58	mg/Kg dry	1		SW-846 6010D	10/26/23	10/30/23 13:01	HNN

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Project Location: Chelsea, MA | Sample Description: | Work Order: 23J3373

Date Received: 10/25/2023

Field Sample #: Disp Cell 4 | Sampled: 10/24/2023 13:30

Sample ID: 23J3373-03

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	66.5			% Wt	1		SM 2540G	10/26/23	10/26/23 9:20	DV
Ignitability	Absent			present/absent	1		SW-846 1030	10/27/23	10/27/23 14:54	JEC
Reactive Cyanide	43	3.9	3.9	mg/Kg	1		SW-846 9014	10/26/23	10/26/23 15:15	EC
Reactive Sulfide	66	19	19	mg/Kg	1		SW-846 9030A	10/26/23	10/26/23 15:15	EC
Specific conductance @20.4°C	220	2.0		µmhos/cm	1		SM21-23 2510B Modified	10/30/23	10/30/23 19:32	JEC
Total Organic Carbon	92000	150	98	mg/Kg dry	1		SW 846 9060A	11/1/23	11/1/23 15:33	NRH

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Sample Extraction Data

Prep Method:SW-846 3546 **Analytical Method:MADEP EPH rev 2.1**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
23J3373-01 [Disp Cell 1]	B356430	10.2	2.00	10/26/23
23J3373-01RE1 [Disp Cell 1]	B356430	10.2	2.00	10/26/23
23J3373-02 [Disp Cell 2]	B356430	10.4	2.00	10/26/23
23J3373-02RE1 [Disp Cell 2]	B356430	10.4	2.00	10/26/23
23J3373-03 [Disp Cell 4]	B356430	10.3	2.00	10/26/23
23J3373-03RE1 [Disp Cell 4]	B356430	10.3	2.00	10/26/23

Prep Method:% Solids **Analytical Method:SM 2540G**

Lab Number [Field ID]	Batch	Date
23J3373-01 [Disp Cell 1]	B356376	10/26/23
23J3373-02 [Disp Cell 2]	B356376	10/26/23
23J3373-03 [Disp Cell 4]	B356376	10/26/23

SM21-23 2510B Modified

Lab Number [Field ID]	Batch	Initial [g]	Date
23J3373-01 [Disp Cell 1]	B356706	1.00	10/30/23
23J3373-02 [Disp Cell 2]	B356706	1.00	10/30/23
23J3373-03 [Disp Cell 4]	B356706	1.00	10/30/23

SW 846 9060A

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
23J3373-01 [Disp Cell 1]	B356690	1.00	1.00	11/01/23
23J3373-02 [Disp Cell 2]	B356690	1.00	1.00	11/01/23
23J3373-03 [Disp Cell 4]	B356690	1.00	1.00	11/01/23

SW-846 1030

Lab Number [Field ID]	Batch	Initial [g]	Date
23J3373-01 [Disp Cell 1]	B356545	50.0	10/27/23
23J3373-02 [Disp Cell 2]	B356545	50.0	10/27/23
23J3373-03 [Disp Cell 4]	B356545	50.0	10/27/23

Prep Method:SW-846 3050B **Analytical Method:SW-846 6010D**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
23J3373-01 [Disp Cell 1]	B356399	1.57	50.0	10/26/23
23J3373-02 [Disp Cell 2]	B356399	1.54	50.0	10/26/23
23J3373-03 [Disp Cell 4]	B356399	1.59	50.0	10/26/23

Prep Method:SW-846 7471 **Analytical Method:SW-846 7471B**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
23J3373-01 [Disp Cell 1]	B356832	0.698	50.0	10/31/23
23J3373-02 [Disp Cell 2]	B356832	0.618	50.0	10/31/23

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Sample Extraction Data

Prep Method:SW-846 7471 **Analytical Method:SW-846 7471B**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
23J3373-03 [Disp Cell 4]	B356832	0.611	50.0	10/31/23

Prep Method:SW-846 3546 **Analytical Method:SW-846 8100 Modified**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
23J3373-01 [Disp Cell 1]	B356432	15.0	1.00	10/26/23
23J3373-02 [Disp Cell 2]	B356432	15.3	1.00	10/26/23
23J3373-03 [Disp Cell 4]	B356432	15.1	1.00	10/26/23

Prep Method:SW-846 5035 **Analytical Method:SW-846 8260D**

Lab Number [Field ID]	Batch	Sample Amount(g)	Methanol Volume(mL)	Methanol Aliquot(mL)	Final Volume(mL)	Date
23J3373-01 [Disp Cell 1]	B356331	9.79	9.82	0.5	50	10/26/23
23J3373-02 [Disp Cell 2]	B356331	6.36	7.85	0.5	50	10/26/23
23J3373-03 [Disp Cell 4]	B356331	5.16	6.73	0.5	50	10/26/23

Prep Method:SW-846 3546 **Analytical Method:SW-846 8270E**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
23J3373-01 [Disp Cell 1]	B356433	15.0	1.00	10/26/23
23J3373-01RE1 [Disp Cell 1]	B356433	15.0	1.00	10/26/23
23J3373-02 [Disp Cell 2]	B356433	15.3	1.00	10/26/23
23J3373-02RE1 [Disp Cell 2]	B356433	15.3	1.00	10/26/23
23J3373-03 [Disp Cell 4]	B356433	15.1	1.00	10/26/23
23J3373-03RE1 [Disp Cell 4]	B356433	15.1	1.00	10/26/23

Prep Method:SW-846 7.3 **Analytical Method:SW-846 9014**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
23J3373-01 [Disp Cell 1]	B356372	25.6	250	10/26/23
23J3373-02 [Disp Cell 2]	B356372	25.5	250	10/26/23
23J3373-03 [Disp Cell 4]	B356372	25.7	250	10/26/23

Prep Method:SW-846 7.3 **Analytical Method:SW-846 9030A**

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
23J3373-01 [Disp Cell 1]	B356374	25.6	250	10/26/23
23J3373-02 [Disp Cell 2]	B356374	25.5	250	10/26/23
23J3373-03 [Disp Cell 4]	B356374	25.7	250	10/26/23

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QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B356331 - SW-846 5035										
Blank (B356331-BLK1)				Prepared & Analyzed: 10/26/23						
Acetone	ND	2.5	mg/Kg wet							V-05
tert-Amyl Methyl Ether (TAME)	ND	0.025	mg/Kg wet							
Benzene	ND	0.050	mg/Kg wet							
Bromobenzene	ND	0.050	mg/Kg wet							
Bromochloromethane	ND	0.050	mg/Kg wet							
Bromodichloromethane	ND	0.050	mg/Kg wet							
Bromoform	ND	0.050	mg/Kg wet							
Bromomethane	ND	0.10	mg/Kg wet							V-05, V-34
2-Butanone (MEK)	ND	1.0	mg/Kg wet							
n-Butylbenzene	ND	0.050	mg/Kg wet							
sec-Butylbenzene	ND	0.050	mg/Kg wet							
tert-Butylbenzene	ND	0.050	mg/Kg wet							
tert-Butyl Ethyl Ether (TBEE)	ND	0.025	mg/Kg wet							
Carbon Disulfide	ND	0.50	mg/Kg wet							
Carbon Tetrachloride	ND	0.050	mg/Kg wet							
Chlorobenzene	ND	0.050	mg/Kg wet							
Chlorodibromomethane	ND	0.025	mg/Kg wet							
Chloroethane	ND	0.10	mg/Kg wet							
Chloroform	ND	0.10	mg/Kg wet							
Chloromethane	ND	0.10	mg/Kg wet							V-05, V-34
2-Chlorotoluene	ND	0.050	mg/Kg wet							
4-Chlorotoluene	ND	0.050	mg/Kg wet							
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.20	mg/Kg wet							
1,2-Dibromoethane (EDB)	ND	0.025	mg/Kg wet							
Dibromomethane	ND	0.050	mg/Kg wet							
1,2-Dichlorobenzene	ND	0.050	mg/Kg wet							
1,3-Dichlorobenzene	ND	0.050	mg/Kg wet							
1,4-Dichlorobenzene	ND	0.050	mg/Kg wet							
Dichlorodifluoromethane (Freon 12)	ND	0.10	mg/Kg wet							
1,1-Dichloroethane	ND	0.050	mg/Kg wet							
1,2-Dichloroethane	ND	0.050	mg/Kg wet							
1,1-Dichloroethylene	ND	0.050	mg/Kg wet							
cis-1,2-Dichloroethylene	ND	0.050	mg/Kg wet							
trans-1,2-Dichloroethylene	ND	0.050	mg/Kg wet							
1,2-Dichloropropane	ND	0.050	mg/Kg wet							
1,3-Dichloropropane	ND	0.025	mg/Kg wet							
2,2-Dichloropropane	ND	0.050	mg/Kg wet							
1,1-Dichloropropene	ND	0.10	mg/Kg wet							
cis-1,3-Dichloropropene	ND	0.025	mg/Kg wet							
trans-1,3-Dichloropropene	ND	0.025	mg/Kg wet							
Diethyl Ether	ND	0.10	mg/Kg wet							
Diisopropyl Ether (DIPE)	ND	0.025	mg/Kg wet							
1,4-Dioxane	ND	2.5	mg/Kg wet							
Ethylbenzene	ND	0.050	mg/Kg wet							
Hexachlorobutadiene	ND	0.050	mg/Kg wet							
2-Hexanone (MBK)	ND	0.50	mg/Kg wet							
Isopropylbenzene (Cumene)	ND	0.050	mg/Kg wet							
p-Isopropyltoluene (p-Cymene)	ND	0.050	mg/Kg wet							
Methyl tert-Butyl Ether (MTBE)	ND	0.050	mg/Kg wet							
Methylene Chloride	ND	0.25	mg/Kg wet							
4-Methyl-2-pentanone (MIBK)	ND	0.50	mg/Kg wet							
Naphthalene	ND	0.10	mg/Kg wet							

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QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B356331 - SW-846 5035											
Blank (B356331-BLK1)				Prepared & Analyzed: 10/26/23							
n-Propylbenzene	ND	0.050	mg/Kg wet								
Styrene	ND	0.050	mg/Kg wet								
1,1,1,2-Tetrachloroethane	ND	0.050	mg/Kg wet								
1,1,2,2-Tetrachloroethane	ND	0.025	mg/Kg wet								
Tetrachloroethylene	ND	0.050	mg/Kg wet								
Tetrahydrofuran	ND	0.20	mg/Kg wet								
Toluene	ND	0.050	mg/Kg wet								
1,2,3-Trichlorobenzene	ND	0.20	mg/Kg wet								
1,2,4-Trichlorobenzene	ND	0.050	mg/Kg wet								
1,1,1-Trichloroethane	ND	0.050	mg/Kg wet								
1,1,2-Trichloroethane	ND	0.050	mg/Kg wet								
Trichloroethylene	ND	0.050	mg/Kg wet								
Trichlorofluoromethane (Freon 11)	ND	0.10	mg/Kg wet								
1,2,3-Trichloropropane	ND	0.10	mg/Kg wet								
1,2,4-Trimethylbenzene	ND	0.050	mg/Kg wet								
1,3,5-Trimethylbenzene	ND	0.050	mg/Kg wet								
Vinyl Chloride	ND	0.10	mg/Kg wet							L-04, V-05	
m+p Xylene	ND	0.10	mg/Kg wet								
o-Xylene	ND	0.050	mg/Kg wet								
Surrogate: 1,2-Dichloroethane-d4	*0.0226*		mg/Kg wet	0.0250		90.6	70-130				
Surrogate: Toluene-d8	*0.0260*		mg/Kg wet	0.0250		104	70-130				
Surrogate: 4-Bromofluorobenzene	*0.0267*		mg/Kg wet	0.0250		107	70-130				
LCS (B356331-BS1)				Prepared & Analyzed: 10/26/23							
Acetone	4.07	2.5	mg/Kg wet	5.00		81.3	40-160			V-05, V-35	†
tert-Amyl Methyl Ether (TAME)	0.560	0.025	mg/Kg wet	0.500		112	70-130				
Benzene	0.545	0.050	mg/Kg wet	0.500		109	70-130				
Bromobenzene	0.534	0.050	mg/Kg wet	0.500		107	70-130				
Bromochloromethane	0.580	0.050	mg/Kg wet	0.500		116	70-130				
Bromodichloromethane	0.510	0.050	mg/Kg wet	0.500		102	70-130				
Bromoform	0.464	0.050	mg/Kg wet	0.500		92.8	70-130				
Bromomethane	0.440	0.10	mg/Kg wet	0.500		88.1	40-160			V-05, V-34	†
2-Butanone (MEK)	5.47	1.0	mg/Kg wet	5.00		109	40-160				†
n-Butylbenzene	0.486	0.050	mg/Kg wet	0.500		97.3	70-130				
sec-Butylbenzene	0.466	0.050	mg/Kg wet	0.500		93.2	70-130				
tert-Butylbenzene	0.454	0.050	mg/Kg wet	0.500		90.9	70-130				
tert-Butyl Ethyl Ether (TBEE)	0.558	0.025	mg/Kg wet	0.500		112	70-130				
Carbon Disulfide	5.13	0.50	mg/Kg wet	5.00		103	70-130			V-35	
Carbon Tetrachloride	0.554	0.050	mg/Kg wet	0.500		111	70-130				
Chlorobenzene	0.514	0.050	mg/Kg wet	0.500		103	70-130				
Chlorodibromomethane	0.502	0.025	mg/Kg wet	0.500		100	70-130				
Chloroethane	0.567	0.10	mg/Kg wet	0.500		113	70-130				
Chloroform	0.501	0.10	mg/Kg wet	0.500		100	70-130				
Chloromethane	0.262	0.10	mg/Kg wet	0.500		52.5	40-160			L-14, V-05, V-34	†
2-Chlorotoluene	0.471	0.050	mg/Kg wet	0.500		94.2	70-130				
4-Chlorotoluene	0.536	0.050	mg/Kg wet	0.500		107	70-130				
1,2-Dibromo-3-chloropropane (DBCP)	0.430	0.20	mg/Kg wet	0.500		85.9	70-130				
1,2-Dibromoethane (EDB)	0.545	0.025	mg/Kg wet	0.500		109	70-130				
Dibromomethane	0.506	0.050	mg/Kg wet	0.500		101	70-130				
1,2-Dichlorobenzene	0.450	0.050	mg/Kg wet	0.500		90.1	70-130				
1,3-Dichlorobenzene	0.468	0.050	mg/Kg wet	0.500		93.5	70-130				
1,4-Dichlorobenzene	0.456	0.050	mg/Kg wet	0.500		91.1	70-130				

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QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B356331 - SW-846 5035												
LCS (B356331-BS1)				Prepared & Analyzed: 10/26/23								
Dichlorodifluoromethane (Freon 12)	0.482	0.10	mg/Kg wet	0.500		96.3		40-160				†
1,1-Dichloroethane	0.528	0.050	mg/Kg wet	0.500		106		70-130				
1,2-Dichloroethane	0.456	0.050	mg/Kg wet	0.500		91.3		70-130				
1,1-Dichloroethylene	0.402	0.050	mg/Kg wet	0.500		80.3		70-130				
cis-1,2-Dichloroethylene	0.519	0.050	mg/Kg wet	0.500		104		70-130				
trans-1,2-Dichloroethylene	0.514	0.050	mg/Kg wet	0.500		103		70-130				
1,2-Dichloropropane	0.546	0.050	mg/Kg wet	0.500		109		70-130				
1,3-Dichloropropane	0.551	0.025	mg/Kg wet	0.500		110		70-130				
2,2-Dichloropropane	0.566	0.050	mg/Kg wet	0.500		113		70-130				
1,1-Dichloropropene	0.520	0.10	mg/Kg wet	0.500		104		70-130				
cis-1,3-Dichloropropene	0.544	0.025	mg/Kg wet	0.500		109		70-130				
trans-1,3-Dichloropropene	0.517	0.025	mg/Kg wet	0.500		103		70-130				
Diethyl Ether	0.460	0.10	mg/Kg wet	0.500		91.9		70-130				
Diisopropyl Ether (DIPE)	0.542	0.025	mg/Kg wet	0.500		108		70-130				
1,4-Dioxane	5.53	2.5	mg/Kg wet	5.00		111		40-160				†
Ethylbenzene	0.506	0.050	mg/Kg wet	0.500		101		70-130				
Hexachlorobutadiene	0.530	0.050	mg/Kg wet	0.500		106		70-130				
2-Hexanone (MBK)	5.67	0.50	mg/Kg wet	5.00		113		40-160				†
Isopropylbenzene (Cumene)	0.519	0.050	mg/Kg wet	0.500		104		70-130				
p-Isopropyltoluene (p-Cymene)	0.477	0.050	mg/Kg wet	0.500		95.4		70-130				
Methyl tert-Butyl Ether (MTBE)	0.554	0.050	mg/Kg wet	0.500		111		70-130				
Methylene Chloride	0.420	0.25	mg/Kg wet	0.500		84.0		70-130				
4-Methyl-2-pentanone (MIBK)	5.70	0.50	mg/Kg wet	5.00		114		40-160				†
Naphthalene	0.492	0.10	mg/Kg wet	0.500		98.3		70-130				
n-Propylbenzene	0.530	0.050	mg/Kg wet	0.500		106		70-130				
Styrene	0.522	0.050	mg/Kg wet	0.500		104		70-130				
1,1,1,2-Tetrachloroethane	0.494	0.050	mg/Kg wet	0.500		98.9		70-130				
1,1,2,2-Tetrachloroethane	0.521	0.025	mg/Kg wet	0.500		104		70-130				
Tetrachloroethylene	0.516	0.050	mg/Kg wet	0.500		103		70-130				
Tetrahydrofuran	0.528	0.20	mg/Kg wet	0.500		106		70-130				
Toluene	0.516	0.050	mg/Kg wet	0.500		103		70-130				
1,2,3-Trichlorobenzene	0.466	0.20	mg/Kg wet	0.500		93.3		70-130				
1,2,4-Trichlorobenzene	0.472	0.050	mg/Kg wet	0.500		94.5		70-130				
1,1,1-Trichloroethane	0.494	0.050	mg/Kg wet	0.500		98.8		70-130				
1,1,2-Trichloroethane	0.547	0.050	mg/Kg wet	0.500		109		70-130				
Trichloroethylene	0.528	0.050	mg/Kg wet	0.500		106		70-130				
Trichlorofluoromethane (Freon 11)	0.440	0.10	mg/Kg wet	0.500		88.0		70-130				
1,2,3-Trichloropropane	0.517	0.10	mg/Kg wet	0.500		103		70-130				
1,2,4-Trimethylbenzene	0.467	0.050	mg/Kg wet	0.500		93.4		70-130				
1,3,5-Trimethylbenzene	0.529	0.050	mg/Kg wet	0.500		106		70-130				
Vinyl Chloride	0.309	0.10	mg/Kg wet	0.500		**61.8**	*	70-130			L-04, V-05	
m+p Xylene	1.01	0.10	mg/Kg wet	1.00		101		70-130				
o-Xylene	0.518	0.050	mg/Kg wet	0.500		104		70-130				
Surrogate: 1,2-Dichloroethane-d4	*0.0224*		mg/Kg wet	0.0250		89.7		70-130				
Surrogate: Toluene-d8	*0.0257*		mg/Kg wet	0.0250		103		70-130				
Surrogate: 4-Bromofluorobenzene	*0.0283*		mg/Kg wet	0.0250		113		70-130				

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QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD		RPD Limit	Notes	
Batch B356331 - SW-846 5035												
LCS Dup (B356331-BSD1)				Prepared & Analyzed: 10/26/23								
Acetone	3.98	2.5	mg/Kg wet	5.00		79.6	40-160	2.16		20	V-05, V-35	†
tert-Amyl Methyl Ether (TAME)	0.547	0.025	mg/Kg wet	0.500		109	70-130	2.44		20		
Benzene	0.550	0.050	mg/Kg wet	0.500		110	70-130	0.822		20		
Bromobenzene	0.512	0.050	mg/Kg wet	0.500		102	70-130	4.30		20		
Bromochloromethane	0.582	0.050	mg/Kg wet	0.500		116	70-130	0.258		20		
Bromodichloromethane	0.518	0.050	mg/Kg wet	0.500		104	70-130	1.75		20		
Bromoform	0.444	0.050	mg/Kg wet	0.500		88.9	70-130	4.29		20		
Bromomethane	0.504	0.10	mg/Kg wet	0.500		101	40-160	13.4		20	V-05, V-34	†
2-Butanone (MEK)	6.78	1.0	mg/Kg wet	5.00		136	40-160	**21.3**	*	20		†
n-Butylbenzene	0.482	0.050	mg/Kg wet	0.500		96.5	70-130	0.826		20		
sec-Butylbenzene	0.470	0.050	mg/Kg wet	0.500		94.1	70-130	0.961		20		
tert-Butylbenzene	0.455	0.050	mg/Kg wet	0.500		91.0	70-130	0.110		20		
tert-Butyl Ethyl Ether (TBEE)	0.550	0.025	mg/Kg wet	0.500		110	70-130	1.45		20		
Carbon Disulfide	5.09	0.50	mg/Kg wet	5.00		102	70-130	0.783		20	V-35	
Carbon Tetrachloride	0.574	0.050	mg/Kg wet	0.500		115	70-130	3.72		20		
Chlorobenzene	0.490	0.050	mg/Kg wet	0.500		98.0	70-130	4.88		20		
Chlorodibromomethane	0.508	0.025	mg/Kg wet	0.500		102	70-130	1.29		20		
Chloroethane	0.546	0.10	mg/Kg wet	0.500		109	70-130	3.77		20		
Chloroform	0.512	0.10	mg/Kg wet	0.500		102	70-130	2.07		20		
Chloromethane	0.272	0.10	mg/Kg wet	0.500		54.5	40-160	3.74		20	L-14, V-05, V-34	†
2-Chlorotoluene	0.470	0.050	mg/Kg wet	0.500		94.1	70-130	0.106		20		
4-Chlorotoluene	0.514	0.050	mg/Kg wet	0.500		103	70-130	4.19		20		
1,2-Dibromo-3-chloropropane (DBCP)	0.399	0.20	mg/Kg wet	0.500		79.8	70-130	7.36		20		
1,2-Dibromoethane (EDB)	0.547	0.025	mg/Kg wet	0.500		109	70-130	0.366		20		
Dibromomethane	0.520	0.050	mg/Kg wet	0.500		104	70-130	2.63		20		
1,2-Dichlorobenzene	0.450	0.050	mg/Kg wet	0.500		90.1	70-130	0.00		20		
1,3-Dichlorobenzene	0.458	0.050	mg/Kg wet	0.500		91.7	70-130	1.94		20		
1,4-Dichlorobenzene	0.447	0.050	mg/Kg wet	0.500		89.4	70-130	1.88		20		
Dichlorodifluoromethane (Freon 12)	0.488	0.10	mg/Kg wet	0.500		97.6	40-160	1.34		20		†
1,1-Dichloroethane	0.541	0.050	mg/Kg wet	0.500		108	70-130	2.43		20		
1,2-Dichloroethane	0.454	0.050	mg/Kg wet	0.500		90.8	70-130	0.549		20		
1,1-Dichloroethylene	0.421	0.050	mg/Kg wet	0.500		84.2	70-130	4.74		20		
cis-1,2-Dichloroethylene	0.533	0.050	mg/Kg wet	0.500		107	70-130	2.66		20		
trans-1,2-Dichloroethylene	0.518	0.050	mg/Kg wet	0.500		104	70-130	0.776		20		
1,2-Dichloropropane	0.540	0.050	mg/Kg wet	0.500		108	70-130	1.10		20		
1,3-Dichloropropane	0.556	0.025	mg/Kg wet	0.500		111	70-130	0.813		20		
2,2-Dichloropropane	0.564	0.050	mg/Kg wet	0.500		113	70-130	0.442		20		
1,1-Dichloropropene	0.532	0.10	mg/Kg wet	0.500		106	70-130	2.28		20		
cis-1,3-Dichloropropene	0.538	0.025	mg/Kg wet	0.500		108	70-130	1.02		20		
trans-1,3-Dichloropropene	0.522	0.025	mg/Kg wet	0.500		104	70-130	0.867		20		
Diethyl Ether	0.452	0.10	mg/Kg wet	0.500		90.3	70-130	1.76		20		
Diisopropyl Ether (DIPE)	0.546	0.025	mg/Kg wet	0.500		109	70-130	0.735		20		
1,4-Dioxane	5.34	2.5	mg/Kg wet	5.00		107	40-160	3.44		20		†
Ethylbenzene	0.488	0.050	mg/Kg wet	0.500		97.7	70-130	3.62		20		
Hexachlorobutadiene	0.516	0.050	mg/Kg wet	0.500		103	70-130	2.68		20		
2-Hexanone (MBK)	5.56	0.50	mg/Kg wet	5.00		111	40-160	2.07		20		†
Isopropylbenzene (Cumene)	0.504	0.050	mg/Kg wet	0.500		101	70-130	3.03		20		
p-Isopropyltoluene (p-Cymene)	0.466	0.050	mg/Kg wet	0.500		93.3	70-130	2.23		20		
Methyl tert-Butyl Ether (MTBE)	0.548	0.050	mg/Kg wet	0.500		110	70-130	1.18		20		
Methylene Chloride	0.416	0.25	mg/Kg wet	0.500		83.3	70-130	0.837		20		
4-Methyl-2-pentanone (MIBK)	5.58	0.50	mg/Kg wet	5.00		112	40-160	2.28		20		†
Naphthalene	0.450	0.10	mg/Kg wet	0.500		90.0	70-130	8.82		20		

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QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B356331 - SW-846 5035											
LCS Dup (B356331-BSD1)				Prepared & Analyzed: 10/26/23							
n-Propylbenzene	0.510	0.050	mg/Kg wet	0.500		102		70-130	3.94	20	
Styrene	0.498	0.050	mg/Kg wet	0.500		99.7		70-130	4.51	20	
1,1,1,2-Tetrachloroethane	0.486	0.050	mg/Kg wet	0.500		97.2		70-130	1.73	20	
1,1,2,2-Tetrachloroethane	0.488	0.025	mg/Kg wet	0.500		97.5		70-130	6.64	20	
Tetrachloroethylene	0.524	0.050	mg/Kg wet	0.500		105		70-130	1.73	20	
Tetrahydrofuran	0.499	0.20	mg/Kg wet	0.500		99.8		70-130	5.55	20	
Toluene	0.530	0.050	mg/Kg wet	0.500		106		70-130	2.58	20	
1,2,3-Trichlorobenzene	0.450	0.20	mg/Kg wet	0.500		90.0		70-130	3.60	20	
1,2,4-Trichlorobenzene	0.440	0.050	mg/Kg wet	0.500		87.9		70-130	7.24	20	
1,1,1-Trichloroethane	0.502	0.050	mg/Kg wet	0.500		100		70-130	1.51	20	
1,1,2-Trichloroethane	0.549	0.050	mg/Kg wet	0.500		110		70-130	0.365	20	
Trichloroethylene	0.530	0.050	mg/Kg wet	0.500		106		70-130	0.378	20	
Trichlorofluoromethane (Freon 11)	0.459	0.10	mg/Kg wet	0.500		91.8		70-130	4.23	20	
1,2,3-Trichloropropane	0.500	0.10	mg/Kg wet	0.500		100		70-130	3.24	20	
1,2,4-Trimethylbenzene	0.460	0.050	mg/Kg wet	0.500		91.9		70-130	1.62	20	
1,3,5-Trimethylbenzene	0.510	0.050	mg/Kg wet	0.500		102		70-130	3.66	20	
Vinyl Chloride	0.299	0.10	mg/Kg wet	0.500		**59.8**	*	70-130	3.29	20	L-04, V-05
m+p Xylene	0.998	0.10	mg/Kg wet	1.00		99.8		70-130	1.44	20	
o-Xylene	0.509	0.050	mg/Kg wet	0.500		102		70-130	1.75	20	
Surrogate: 1,2-Dichloroethane-d4	*0.0224*		mg/Kg wet	0.0250		89.6		70-130			
Surrogate: Toluene-d8	*0.0258*		mg/Kg wet	0.0250		103		70-130			
Surrogate: 4-Bromofluorobenzene	*0.0272*		mg/Kg wet	0.0250		109		70-130			

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QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B356433 - SW-846 3546										
Blank (B356433-BLK1)				Prepared: 10/26/23 Analyzed: 11/01/23						
Biphenyl	ND	0.067	mg/Kg wet							
Acenaphthene	ND	0.17	mg/Kg wet							
Acenaphthylene	ND	0.17	mg/Kg wet							
Acetophenone	ND	0.34	mg/Kg wet							
Aniline	ND	0.34	mg/Kg wet							
Anthracene	ND	0.17	mg/Kg wet							
Benzo(a)anthracene	ND	0.17	mg/Kg wet							
Benzo(a)pyrene	ND	0.17	mg/Kg wet							
Benzo(b)fluoranthene	ND	0.17	mg/Kg wet							
Benzo(g,h,i)perylene	ND	0.17	mg/Kg wet							
Benzo(k)fluoranthene	ND	0.17	mg/Kg wet							
Bis(2-chloroethoxy)methane	ND	0.34	mg/Kg wet							
Bis(2-chloroethyl)ether	ND	0.34	mg/Kg wet							
Bis(2-chloroisopropyl)ether	ND	0.34	mg/Kg wet							
Bis(2-Ethylhexyl)phthalate	ND	0.34	mg/Kg wet							
4-Bromophenylphenylether	ND	0.34	mg/Kg wet							
Butylbenzylphthalate	ND	0.34	mg/Kg wet							
4-Chloroaniline	ND	0.66	mg/Kg wet							
2-Chloronaphthalene	ND	0.34	mg/Kg wet							
2-Chlorophenol	ND	0.34	mg/Kg wet							
Chrysene	ND	0.17	mg/Kg wet							
Dibenz(a,h)anthracene	ND	0.17	mg/Kg wet							
Dibenzofuran	ND	0.34	mg/Kg wet							
Di-n-butylphthalate	ND	0.34	mg/Kg wet							
1,2-Dichlorobenzene	ND	0.34	mg/Kg wet							
1,3-Dichlorobenzene	ND	0.34	mg/Kg wet							
1,4-Dichlorobenzene	ND	0.34	mg/Kg wet							
3,3-Dichlorobenzidine	ND	0.17	mg/Kg wet							
2,4-Dichlorophenol	ND	0.34	mg/Kg wet							
Diethylphthalate	ND	0.34	mg/Kg wet							
2,4-Dimethylphenol	ND	0.34	mg/Kg wet							
Dimethylphthalate	ND	0.34	mg/Kg wet							
2,4-Dinitrophenol	ND	0.66	mg/Kg wet							
2,4-Dinitrotoluene	ND	0.34	mg/Kg wet							
2,6-Dinitrotoluene	ND	0.34	mg/Kg wet							
Di-n-octylphthalate	ND	0.34	mg/Kg wet							V-05
1,2-Diphenylhydrazine/Azobenzene	ND	0.34	mg/Kg wet							
Fluoranthene	ND	0.17	mg/Kg wet							
Fluorene	ND	0.17	mg/Kg wet							
Hexachlorobenzene	ND	0.34	mg/Kg wet							
Hexachlorobutadiene	ND	0.34	mg/Kg wet							
Hexachloroethane	ND	0.34	mg/Kg wet							
Indeno(1,2,3-cd)pyrene	ND	0.17	mg/Kg wet							
Isophorone	ND	0.34	mg/Kg wet							
2-Methylnaphthalene	ND	0.17	mg/Kg wet							
2-Methylphenol	ND	0.34	mg/Kg wet							
3/4-Methylphenol	ND	0.34	mg/Kg wet							
Naphthalene	ND	0.17	mg/Kg wet							
Nitrobenzene	ND	0.34	mg/Kg wet							
2-Nitrophenol	ND	0.34	mg/Kg wet							
4-Nitrophenol	ND	0.66	mg/Kg wet							
Pentachlorophenol	ND	0.34	mg/Kg wet							

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QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B356433 - SW-846 3546										
Blank (B356433-BLK1)				Prepared: 10/26/23 Analyzed: 11/01/23						
Phenanthrene	ND	0.17	mg/Kg wet							
Phenol	ND	0.34	mg/Kg wet							
Pyrene	ND	0.17	mg/Kg wet							
Pyridine	ND	0.34	mg/Kg wet							
1,2,4-Trichlorobenzene	ND	0.34	mg/Kg wet							
2,4,5-Trichlorophenol	ND	0.34	mg/Kg wet							
2,4,6-Trichlorophenol	ND	0.34	mg/Kg wet							
Surrogate: 2-Fluorophenol	*4.40*		mg/Kg wet	6.67		66.1	30-130			
Surrogate: Phenol-d6	*4.57*		mg/Kg wet	6.67		68.6	30-130			
Surrogate: Nitrobenzene-d5	*1.94*		mg/Kg wet	3.33		58.2	30-130			
Surrogate: 2-Fluorobiphenyl	*2.01*		mg/Kg wet	3.33		60.2	30-130			
Surrogate: 2,4,6-Tribromophenol	*4.51*		mg/Kg wet	6.67		67.6	30-130			
Surrogate: p-Terphenyl-d14	*2.53*		mg/Kg wet	3.33		75.8	30-130			
LCS (B356433-BS1)				Prepared: 10/26/23 Analyzed: 11/01/23						
Biphenyl	1.04	0.067	mg/Kg wet	1.67		62.7	40-140			
Acenaphthene	1.03	0.17	mg/Kg wet	1.67		61.9	40-140			
Acenaphthylene	1.17	0.17	mg/Kg wet	1.67		70.4	40-140			
Acetophenone	1.17	0.34	mg/Kg wet	1.67		70.3	40-140			
Aniline	0.890	0.34	mg/Kg wet	1.67		53.4	40-140			
Anthracene	1.19	0.17	mg/Kg wet	1.67		71.1	40-140			
Benzo(a)anthracene	1.15	0.17	mg/Kg wet	1.67		69.0	40-140			
Benzo(a)pyrene	1.19	0.17	mg/Kg wet	1.67		71.4	40-140			
Benzo(b)fluoranthene	1.16	0.17	mg/Kg wet	1.67		69.8	40-140			
Benzo(g,h,i)perylene	1.38	0.17	mg/Kg wet	1.67		83.0	40-140			
Benzo(k)fluoranthene	1.26	0.17	mg/Kg wet	1.67		75.4	40-140			
Bis(2-chloroethoxy)methane	1.07	0.34	mg/Kg wet	1.67		64.5	40-140			
Bis(2-chloroethyl)ether	1.23	0.34	mg/Kg wet	1.67		73.5	40-140			
Bis(2-chloroisopropyl)ether	1.58	0.34	mg/Kg wet	1.67		94.6	40-140			
Bis(2-Ethylhexyl)phthalate	0.905	0.34	mg/Kg wet	1.67		54.3	40-140			
4-Bromophenylphenylether	1.08	0.34	mg/Kg wet	1.67		65.1	40-140			
Butylbenzylphthalate	1.01	0.34	mg/Kg wet	1.67		60.5	40-140			
4-Chloroaniline	0.756	0.66	mg/Kg wet	1.67		45.4	15-140			†
2-Chloronaphthalene	0.962	0.34	mg/Kg wet	1.67		57.7	40-140			
2-Chlorophenol	1.20	0.34	mg/Kg wet	1.67		72.1	30-130			
Chrysene	1.18	0.17	mg/Kg wet	1.67		70.9	40-140			
Dibenz(a,h)anthracene	1.38	0.17	mg/Kg wet	1.67		82.7	40-140			
Dibenzofuran	1.19	0.34	mg/Kg wet	1.67		71.4	40-140			
Di-n-butylphthalate	1.03	0.34	mg/Kg wet	1.67		62.1	40-140			
1,2-Dichlorobenzene	1.09	0.34	mg/Kg wet	1.67		65.3	40-140			
1,3-Dichlorobenzene	1.06	0.34	mg/Kg wet	1.67		63.9	40-140			
1,4-Dichlorobenzene	1.07	0.34	mg/Kg wet	1.67		63.9	40-140			
3,3-Dichlorobenzidine	1.00	0.17	mg/Kg wet	1.67		60.2	40-140			
2,4-Dichlorophenol	1.16	0.34	mg/Kg wet	1.67		69.4	30-130			
Diethylphthalate	1.20	0.34	mg/Kg wet	1.67		71.7	40-140			
2,4-Dimethylphenol	0.972	0.34	mg/Kg wet	1.67		58.3	30-130			
Dimethylphthalate	1.20	0.34	mg/Kg wet	1.67		72.0	40-140			
2,4-Dinitrophenol	1.05	0.66	mg/Kg wet	1.67		62.9	15-140			†
2,4-Dinitrotoluene	1.33	0.34	mg/Kg wet	1.67		79.9	40-140			
2,6-Dinitrotoluene	1.28	0.34	mg/Kg wet	1.67		76.7	40-140			
Di-n-octylphthalate	0.838	0.34	mg/Kg wet	1.67		50.3	40-140			V-05
1,2-Diphenylhydrazine/Azobenzene	1.11	0.34	mg/Kg wet	1.67		66.6	40-140			

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QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B356433 - SW-846 3546										
LCS (B356433-BS1)				Prepared: 10/26/23 Analyzed: 11/01/23						
Fluoranthene	1.16	0.17	mg/Kg wet	1.67		69.4	40-140			
Fluorene	1.18	0.17	mg/Kg wet	1.67		71.1	40-140			
Hexachlorobenzene	1.17	0.34	mg/Kg wet	1.67		70.0	40-140			
Hexachlorobutadiene	0.992	0.34	mg/Kg wet	1.67		59.5	40-140			
Hexachloroethane	1.03	0.34	mg/Kg wet	1.67		62.1	40-140			
Indeno(1,2,3-cd)pyrene	1.34	0.17	mg/Kg wet	1.67		80.4	40-140			
Isophorone	1.15	0.34	mg/Kg wet	1.67		68.9	40-140			
2-Methylnaphthalene	1.14	0.17	mg/Kg wet	1.67		68.2	40-140			
2-Methylphenol	1.19	0.34	mg/Kg wet	1.67		71.3	30-130			
3/4-Methylphenol	1.32	0.34	mg/Kg wet	1.67		79.1	30-130			
Naphthalene	1.09	0.17	mg/Kg wet	1.67		65.3	40-140			
Nitrobenzene	1.09	0.34	mg/Kg wet	1.67		65.3	40-140			
2-Nitrophenol	1.15	0.34	mg/Kg wet	1.67		69.1	30-130			
4-Nitrophenol	1.40	0.66	mg/Kg wet	1.67		83.9	15-140			†
Pentachlorophenol	0.953	0.34	mg/Kg wet	1.67		57.2	30-130			
Phenanthrene	1.22	0.17	mg/Kg wet	1.67		73.4	40-140			
Phenol	1.19	0.34	mg/Kg wet	1.67		71.4	15-140			†
Pyrene	1.19	0.17	mg/Kg wet	1.67		71.2	40-140			
Pyridine	0.776	0.34	mg/Kg wet	1.67		46.5	30-140			†
1,2,4-Trichlorobenzene	1.05	0.34	mg/Kg wet	1.67		62.7	40-140			
2,4,5-Trichlorophenol	1.24	0.34	mg/Kg wet	1.67		74.5	30-130			
2,4,6-Trichlorophenol	1.13	0.34	mg/Kg wet	1.67		67.7	30-130			
Surrogate: 2-Fluorophenol	*5.18*		mg/Kg wet	6.67		77.7	30-130			
Surrogate: Phenol-d6	*5.35*		mg/Kg wet	6.67		80.2	30-130			
Surrogate: Nitrobenzene-d5	*2.23*		mg/Kg wet	3.33		66.9	30-130			
Surrogate: 2-Fluorobiphenyl	*2.10*		mg/Kg wet	3.33		63.0	30-130			
Surrogate: 2,4,6-Tribromophenol	*5.45*		mg/Kg wet	6.67		81.8	30-130			
Surrogate: p-Terphenyl-d14	*2.15*		mg/Kg wet	3.33		64.5	30-130			
LCS Dup (B356433-BSD1)				Prepared: 10/26/23 Analyzed: 11/01/23						
Biphenyl	1.09	0.067	mg/Kg wet	1.66		65.8	40-140	4.19	20	
Acenaphthene	1.08	0.17	mg/Kg wet	1.66		65.5	40-140	5.02	30	
Acenaphthylene	1.22	0.17	mg/Kg wet	1.66		73.8	40-140	4.08	30	
Acetophenone	1.24	0.34	mg/Kg wet	1.66		75.2	40-140	5.96	30	
Aniline	0.915	0.34	mg/Kg wet	1.66		55.2	40-140	2.72	30	
Anthracene	1.16	0.17	mg/Kg wet	1.66		70.3	40-140	1.80	30	
Benzo(a)anthracene	1.13	0.17	mg/Kg wet	1.66		68.2	40-140	1.92	30	
Benzo(a)pyrene	1.15	0.17	mg/Kg wet	1.66		69.5	40-140	3.42	30	
Benzo(b)fluoranthene	1.13	0.17	mg/Kg wet	1.66		68.3	40-140	2.95	30	
Benzo(g,h,i)perylene	1.36	0.17	mg/Kg wet	1.66		82.4	40-140	1.39	30	
Benzo(k)fluoranthene	1.22	0.17	mg/Kg wet	1.66		73.9	40-140	2.70	30	
Bis(2-chloroethoxy)methane	1.16	0.34	mg/Kg wet	1.66		70.1	40-140	7.66	30	
Bis(2-chloroethyl)ether	1.28	0.34	mg/Kg wet	1.66		77.3	40-140	4.40	30	
Bis(2-chloroisopropyl)ether	1.71	0.34	mg/Kg wet	1.66		103	40-140	7.90	30	
Bis(2-Ethylhexyl)phthalate	0.901	0.34	mg/Kg wet	1.66		54.4	40-140	0.481	30	
4-Bromophenylphenylether	1.10	0.34	mg/Kg wet	1.66		66.3	40-140	1.19	30	
Butylbenzylphthalate	1.03	0.34	mg/Kg wet	1.66		62.0	40-140	1.75	30	
4-Chloroaniline	0.854	0.66	mg/Kg wet	1.66		51.6	15-140	12.2	30	†
2-Chloronaphthalene	1.02	0.34	mg/Kg wet	1.66		61.7	40-140	5.94	30	
2-Chlorophenol	1.31	0.34	mg/Kg wet	1.66		79.3	30-130	8.80	30	
Chrysene	1.17	0.17	mg/Kg wet	1.66		70.6	40-140	1.17	30	
Dibenz(a,h)anthracene	1.38	0.17	mg/Kg wet	1.66		83.1	40-140	0.158	30	

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QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch B356433 - SW-846 3546											
LCS Dup (B356433-BSD1)				Prepared: 10/26/23 Analyzed: 11/01/23							
Dibenzofuran	1.24	0.34	mg/Kg wet	1.66		74.9	40-140	4.10	30		
Di-n-butylphthalate	1.03	0.34	mg/Kg wet	1.66		62.5	40-140	0.00976	30		
1,2-Dichlorobenzene	1.14	0.34	mg/Kg wet	1.66		68.6	40-140	4.32	30		
1,3-Dichlorobenzene	1.10	0.34	mg/Kg wet	1.66		66.7	40-140	3.65	30		
1,4-Dichlorobenzene	1.09	0.34	mg/Kg wet	1.66		66.0	40-140	2.57	30		
3,3-Dichlorobenzidine	0.994	0.17	mg/Kg wet	1.66		60.0	40-140	0.964	30		
2,4-Dichlorophenol	1.24	0.34	mg/Kg wet	1.66		75.2	30-130	7.36	30		
Diethylphthalate	1.22	0.34	mg/Kg wet	1.66		73.5	40-140	1.81	30		
2,4-Dimethylphenol	1.10	0.34	mg/Kg wet	1.66		66.2	30-130	12.0	30		
Dimethylphthalate	1.23	0.34	mg/Kg wet	1.66		74.1	40-140	2.21	30		
2,4-Dinitrophenol	1.01	0.66	mg/Kg wet	1.66		61.2	15-140	3.40	30		†
2,4-Dinitrotoluene	1.34	0.34	mg/Kg wet	1.66		81.1	40-140	0.852	30		
2,6-Dinitrotoluene	1.31	0.34	mg/Kg wet	1.66		78.9	40-140	2.22	30		
Di-n-octylphthalate	0.828	0.34	mg/Kg wet	1.66		50.0	40-140	1.14	30	V-05	
1,2-Diphenylhydrazine/Azobenzene	1.13	0.34	mg/Kg wet	1.66		68.0	40-140	1.48	30		
Fluoranthene	1.12	0.17	mg/Kg wet	1.66		67.5	40-140	3.38	30		
Fluorene	1.20	0.17	mg/Kg wet	1.66		72.6	40-140	1.42	30		
Hexachlorobenzene	1.17	0.34	mg/Kg wet	1.66		70.6	40-140	0.189	30		
Hexachlorobutadiene	1.04	0.34	mg/Kg wet	1.66		62.7	40-140	4.54	30		
Hexachloroethane	1.06	0.34	mg/Kg wet	1.66		64.3	40-140	2.88	30		
Indeno(1,2,3-cd)pyrene	1.30	0.17	mg/Kg wet	1.66		78.8	40-140	2.62	30		
Isophorone	1.22	0.34	mg/Kg wet	1.66		73.7	40-140	6.06	30		
2-Methylnaphthalene	1.21	0.17	mg/Kg wet	1.66		73.4	40-140	6.63	30		
2-Methylphenol	1.31	0.34	mg/Kg wet	1.66		79.1	30-130	9.60	30		
3/4-Methylphenol	1.42	0.34	mg/Kg wet	1.66		85.6	30-130	7.16	30		
Naphthalene	1.15	0.17	mg/Kg wet	1.66		69.3	40-140	5.28	30		
Nitrobenzene	1.16	0.34	mg/Kg wet	1.66		70.2	40-140	6.57	30		
2-Nitrophenol	1.24	0.34	mg/Kg wet	1.66		74.7	30-130	7.21	30		
4-Nitrophenol	1.39	0.66	mg/Kg wet	1.66		84.0	15-140	0.569	30		†
Pentachlorophenol	1.03	0.34	mg/Kg wet	1.66		62.1	30-130	7.62	30		
Phenanthrene	1.20	0.17	mg/Kg wet	1.66		72.2	40-140	2.20	30		
Phenol	1.29	0.34	mg/Kg wet	1.66		77.8	15-140	7.84	30		†
Pyrene	1.19	0.17	mg/Kg wet	1.66		71.8	40-140	0.231	30		
Pyridine	0.822	0.34	mg/Kg wet	1.66		49.6	30-140	5.78	30		†
1,2,4-Trichlorobenzene	1.13	0.34	mg/Kg wet	1.66		68.3	40-140	7.85	30		
2,4,5-Trichlorophenol	1.25	0.34	mg/Kg wet	1.66		75.4	30-130	0.563	30		
2,4,6-Trichlorophenol	1.21	0.34	mg/Kg wet	1.66		73.3	30-130	7.31	30		
Surrogate: 2-Fluorophenol	*5.41*		mg/Kg wet	6.62		81.7	30-130				
Surrogate: Phenol-d6	*5.78*		mg/Kg wet	6.62		87.2	30-130				
Surrogate: Nitrobenzene-d5	*2.37*		mg/Kg wet	3.31		71.6	30-130				
Surrogate: 2-Fluorobiphenyl	*2.16*		mg/Kg wet	3.31		65.3	30-130				
Surrogate: 2,4,6-Tribromophenol	*5.74*		mg/Kg wet	6.62		86.6	30-130				
Surrogate: p-Terphenyl-d14	*2.20*		mg/Kg wet	3.31		66.5	30-130				

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QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B356433 - SW-846 3546											
Matrix Spike (B356433-MS1)	**Source: 23J3373-01**			Prepared: 10/26/23 Analyzed: 11/01/23							
Biphenyl	4.63	0.26	mg/Kg dry	6.56	0.491	63.2		40-140			
Acenaphthene	6.19	0.67	mg/Kg dry	6.56	1.93	65.0		40-140			
Acenaphthylene	7.30	0.67	mg/Kg dry	6.56	2.94	66.5		40-140			
Acetophenone	4.70	1.3	mg/Kg dry	6.56	ND	71.6		40-140			
Aniline	2.49	1.3	mg/Kg dry	6.56	ND	**37.9**	*	40-140			MS-07A
Anthracene	13.0	0.67	mg/Kg dry	6.56	8.64	66.7		40-140			
Benzo(a)anthracene	24.3	0.67	mg/Kg dry	6.56	14.5	**148**	*	40-140			MS-22
Benzo(a)pyrene	23.2	0.67	mg/Kg dry	6.56	14.1	139		40-140			
Benzo(b)fluoranthene	29.9	0.67	mg/Kg dry	6.56	18.0	**181**	*	40-140			MS-22
Benzo(g,h,i)perylene	17.8	0.67	mg/Kg dry	6.56	9.00	135		40-140			
Benzo(k)fluoranthene	15.2	0.67	mg/Kg dry	6.56	6.51	132		40-140			
Bis(2-chloroethoxy)methane	4.39	1.3	mg/Kg dry	6.56	ND	66.9		40-140			
Bis(2-chloroethyl)ether	4.98	1.3	mg/Kg dry	6.56	ND	76.0		40-140			
Bis(2-chloroisopropyl)ether	5.50	1.3	mg/Kg dry	6.56	ND	83.8		40-140			
Bis(2-Ethylhexyl)phthalate	23.3	1.3	mg/Kg dry	6.56	19.1	63.8		40-140			
4-Bromophenylphenylether	5.69	1.3	mg/Kg dry	6.56	ND	86.7		40-140			
Butylbenzylphthalate	4.91	1.3	mg/Kg dry	6.56	ND	74.9		40-140			
4-Chloroaniline	3.79	2.6	mg/Kg dry	6.56	ND	57.7		40-140			
2-Chloronaphthalene	4.14	1.3	mg/Kg dry	6.56	ND	63.2		40-140			
2-Chlorophenol	4.77	1.3	mg/Kg dry	6.56	ND	72.8		30-130			
Chrysene	21.5	0.67	mg/Kg dry	6.56	12.0	**145**	*	40-140			MS-22
Dibenz(a,h)anthracene	8.28	0.67	mg/Kg dry	6.56	2.40	89.6		40-140			
Dibenzofuran	6.79	1.3	mg/Kg dry	6.56	1.94	73.9		40-140			
Di-n-butylphthalate	4.17	1.3	mg/Kg dry	6.56	ND	63.6		40-140			
1,2-Dichlorobenzene	4.40	1.3	mg/Kg dry	6.56	ND	67.1		40-140			
1,3-Dichlorobenzene	4.33	1.3	mg/Kg dry	6.56	ND	66.0		40-140			
1,4-Dichlorobenzene	4.30	1.3	mg/Kg dry	6.56	ND	65.5		40-140			
3,3-Dichlorobenzidine	3.54	0.67	mg/Kg dry	6.56	ND	53.9		40-140			
2,4-Dichlorophenol	4.70	1.3	mg/Kg dry	6.56	ND	71.6		30-130			
Diethylphthalate	4.50	1.3	mg/Kg dry	6.56	ND	68.6		40-140			
2,4-Dimethylphenol	4.54	1.3	mg/Kg dry	6.56	ND	69.2		30-130			
Dimethylphthalate	4.64	1.3	mg/Kg dry	6.56	ND	70.8		40-140			
2,4-Dinitrophenol	ND	0.0	mg/Kg dry	6.56	ND		*	30-130			MS-07A
2,4-Dinitrotoluene	5.35	1.3	mg/Kg dry	6.56	ND	81.5		40-140			
2,6-Dinitrotoluene	4.80	1.3	mg/Kg dry	6.56	ND	73.3		40-140			
Di-n-octylphthalate	5.77	1.3	mg/Kg dry	6.56	0.879	74.6		40-140			V-05
1,2-Diphenylhydrazine/Azobenzene	4.08	1.3	mg/Kg dry	6.56	ND	62.2		40-140			
Fluoranthene	37.5	0.67	mg/Kg dry	6.56	27.6	**151**	*	40-140			MS-07A
Fluorene	7.12	0.67	mg/Kg dry	6.56	2.47	71.0		40-140			
Hexachlorobenzene	5.40	1.3	mg/Kg dry	6.56	ND	82.3		40-140			
Hexachlorobutadiene	4.49	1.3	mg/Kg dry	6.56	ND	68.4		40-140			
Hexachloroethane	3.36	1.3	mg/Kg dry	6.56	ND	51.2		40-140			R-06
Indeno(1,2,3-cd)pyrene	19.7	0.67	mg/Kg dry	6.56	9.79	**152**	*	40-140			MS-22
Isophorone	5.35	1.3	mg/Kg dry	6.56	ND	81.6		40-140			
2-Methylnaphthalene	6.50	0.67	mg/Kg dry	6.56	1.32	78.9		40-140			
2-Methylphenol	4.65	1.3	mg/Kg dry	6.56	ND	70.9		30-130			
3/4-Methylphenol	5.09	1.3	mg/Kg dry	6.56	ND	77.6		30-130			
Naphthalene	8.59	0.67	mg/Kg dry	6.56	3.93	71.1		40-140			
Nitrobenzene	4.56	1.3	mg/Kg dry	6.56	ND	69.5		40-140			
2-Nitrophenol	3.77	1.3	mg/Kg dry	6.56	ND	57.4		30-130			
4-Nitrophenol	6.11	2.6	mg/Kg dry	6.56	ND	93.1		30-130			
Pentachlorophenol	2.20	1.3	mg/Kg dry	6.56	ND	33.6		30-130			R-06

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QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B356433 - SW-846 3546											
Matrix Spike (B356433-MS1)	**Source: 23J3373-01**			Prepared: 10/26/23 Analyzed: 11/01/23							
Phenanthrene	14.6	0.67	mg/Kg dry	6.56	9.80	73.5		40-140			
Phenol	4.69	1.3	mg/Kg dry	6.56	ND	71.4		30-130			
Pyrene	44.0	0.67	mg/Kg dry	6.56	44.1	**-1.60**	*	40-140			MS-22
Pyridine	3.15	1.3	mg/Kg dry	6.56	ND	48.0		40-140			
1,2,4-Trichlorobenzene	4.73	1.3	mg/Kg dry	6.56	ND	72.2		40-140			
2,4,5-Trichlorophenol	4.33	1.3	mg/Kg dry	6.56	ND	66.0		30-130			
2,4,6-Trichlorophenol	4.33	1.3	mg/Kg dry	6.56	ND	66.0		30-130			
Surrogate: 2-Fluorophenol	*19.7*		mg/Kg dry	26.2		75.3		30-130			
Surrogate: Phenol-d6	*19.9*		mg/Kg dry	26.2		75.8		30-130			
Surrogate: Nitrobenzene-d5	*9.85*		mg/Kg dry	13.1		75.1		30-130			
Surrogate: 2-Fluorobiphenyl	*8.23*		mg/Kg dry	13.1		62.8		30-130			
Surrogate: 2,4,6-Tribromophenol	*23.9*		mg/Kg dry	26.2		91.0		30-130			
Surrogate: p-Terphenyl-d14	*6.82*		mg/Kg dry	13.1		52.0		30-130			
Matrix Spike Dup (B356433-MSD1)	**Source: 23J3373-01**			Prepared: 10/26/23 Analyzed: 11/01/23							
Biphenyl	4.98	0.26	mg/Kg dry	6.56	0.491	68.4		40-140	7.15	30	
Acenaphthene	6.15	0.67	mg/Kg dry	6.56	1.93	64.4		40-140	0.574	30	
Acenaphthylene	7.85	0.67	mg/Kg dry	6.56	2.94	74.9		40-140	7.25	30	
Acetophenone	4.80	1.3	mg/Kg dry	6.56	ND	73.2		40-140	2.13	30	
Aniline	2.34	1.3	mg/Kg dry	6.56	ND	**35.7**	*	40-140	6.08	30	MS-07A
Anthracene	14.1	0.67	mg/Kg dry	6.56	8.64	83.1		40-140	7.95	30	
Benzo(a)anthracene	21.8	0.67	mg/Kg dry	6.56	14.5	110		40-140	10.8	30	
Benzo(a)pyrene	21.3	0.67	mg/Kg dry	6.56	14.1	110		40-140	8.77	30	
Benzo(b)fluoranthene	25.8	0.67	mg/Kg dry	6.56	18.0	119		40-140	14.7	30	
Benzo(g,h,i)perylene	16.1	0.67	mg/Kg dry	6.56	9.00	108		40-140	10.3	30	
Benzo(k)fluoranthene	12.7	0.67	mg/Kg dry	6.56	6.51	94.7		40-140	17.6	30	
Bis(2-chloroethoxy)methane	4.35	1.3	mg/Kg dry	6.56	ND	66.3		40-140	0.841	30	
Bis(2-chloroethyl)ether	4.96	1.3	mg/Kg dry	6.56	ND	75.6		40-140	0.501	30	
Bis(2-chloroisopropyl)ether	5.63	1.3	mg/Kg dry	6.56	ND	85.9		40-140	2.40	30	
Bis(2-Ethylhexyl)phthalate	24.8	1.3	mg/Kg dry	6.56	19.1	86.3		40-140	6.14	30	
4-Bromophenylphenylether	5.50	1.3	mg/Kg dry	6.56	ND	83.8		40-140	3.38	30	
Butylbenzylphthalate	5.34	1.3	mg/Kg dry	6.56	ND	81.4		40-140	8.31	30	
4-Chloroaniline	3.41	2.6	mg/Kg dry	6.56	ND	52.0		40-140	10.5	30	
2-Chloronaphthalene	4.34	1.3	mg/Kg dry	6.56	ND	66.1		40-140	4.58	30	
2-Chlorophenol	4.75	1.3	mg/Kg dry	6.56	ND	72.4		30-130	0.523	30	
Chrysene	20.5	0.67	mg/Kg dry	6.56	12.0	129		40-140	5.07	30	
Dibenz(a,h)anthracene	8.10	0.67	mg/Kg dry	6.56	2.40	86.9		40-140	2.18	30	
Dibenzofuran	6.73	1.3	mg/Kg dry	6.56	1.94	73.0		40-140	0.874	30	
Di-n-butylphthalate	4.19	1.3	mg/Kg dry	6.56	ND	64.0		40-140	0.596	30	
1,2-Dichlorobenzene	4.51	1.3	mg/Kg dry	6.56	ND	68.7		40-140	2.42	30	
1,3-Dichlorobenzene	4.36	1.3	mg/Kg dry	6.56	ND	66.4		40-140	0.574	30	
1,4-Dichlorobenzene	4.40	1.3	mg/Kg dry	6.56	ND	67.1		40-140	2.41	30	
3,3-Dichlorobenzidine	3.66	0.67	mg/Kg dry	6.56	ND	55.8		40-140	3.39	30	
2,4-Dichlorophenol	4.98	1.3	mg/Kg dry	6.56	ND	75.9		30-130	5.75	30	
Diethylphthalate	4.56	1.3	mg/Kg dry	6.56	ND	69.5		40-140	1.36	30	
2,4-Dimethylphenol	4.63	1.3	mg/Kg dry	6.56	ND	70.6		30-130	1.95	30	
Dimethylphthalate	4.90	1.3	mg/Kg dry	6.56	ND	74.7		40-140	5.36	30	
2,4-Dinitrophenol	ND	0.0	mg/Kg dry	6.56	ND		*	30-130	NC	30	MS-07A
2,4-Dinitrotoluene	5.71	1.3	mg/Kg dry	6.56	ND	87.1		40-140	6.55	30	
2,6-Dinitrotoluene	5.09	1.3	mg/Kg dry	6.56	ND	77.6		40-140	5.75	30	
Di-n-octylphthalate	4.98	1.3	mg/Kg dry	6.56	0.879	62.6		40-140	14.7	30	V-05
1,2-Diphenylhydrazine/Azobenzene	4.12	1.3	mg/Kg dry	6.56	ND	62.9		40-140	1.06	30	

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QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD		RPD Limit	Notes
Batch B356433 - SW-846 3546												
Matrix Spike Dup (B356433-MSD1)		**Source: 23J3373-01**			Prepared: 10/26/23 Analyzed: 11/01/23							
Fluoranthene	37.1	0.67	mg/Kg dry	6.56	27.6	**144**	*	40-140	1.10		30	MS-07A
Fluorene	6.92	0.67	mg/Kg dry	6.56	2.47	67.9		40-140	2.86		30	
Hexachlorobenzene	5.57	1.3	mg/Kg dry	6.56	ND	85.0		40-140	3.20		30	
Hexachlorobutadiene	4.61	1.3	mg/Kg dry	6.56	ND	70.3		40-140	2.74		30	
Hexachloroethane	1.91	1.3	mg/Kg dry	6.56	ND	**29.1**	*	40-140	**55.1**	*	30	MS-23
Indeno(1,2,3-cd)pyrene	18.6	0.67	mg/Kg dry	6.56	9.79	134		40-140	5.92		30	
Isophorone	5.37	1.3	mg/Kg dry	6.56	ND	81.8		40-140	0.294		30	
2-Methylnaphthalene	6.72	0.67	mg/Kg dry	6.56	1.32	82.2		40-140	3.26		30	
2-Methylphenol	4.83	1.3	mg/Kg dry	6.56	ND	73.7		30-130	3.76		30	
3/4-Methylphenol	5.25	1.3	mg/Kg dry	6.56	ND	80.1		30-130	3.12		30	
Naphthalene	9.08	0.67	mg/Kg dry	6.56	3.93	78.5		40-140	5.54		30	
Nitrobenzene	4.54	1.3	mg/Kg dry	6.56	ND	69.2		40-140	0.375		30	
2-Nitrophenol	3.60	1.3	mg/Kg dry	6.56	ND	54.8		30-130	4.63		30	
4-Nitrophenol	6.95	2.6	mg/Kg dry	6.56	ND	106		30-130	12.9		30	
Pentachlorophenol	3.15	1.3	mg/Kg dry	6.56	ND	48.0		30-130	**35.4**	*	30	R-06
Phenanthrene	14.2	0.67	mg/Kg dry	6.56	9.80	67.7		40-140	2.62		30	
Phenol	4.74	1.3	mg/Kg dry	6.56	ND	72.3		30-130	1.22		30	
Pyrene	50.3	0.67	mg/Kg dry	6.56	44.1	93.6		40-140	13.2		30	
Pyridine	2.81	1.3	mg/Kg dry	6.56	ND	42.9		40-140	11.2		30	
1,2,4-Trichlorobenzene	4.73	1.3	mg/Kg dry	6.56	ND	72.2		40-140	0.0277		30	
2,4,5-Trichlorophenol	4.72	1.3	mg/Kg dry	6.56	ND	72.0		30-130	8.75		30	
2,4,6-Trichlorophenol	4.95	1.3	mg/Kg dry	6.56	ND	75.5		30-130	13.5		30	
Surrogate: 2-Fluorophenol	*20.1*		mg/Kg dry	26.2		76.5		30-130				
Surrogate: Phenol-d6	*20.6*		mg/Kg dry	26.2		78.6		30-130				
Surrogate: Nitrobenzene-d5	*10.1*		mg/Kg dry	13.1		77.2		30-130				
Surrogate: 2-Fluorobiphenyl	*9.15*		mg/Kg dry	13.1		69.8		30-130				
Surrogate: 2,4,6-Tribromophenol	*23.6*		mg/Kg dry	26.2		90.0		30-130				
Surrogate: p-Terphenyl-d14	*7.87*		mg/Kg dry	13.1		60.0		30-130				

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QUALITY CONTROL

Petroleum Hydrocarbons Analyses - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B356432 - SW-846 3546											
Blank (B356432-BLK1)				Prepared: 10/26/23 Analyzed: 11/01/23							
TPH (C9-C36)	ND	8.3	mg/Kg wet								
Surrogate: 2-Fluorobiphenyl	*2.26*		mg/Kg wet	3.33		67.8		40-140			
LCS (B356432-BS1)				Prepared: 10/26/23 Analyzed: 11/01/23							
TPH (C9-C36)	24.0	8.3	mg/Kg wet	33.2		72.2		40-140			
Surrogate: 2-Fluorobiphenyl	*3.67*		mg/Kg wet	3.32		110		40-140			
LCS Dup (B356432-BSD1)				Prepared: 10/26/23 Analyzed: 11/01/23							
TPH (C9-C36)	24.0	8.3	mg/Kg wet	33.3		72.0		40-140	0.0957	30	
Surrogate: 2-Fluorobiphenyl	*3.64*		mg/Kg wet	3.33		109		40-140			
Matrix Spike (B356432-MS1)	**Source: 23J3373-03**			Prepared: 10/26/23 Analyzed: 11/01/23							
TPH (C9-C36)	18500	1200	mg/Kg dry	99.7	21600	**-3140**	*	40-140			MS-19
Surrogate: 2-Fluorobiphenyl	*0.00*		mg/Kg dry	9.97			*	40-140			S-01
Matrix Spike Dup (B356432-MSD1)	**Source: 23J3373-03**			Prepared: 10/26/23 Analyzed: 11/01/23							
TPH (C9-C36)	24100	1200	mg/Kg dry	97.7	21600	**2550**	*	40-140	26.4	30	MS-19
Surrogate: 2-Fluorobiphenyl	*0.00*		mg/Kg dry	9.77			*	40-140			S-01

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QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B356430 - SW-846 3546										
Blank (B356430-BLK1)				Prepared: 10/26/23 Analyzed: 10/27/23						
C9-C18 Aliphatics	ND	10	mg/Kg wet							
C19-C36 Aliphatics	ND	10	mg/Kg wet							
Unadjusted C11-C22 Aromatics	ND	10	mg/Kg wet							
C11-C22 Aromatics	ND	10	mg/Kg wet							
Acenaphthene	ND	0.10	mg/Kg wet							
Acenaphthylene	ND	0.10	mg/Kg wet							
Anthracene	ND	0.10	mg/Kg wet							
Benzo(a)anthracene	ND	0.10	mg/Kg wet							
Benzo(a)pyrene	ND	0.10	mg/Kg wet							
Benzo(b)fluoranthene	ND	0.10	mg/Kg wet							
Benzo(g,h,i)perylene	ND	0.10	mg/Kg wet							R-05
Benzo(k)fluoranthene	ND	0.10	mg/Kg wet							
Chrysene	ND	0.10	mg/Kg wet							
Dibenz(a,h)anthracene	ND	0.10	mg/Kg wet							R-05
Fluoranthene	ND	0.10	mg/Kg wet							
Fluorene	ND	0.10	mg/Kg wet							
Indeno(1,2,3-cd)pyrene	ND	0.10	mg/Kg wet							
2-Methylnaphthalene	ND	0.10	mg/Kg wet							
Naphthalene	ND	0.10	mg/Kg wet							
Phenanthrene	ND	0.10	mg/Kg wet							
Pyrene	ND	0.10	mg/Kg wet							
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet							
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet							
Surrogate: Chlorooctadecane (COD)	*4.28*		mg/Kg wet	5.00		85.6	40-140			
Surrogate: o-Terphenyl (OTP)	*4.72*		mg/Kg wet	5.00		94.3	40-140			
Surrogate: 2-Bromonaphthalene	*3.95*		mg/Kg wet	5.00		79.0	40-140			
Surrogate: 2-Fluorobiphenyl	*3.86*		mg/Kg wet	5.00		77.2	40-140			
LCS (B356430-BS1)				Prepared: 10/26/23 Analyzed: 10/27/23						
C9-C18 Aliphatics	22.4	10	mg/Kg wet	29.9		75.2	40-140			
C19-C36 Aliphatics	33.7	10	mg/Kg wet	39.8		84.8	40-140			
Unadjusted C11-C22 Aromatics	85.8	10	mg/Kg wet	84.6		101	40-140			
Acenaphthene	4.76	0.10	mg/Kg wet	4.98		95.7	40-140			
Acenaphthylene	4.42	0.10	mg/Kg wet	4.98		88.9	40-140			
Anthracene	4.94	0.10	mg/Kg wet	4.98		99.3	40-140			
Benzo(a)anthracene	4.82	0.10	mg/Kg wet	4.98		96.9	40-140			
Benzo(a)pyrene	4.95	0.10	mg/Kg wet	4.98		99.4	40-140			
Benzo(b)fluoranthene	4.63	0.10	mg/Kg wet	4.98		93.1	40-140			
Benzo(g,h,i)perylene	4.61	0.10	mg/Kg wet	4.98		92.6	40-140			R-05
Benzo(k)fluoranthene	4.47	0.10	mg/Kg wet	4.98		89.8	40-140			
Chrysene	5.12	0.10	mg/Kg wet	4.98		103	40-140			
Dibenz(a,h)anthracene	4.74	0.10	mg/Kg wet	4.98		95.3	40-140			R-05
Fluoranthene	4.88	0.10	mg/Kg wet	4.98		98.1	40-140			
Fluorene	4.98	0.10	mg/Kg wet	4.98		100	40-140			
Indeno(1,2,3-cd)pyrene	4.66	0.10	mg/Kg wet	4.98		93.6	40-140			
2-Methylnaphthalene	4.41	0.10	mg/Kg wet	4.98		88.6	40-140			
Naphthalene	4.02	0.10	mg/Kg wet	4.98		80.8	40-140			
Phenanthrene	4.98	0.10	mg/Kg wet	4.98		100	40-140			
Pyrene	5.00	0.10	mg/Kg wet	4.98		101	40-140			
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	4.98			0-5			
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	4.98			0-5			
Surrogate: Chlorooctadecane (COD)	*3.67*		mg/Kg wet	4.98		73.8	40-140			

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QUALITY CONTROL

Petroleum Hydrocarbons Analyses - EPH - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD		RPD Limit	Notes
Batch B356430 - SW-846 3546											
LCS (B356430-BS1)				Prepared: 10/26/23 Analyzed: 10/27/23							
Surrogate: o-Terphenyl (OTP)	*4.73*		mg/Kg wet	4.98		95.1	40-140				
Surrogate: 2-Bromonaphthalene	*5.16*		mg/Kg wet	4.98		104	40-140				
Surrogate: 2-Fluorobiphenyl	*5.15*		mg/Kg wet	4.98		104	40-140				
LCS Dup (B356430-BSD1)				Prepared: 10/26/23 Analyzed: 10/27/23							
C9-C18 Aliphatics	22.5	10	mg/Kg wet	30.0		75.0	40-140	0.161		25	
C19-C36 Aliphatics	34.5	10	mg/Kg wet	40.0		86.3	40-140	2.27		25	
Unadjusted C11-C22 Aromatics	71.2	10	mg/Kg wet	85.0		83.8	40-140	18.5		25	
Acenaphthene	3.91	0.10	mg/Kg wet	5.00		78.1	40-140	19.7		25	
Acenaphthylene	3.62	0.10	mg/Kg wet	5.00		72.4	40-140	19.9		25	
Anthracene	4.22	0.10	mg/Kg wet	5.00		84.4	40-140	15.7		25	
Benzo(a)anthracene	4.04	0.10	mg/Kg wet	5.00		80.9	40-140	17.5		25	
Benzo(a)pyrene	4.13	0.10	mg/Kg wet	5.00		82.5	40-140	18.1		25	
Benzo(b)fluoranthene	4.00	0.10	mg/Kg wet	5.00		80.0	40-140	14.6		25	
Benzo(g,h,i)perylene	3.40	0.10	mg/Kg wet	5.00		68.0	40-140	**30.1**	*	25	R-05
Benzo(k)fluoranthene	3.63	0.10	mg/Kg wet	5.00		72.7	40-140	20.6		25	
Chrysene	4.04	0.10	mg/Kg wet	5.00		80.9	40-140	23.5		25	
Dibenz(a,h)anthracene	3.33	0.10	mg/Kg wet	5.00		66.6	40-140	**35.0**	*	25	R-05
Fluoranthene	4.23	0.10	mg/Kg wet	5.00		84.7	40-140	14.2		25	
Fluorene	4.09	0.10	mg/Kg wet	5.00		81.8	40-140	19.6		25	
Indeno(1,2,3-cd)pyrene	3.96	0.10	mg/Kg wet	5.00		79.2	40-140	16.1		25	
2-Methylnaphthalene	3.77	0.10	mg/Kg wet	5.00		75.3	40-140	15.7		25	
Naphthalene	3.54	0.10	mg/Kg wet	5.00		70.8	40-140	12.7		25	
Phenanthrene	4.22	0.10	mg/Kg wet	5.00		84.5	40-140	16.4		25	
Pyrene	4.34	0.10	mg/Kg wet	5.00		86.8	40-140	14.2		25	
Naphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5				
2-Methylnaphthalene-aliphatic fraction	ND	0.10	mg/Kg wet	5.00			0-5				
Surrogate: Chlorooctadecane (COD)	*3.86*		mg/Kg wet	5.00		77.2	40-140				
Surrogate: o-Terphenyl (OTP)	*4.21*		mg/Kg wet	5.00		84.2	40-140				
Surrogate: 2-Bromonaphthalene	*4.49*		mg/Kg wet	5.00		89.9	40-140				
Surrogate: 2-Fluorobiphenyl	*4.45*		mg/Kg wet	5.00		89.1	40-140				

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QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B356399 - SW-846 3050B											
Blank (B356399-BLK1)				Prepared: 10/26/23 Analyzed: 10/30/23							
Arsenic	ND	3.3	mg/Kg wet								
Barium	ND	1.7	mg/Kg wet								
Cadmium	ND	0.33	mg/Kg wet								
Chromium	0.15	0.66	mg/Kg wet								J
Lead	ND	0.50	mg/Kg wet								
Selenium	ND	3.3	mg/Kg wet								
Blank (B356399-BLK2)				Prepared: 10/26/23 Analyzed: 10/31/23							
Copper	0.44	0.66	mg/Kg wet								J
Silver	ND	0.33	mg/Kg wet								
Zinc	ND	0.66	mg/Kg wet								
LCS (B356399-BS1)				Prepared: 10/26/23 Analyzed: 10/30/23							
Arsenic	156	9.8	mg/Kg wet	180		86.7		81.1-119.4			
Barium	330	4.9	mg/Kg wet	354		93.3		81.6-118.1			
Cadmium	98.1	0.98	mg/Kg wet	105		93.4		82.8-118.1			
Chromium	218	2.0	mg/Kg wet	232		93.8		81.5-118.5			
Lead	133	1.5	mg/Kg wet	145		92.0		82.1-117.9			
Selenium	83.4	9.8	mg/Kg wet	96.3		86.6		78.8-121.5			
Zinc	339	2.0	mg/Kg wet	369		91.9		80.2-120.1			
LCS (B356399-BS2)				Prepared: 10/26/23 Analyzed: 10/31/23							
Silver	45.1	0.98	mg/Kg wet	47.3		95.3		79.5-120.5			
LCS Dup (B356399-BSD1)				Prepared: 10/26/23 Analyzed: 10/30/23							
Arsenic	158	9.9	mg/Kg wet	180		87.6		81.1-119.4	1.03	30	
Barium	333	4.9	mg/Kg wet	354		94.2		81.6-118.1	0.940	20	
Cadmium	99.4	0.99	mg/Kg wet	105		94.6		82.8-118.1	1.31	20	
Chromium	221	2.0	mg/Kg wet	232		95.3		81.5-118.5	1.54	30	
Lead	134	1.5	mg/Kg wet	145		92.4		82.1-117.9	0.397	30	
Selenium	85.2	9.9	mg/Kg wet	96.3		88.4		78.8-121.5	2.10	30	
Zinc	342	2.0	mg/Kg wet	369		92.8		80.2-120.1	0.945	30	
LCS Dup (B356399-BSD2)				Prepared: 10/26/23 Analyzed: 10/31/23							
Silver	45.9	0.99	mg/Kg wet	47.3		97.0		79.5-120.5	1.69	30	
Reference (B356399-SRM2) MRL CHECK				Prepared: 10/26/23 Analyzed: 10/31/23							
Lead	0.646	0.50	mg/Kg wet	0.495		**130**	*	80-120			M-10
Batch B356832 - SW-846 7471											
Blank (B356832-BLK1)				Prepared: 10/31/23 Analyzed: 11/01/23							
Mercury	ND	0.021	mg/Kg wet								

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QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B356832 - SW-846 7471										
LCS (B356832-BS1)				Prepared: 10/31/23 Analyzed: 11/01/23						
Mercury	11.8	1.6	mg/Kg wet	10.3		114	55-143.7			
LCS Dup (B356832-BSD1)				Prepared: 10/31/23 Analyzed: 11/01/23						
Mercury	9.71	1.9	mg/Kg wet	10.3		94.3	55-143.7	19.1	20	

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QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B356372 - SW-846 7.3										
Blank (B356372-BLK1)				Prepared & Analyzed: 10/26/23						
Reactive Cyanide	ND	0.40	mg/Kg							
LCS (B356372-BS1)				Prepared & Analyzed: 10/26/23						
Reactive Cyanide	9.4	0.40	mg/Kg	10.0		94.4	81.9-116			
Batch B356374 - SW-846 7.3										
Blank (B356374-BLK1)				Prepared & Analyzed: 10/26/23						
Reactive Sulfide	ND	2.0	mg/Kg							
LCS (B356374-BS1)				Prepared & Analyzed: 10/26/23						
Reactive Sulfide	10	2.0	mg/Kg	10.0		102	78.9-130			
Batch B356690 - SW 846 9060A										
Blank (B356690-BLK1)				Prepared & Analyzed: 11/01/23						
Total Organic Carbon	ND	100	mg/Kg wet							
LCS (B356690-BS1)				Prepared & Analyzed: 11/01/23						
Total Organic Carbon	558	100	mg/Kg wet	750		74.4	67.3-125			
LCS Dup (B356690-BSD1)				Prepared & Analyzed: 11/01/23						
Total Organic Carbon	521	100	mg/Kg wet	750		69.5	67.3-125	6.87	26.4	
Batch B356706 - SM21-23 2510B Modified										
Blank (B356706-BLK1)				Prepared & Analyzed: 10/30/23						
Specific conductance	ND	2.0	µmhos/cm							
LCS (B356706-BS1)				Prepared & Analyzed: 10/30/23						
Specific conductance	310		µmhos/cm	306		102	90-116			
Duplicate (B356706-DUP1)	**Source: 23J3373-03**			Prepared & Analyzed: 10/30/23						
Specific conductance	200	2.0	µmhos/cm		220			10.8	35.9	

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FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
B-07	Data is not affected by elevated level in laboratory blank since sample result is >10x level found in the blank.
J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
L-04	Laboratory fortified blank/laboratory control sample recovery and duplicate recovery are outside of control limits. Reported value for this compound is likely to be biased on the low side.
L-14	Compound classified by MA CAM as difficult with acceptable recoveries of 40-160%. Recovery does not meet 70-130% criteria but does meet difficult compound criteria.
M-10	The reporting limit verification for the AIHA lead program is outside of control limits for this element. Any reported result at or near the detection limit may be biased on the high side.
MS-07A	Matrix spike and spike duplicate recovery is outside of control limits. Analysis is in control based on laboratory fortified blank recovery. Possibility of matrix effects that lead to low bias or non-homogeneous sample aliquot cannot be eliminated.
MS-19	Sample to spike ratio is greater than or equal to 4:1. Spiked amount is not representative of the native amount in the sample. Appropriate or meaningful recoveries cannot be calculated.
MS-22	Either matrix spike or MS duplicate is outside of control limits, but the other is within limits. RPD between the two MS/MSD results is within method specified criteria.
MS-23	Either matrix spike or MS duplicate is outside of control limits, but the other is within limits. RPD between the two MS/MSD results is outside of the method specified criteria. Reduced precision anticipated for any reported result for this compound.
R-05	Laboratory fortified blank duplicate RPD is outside of control limits. Reduced precision is anticipated for any reported value for this compound.
R-06	Matrix spike duplicate RPD is outside of control limits. Reduced precision is anticipated for reported result for this compound in this sample.
RL-14	Elevated reporting limit due to foaming sample matrix. MA CAM reporting limit not met.
S-01	The surrogate recovery for this sample is not available due to sample dilution below the surrogate reporting limit required from high analyte concentration and/or matrix interferences.
S-15	Surrogate recovery outside of control limits due to suspected sample matrix interference. Chromatogram(s) is attached.
V-05	Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.
V-06	Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side for this compound.
V-16	Response factor is less than method specified minimum acceptable value. Reduced precision and accuracy may be associated with reported result.
V-34	Initial calibration verification (ICV) did not meet method specifications and was biased on the low side for this compound. Reported result is estimated.
V-35	Initial calibration verification (ICV) did not meet method specifications and was biased on the high side for this compound. Reported result is estimated.

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
MADEP EPH rev 2.1 in Soil	
C9-C18 Aliphatics	CT,NC,ME,NH-P
C19-C36 Aliphatics	CT,NC,ME,NH-P
Unadjusted C11-C22 Aromatics	CT,NC,ME,NH-P
C11-C22 Aromatics	CT,NC,ME,NH-P
Acenaphthene	CT,NC,ME,NH-P
Acenaphthylene	CT,NC,ME,NH-P
Anthracene	CT,NC,ME,NH-P
Benzo(a)anthracene	CT,NC,ME,NH-P
Benzo(a)pyrene	CT,NC,ME,NH-P
Benzo(b)fluoranthene	CT,NC,ME,NH-P
Benzo(g,h,i)perylene	CT,NC,ME,NH-P
Benzo(k)fluoranthene	CT,NC,ME,NH-P
Chrysene	CT,NC,ME,NH-P
Dibenz(a,h)anthracene	CT,NC,ME,NH-P
Fluoranthene	CT,NC,ME,NH-P
Fluorene	CT,NC,ME
Indeno(1,2,3-cd)pyrene	CT,NC,ME,NH-P
2-Methylnaphthalene	CT,NC
Naphthalene	CT,NC,ME,NH-P
Phenanthrene	CT,NC,ME,NH-P
Pyrene	CT,NC,ME,NH-P
MADEP EPH rev 2.1 in Water	
C9-C18 Aliphatics	CT,NC,ME,NH-P
C19-C36 Aliphatics	CT,NC,ME,NH-P
Unadjusted C11-C22 Aromatics	CT,NC,ME,NH-P
C11-C22 Aromatics	CT,NC,ME,NH-P
Acenaphthene	CT,NC,ME,NH-P
Acenaphthylene	CT,NC,ME,NH-P
Anthracene	CT,NC,ME,NH-P
Benzo(a)anthracene	CT,NC,ME,NH-P
Benzo(a)pyrene	CT,NC,ME,NH-P
Benzo(b)fluoranthene	CT,NC,ME,NH-P
Benzo(g,h,i)perylene	CT,NC,ME,NH-P
Benzo(k)fluoranthene	CT,NC,ME,NH-P
Chrysene	CT,NC,ME,NH-P
Dibenz(a,h)anthracene	CT,NC,ME,NH-P
Fluoranthene	CT,NC,ME,NH-P
Fluorene	CT,NC,ME
Indeno(1,2,3-cd)pyrene	CT,NC,ME,NH-P
2-Methylnaphthalene	CT,NC
Naphthalene	CT,NC,ME,NH-P
Phenanthrene	CT,NC,ME,NH-P
Pyrene	CT,NC,ME,NH-P
SW 846 9060A in Soil	
Total Organic Carbon	ME,NY,NH,VA
SW-846 1030 in Soil	

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 1030 in Soil	
Ignitability	NY,NH,CT,NC,ME,VA
SW-846 6010D in Soil	
Arsenic	CT,NH,NY,ME,VA,NC
Barium	CT,NH,NY,ME,VA,NC
Cadmium	CT,NH,NY,ME,VA,NC
Chromium	CT,NH,NY,ME,VA,NC
Copper	CT,NH,NY,ME,VA,NC
Lead	CT,NH,NY,ME,VA,NC
Selenium	CT,NH,NY,ME,VA,NC
Silver	CT,NH,NY,ME,VA,NC
Zinc	CT,NH,NY,ME,VA,NC
SW-846 6010D in Water	
Arsenic	CT,NH,NY,ME,VA,RI,NC
Barium	CT,NH,NY,ME,VA,NC
Cadmium	CT,NH,NY,ME,VA,NC
Chromium	CT,NH,NY,ME,VA,NC
Copper	CT,NH,NY,ME,VA,NC
Lead	CT,NH,NY,ME,VA,NC
Selenium	CT,NH,NY,ME,VA,NC
Silver	CT,NH,NY,ME,VA,NC
Zinc	CT,NH,NY,ME,VA,NC
SW-846 7471B in Soil	
Mercury	CT,NH,NY,NC,ME,VA
SW-846 8260D in Soil	
Acetone	CT,NH,NY,ME
Benzene	CT,NH,NY,ME
Bromobenzene	NH,NY,ME
Bromochloromethane	NH,NY,ME
Bromodichloromethane	CT,NH,NY,ME
Bromoform	CT,NH,NY,ME
Bromomethane	CT,NH,NY,ME
2-Butanone (MEK)	CT,NH,NY,ME
n-Butylbenzene	CT,NH,NY,ME
sec-Butylbenzene	CT,NH,NY,ME
tert-Butylbenzene	CT,NH,NY,ME
Carbon Disulfide	CT,NH,NY,ME
Carbon Tetrachloride	CT,NH,NY,ME
Chlorobenzene	CT,NH,NY,ME
Chlorodibromomethane	CT,NH,NY,ME
Chloroethane	CT,NH,NY,ME
Chloroform	CT,NH,NY,ME
Chloromethane	CT,NH,NY,ME
2-Chlorotoluene	CT,NH,NY,ME
4-Chlorotoluene	CT,NH,NY,ME
1,2-Dibromo-3-chloropropane (DBCP)	NY

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8260D in Soil	
1,2-Dibromoethane (EDB)	NY
Dibromomethane	NH,NY,ME
1,2-Dichlorobenzene	CT,NH,NY,ME
1,3-Dichlorobenzene	CT,NH,NY,ME
1,4-Dichlorobenzene	CT,NH,NY,ME
Dichlorodifluoromethane (Freon 12)	NY,ME
1,1-Dichloroethane	CT,NH,NY,ME
1,2-Dichloroethane	CT,NH,NY,ME
1,1-Dichloroethylene	CT,NH,NY,ME
cis-1,2-Dichloroethylene	CT,NH,NY,ME
trans-1,2-Dichloroethylene	CT,NH,NY,ME
1,2-Dichloropropane	CT,NH,NY,ME
1,3-Dichloropropane	NH,NY,ME
2,2-Dichloropropane	NH,NY,ME
1,1-Dichloropropene	NH,NY,ME
cis-1,3-Dichloropropene	CT,NH,NY,ME
trans-1,3-Dichloropropene	CT,NH,NY,ME
Ethylbenzene	CT,NH,NY,ME
Hexachlorobutadiene	NH,NY,ME
2-Hexanone (MBK)	CT,NH,NY,ME
Isopropylbenzene (Cumene)	CT,NH,NY,ME
p-Isopropyltoluene (p-Cymene)	NH,NY
Methyl tert-Butyl Ether (MTBE)	NY
Methylene Chloride	CT,NH,NY,ME
4-Methyl-2-pentanone (MIBK)	CT,NH,NY
Naphthalene	NH,NY,ME
n-Propylbenzene	NH,NY
Styrene	CT,NH,NY,ME
1,1,1,2-Tetrachloroethane	CT,NH,NY,ME
1,1,2,2-Tetrachloroethane	CT,NH,NY,ME
Tetrachloroethylene	CT,NH,NY,ME
Toluene	CT,NH,NY,ME
1,2,3-Trichlorobenzene	ME
1,2,4-Trichlorobenzene	NH,NY,ME
1,1,1-Trichloroethane	CT,NH,NY,ME
1,1,2-Trichloroethane	CT,NH,NY,ME
Trichloroethylene	CT,NH,NY,ME
Trichlorofluoromethane (Freon 11)	CT,NH,NY,ME
1,2,3-Trichloropropane	NH,NY,ME
1,2,4-Trimethylbenzene	CT,NH,NY,ME
1,3,5-Trimethylbenzene	CT,NH,NY,ME
Vinyl Chloride	CT,NH,NY,ME
m+p Xylene	CT,NH,NY,ME
o-Xylene	CT,NH,NY,ME
SW-846 8270E in Soil	
Acenaphthene	CT,NY,NH

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8270E in Soil	
Acenaphthylene	CT,NY,NH
Acetophenone	NY,NH
Aniline	NY,NH
Anthracene	CT,NY,NH
Benzo(a)anthracene	CT,NY,NH
Benzo(a)pyrene	CT,NY,NH
Benzo(b)fluoranthene	CT,NY,NH
Benzo(g,h,i)perylene	CT,NY,NH
Benzo(k)fluoranthene	CT,NY,NH
Bis(2-chloroethoxy)methane	CT,NY,NH
Bis(2-chloroethyl)ether	CT,NY,NH
Bis(2-chloroisopropyl)ether	CT,NY,NH
Bis(2-Ethylhexyl)phthalate	CT,NY,NH
4-Bromophenylphenylether	CT,NY,NH
Butylbenzylphthalate	CT,NY,NH
4-Chloroaniline	CT,NY,NH
2-Chloronaphthalene	CT,NY,NH
2-Chlorophenol	CT,NY,NH
Chrysene	CT,NY,NH
Dibenz(a,h)anthracene	CT,NY,NH
Dibenzofuran	CT,NY,NH
Di-n-butylphthalate	CT,NY,NH
1,2-Dichlorobenzene	NY,NH
1,3-Dichlorobenzene	NY,NH
1,4-Dichlorobenzene	NY,NH
3,3-Dichlorobenzidine	CT,NY,NH
2,4-Dichlorophenol	CT,NY,NH
Diethylphthalate	CT,NY,NH
2,4-Dimethylphenol	CT,NY,NH
Dimethylphthalate	CT,NY,NH
2,4-Dinitrophenol	CT,NY,NH
2,4-Dinitrotoluene	CT,NY,NH
2,6-Dinitrotoluene	CT,NY,NH
Di-n-octylphthalate	CT,NY,NH
1,2-Diphenylhydrazine/Azobenzene	NY,NH
Fluoranthene	CT,NY,NH
Fluorene	NY,NH
Hexachlorobenzene	CT,NY,NH
Hexachlorobutadiene	CT,NY,NH
Hexachloroethane	CT,NY,NH
Indeno(1,2,3-cd)pyrene	CT,NY,NH
Isophorone	CT,NY,NH
2-Methylnaphthalene	CT,NY,NH
2-Methylphenol	CT,NY,NH
3/4-Methylphenol	CT,NY,NH
Naphthalene	CT,NY,NH
Nitrobenzene	CT,NY,NH

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 8270E in Soil	
2-Nitrophenol	CT,NY,NH
4-Nitrophenol	CT,NY,NH
Pentachlorophenol	CT,NY,NH
Phenanthrene	CT,NY,NH
Phenol	CT,NY,NH
Pyrene	CT,NY,NH
1,2,4-Trichlorobenzene	CT,NY,NH
2,4,5-Trichlorophenol	CT,NY,NH
2,4,6-Trichlorophenol	CT,NY,NH

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
CT	Connecticut Department of Public Health	PH-0821	12/31/2024
NY	New York State Department of Health	10899 NELAP	04/1/2024
NH	New Hampshire Environmental Lab	2516 NELAP	02/5/2024
RI	Rhode Island Department of Health	LAO00373	12/30/2023
NC	North Carolina Div. of Water Quality	652	12/31/2023
ME	State of Maine	MA00100	06/9/2025
VA	Commonwealth of Virginia	460217	12/14/2023
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2024

Pace Analytical®
Phone: 612-607-6400
Fax: 612-607-6344

2353373 RF

https://www.pacelabs.com/

CHAIN OF CUSTODY RECORD

1800 Elm Street SE
Minneapolis, MN 55414

Doc # 381 Rev 4_01/08/2020

Contact: https://www.pacelabs.com/contact-us/contact-environmental-sciences/

Company Name:	Weston & Sampson
Address:	55 Walkers Brook Drive Reading MA
Phone:	978 818 9212
Project Name:	Island End River
Project Location:	Chelsea, MA
Project Number:	ENG23-0300
Project Manager:	L. Koska
Pace Analytical Quote Name/Number	
Invoice Recipient:	L. Koska
Sampled By:	N. Belinowiz

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date 5 Day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

Data Delivery
Format: PDF ☑ EXCEL ☑
Other:
CLP Like Data Pkg Required: ☐
Email To: koskal@wseinc.com
Fax To #:

PCB ONLY
SOXHLET ☑
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Analytical Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	[1]Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	TPH (8100)	EPH	SVOCs (8270)	As, Ba, Cd, Cr, Cu, Pb, Hg, Se, Ag, Zi	PCBs Congeners	VOCs (8260)	Conductivity, pH, Reactive CN/S, Ignitability	Total Organic Carbon	% Solids	Grain Size Distribution	TCLP (as needed - 20x Rule)
1	Disp Cell 1	11:30	10/24/2023	Comp	Sed.	U	✓	✓				X	X	X	X	X	X	X	X	X	X	X
2	Disp Cell 2	12:30	10/24/2023	Comp	Sed.	U	✓	✓				X	X	X	X	X	X	X	X	X	X	X
X	Disp Cell 3	—	10/24/2023	Comp	Sed.	U						X	X	X	X	X	X	X	X	X	X	X
3	Disp Cell 4	1:30	10/24/2023	Comp	Sed.	U	✓	✓				X	X	X	X	X	X	X	X	X	X	X

[2] Preservation Code

Courier Use Only
Total Number Of:
VIALS_____
GLASS_____
PLASTIC_____
BACTERIA_____
ENCORE_____

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N
*Pace Analytical is not responsible for missing samples from prepacked coolers

Relinquished by: (signature) — Date/Time: 10/24/23 17:30
Received by: (signature) — Date/Time: 10/25/23 1057
Relinquished by: (signature) — Date/Time: 10/27/23 1730
Received by: (signature) — Date/Time: 10/27/23 1739
Relinquished by: (signature) — Date/Time:
Received by: (signature) — Date/Time:
Relinquished by: (signature) — Date/Time:
Received by: (signature) — Date/Time:

Client Comments:

Detection Limit Requirements
MA: < RCS-1
CT:
Other:

Special Requirements
☑ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☑ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ AIHA-LAP,LLC

[1] **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

[2] **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Lab Comments:

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Pace ANALYTICAL SERVICES	DC#_Title: ENV-FRM-ELON-0001 v07_Sample Receiving Checklist
	Effective Date: 07/13/2023

Log In Back-Sheet

Client Weston and Sampson

Project Island End River

MCP/RCP Required MA MCP

Deliverable Package Requirement RCS-1

Location Chelsea, MA

PWSID# (When Applicable) N/A

Arrival Method:

Courier ☒ Fed Ex ☐ Walk In ☐ Other ☐

Received By / Date / Time MEM 10/25/23 1737

Back-Sheet By / Date / Time STM 10/25/23 2013

Temperature Method Gun # 4

Temp ☒ < 6° C Actual Temperature 3.0-5.0

Rush Samples: Yes / (No) Notify

Short Hold: (Yes) / ~~No~~ Notify Javier STM

Notes regarding Samples/COC outside of SOP:

Disp Cell 3 not received, past hold for pH

Login Sample Receipt Checklist – (Rejection Criteria Listing – Using Acceptance Policy) Any False statement will be brought to the attention of the Client – True or False

	True	False
Received on Ice	☒	☐
Received in Cooler	☒	☐
Custody Seal: DATE TIME	☐	☒
COC Relinquished	☒	☐
COC/Samples Labels Agree	☒	☐
All Samples in Good Condition	☒	☐
Samples Received within Holding Time	~~☒~~ STM	~~☒~~
Is there enough Volume	☒	☐
Proper Media/Container Used	☒	☐
Splitting Samples Required	~~☒~~ STM	~~☒~~
MS/MSD	☐	~~☒~~
Trip Blanks	☐	~~☒~~
Lab to Filters	☐	~~☒~~
COC Legible	☒	☐

COC Included: (Check all included)

Client ☒ Analysis ☒ Sampler Name ~~☒~~

Project ☒ IDs ~~☒~~ Collection Date/Time ~~☒~~

All Samples Proper pH: N/A ☐ ☐

Additional Container Notes

Note: West Virginia requires all samples to have their temperature taken. Note any outliers.

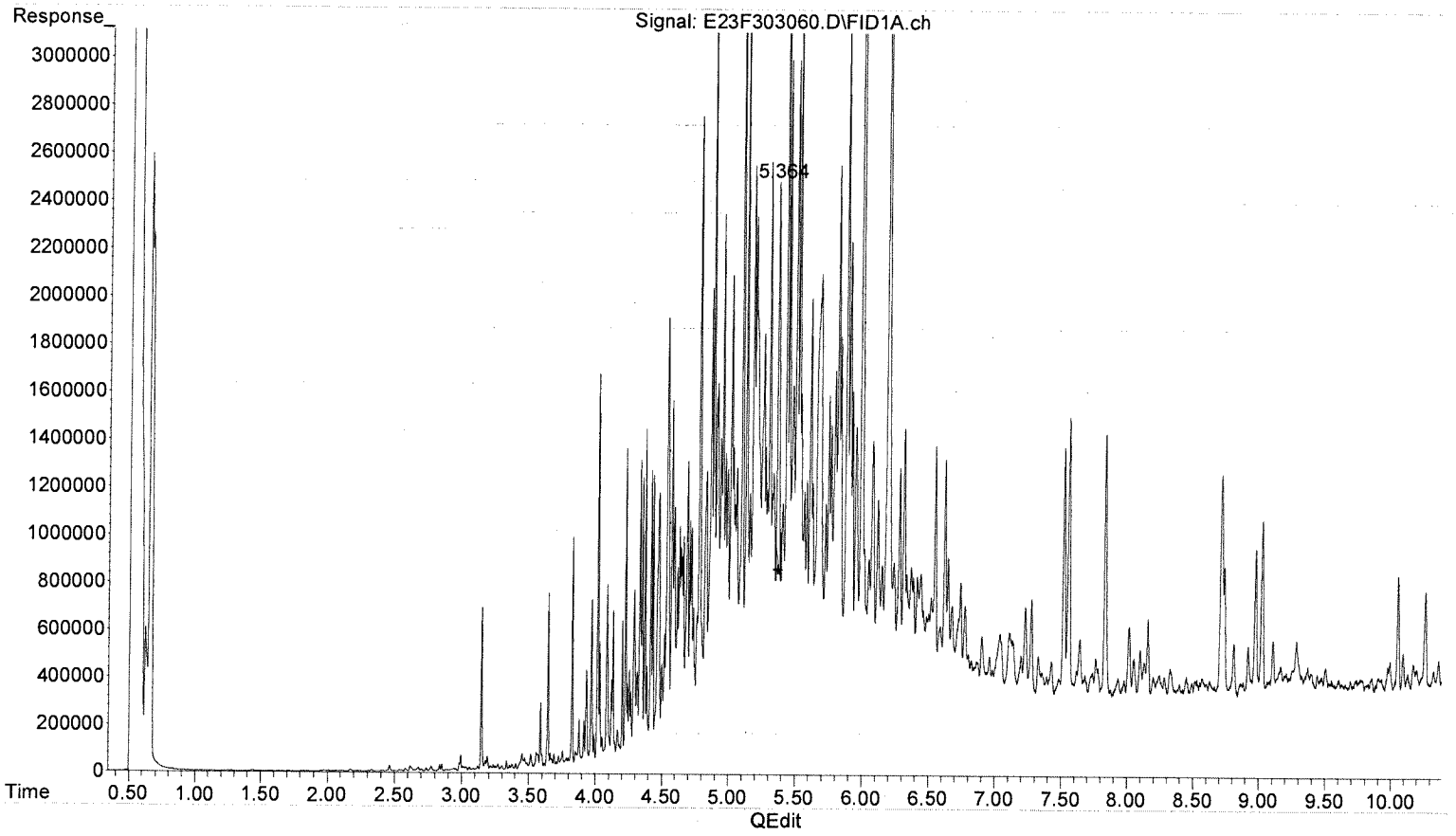
Sample			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
16oz Amb/Clear	Soils Jars (Circle Amb/Clear)		1	1	1																	
8oz Amb/Clear			3	3	3																	
4oz Amb/Clear			1	1	1																	
2oz Amb/Clear																						
Unpreserved	Ambers	1 Liter																				
HCL																						
Sulfuric																						
Sulfuric		250mL																				
Phosphoric																						
HCl																						
Unpreserved		100mL																				
Unpreserved	Plastics	1 Liter																				
Sulfuric																						
Unpreserved		500mL																				
Sulfuric																						
Unpreserved		250mL																				
Trizma																						
Sulfuric																						
Nitric																						
NaOH																						
Ammonium Acetate																						
NaOH/Zinc																						
Unpreserved	VOA Vials																					
HCl																						
MeOH			2	2	1																	
D.I. Water			~~2~~	~~2~~	~~1~~																	
BiSulfate			4	4	2																	
Col/Bact	Other / Fill in																					

Quantitation Report (Qedit)

Data Path : C:\msdchem\1\data\E103023\
Data File : E23F303060.D
Signal(s) : Signal #1: FID1A.ch Signal #2: FID2B.ch
Acq On : 31 Oct 2023 6:25 pm
Operator : PJG
Sample : 23J3373-03 Inst : GCFID5
Misc :
ALS Vial : 44 Sample Multiplier: 1

Integration File signal 1: events.e
Integration File signal 2: events2.e
Quant Time: Nov 01 09:56:53 2023
Quant Method : C:\msdchem\1\methods\EPH030723.M
Quant Title : EPH 12/14/21
QLast Update : Wed Mar 08 12:05:32 2023
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(10) o-Terphenyl (OTP) (S)

5.364min 155.605 ug/mL

response 15048569

matrix interference

(+) = Expected Retention Time
EPH030723.M Wed Nov 01 10:32:52 2023

Attachment H

WETLAND RESOURCE AREA IMPACT EXHIBITS

Island End River Flood Resilience Program
City of Chelsea, MA / City of Everett, MA

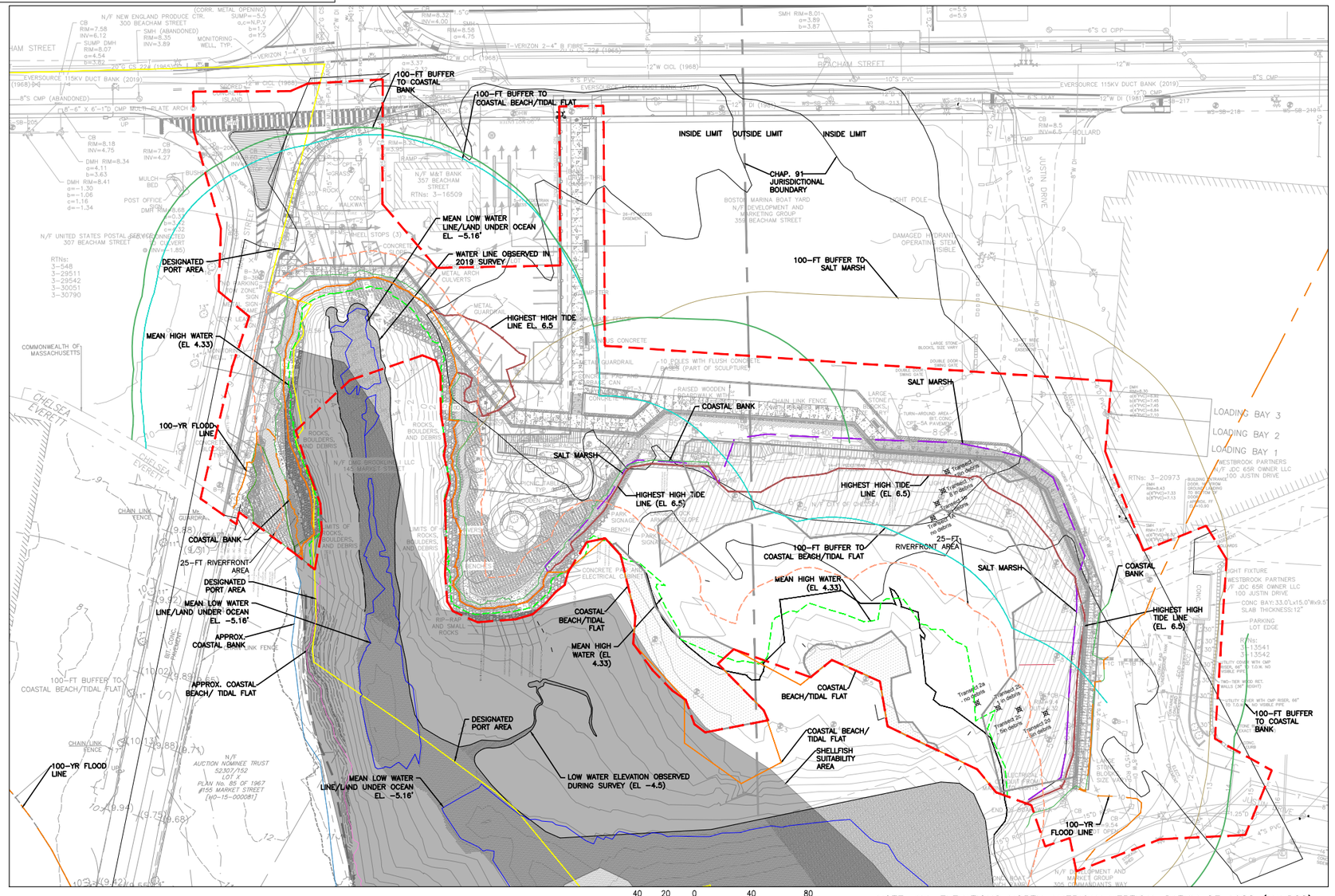
Appendix H: Wetland Resource Area Impact Exhibits

Page	Sheet No.	Drawing Title	Location
1		Table of Contents	
2	RPE-R-101	RESOURCE AREA IMPACT PLAN	RESILIENCE PROVISIONS EAST
3	RPW-R-101	RESOURCE AREA IMPACT PLAN - 1	RESILIENCE PROVISIONS WEST
4	RPW-R-102	RESOURCE AREA IMPACT PLAN - 2	RESILIENCE PROVISIONS WEST
5	RPW-R-103	RESOURCE AREA IMPACT PLAN - 3	RESILIENCE PROVISIONS WEST
6	RPW-R-104	RESOURCE AREA IMPACT PLAN - 4	RESILIENCE PROVISIONS WEST
7	NBA-R-101	RESOURCE AREA IMPACT PLAN	NATURE-BASED APPROACHES
8	RPE-R-201	RESOURCE AREA IMPACT SECTION -1	RESILIENCE PROVISIONS EAST
9	RPE-R-202	RESOURCE AREA IMPACT SECTION -2	RESILIENCE PROVISIONS EAST
10	SSCF-R-201	HEADWALL SECTIONS	STORM SURGE CONTROL FACILITY
11	RPW-R-201	RESOURCE AREA IMPACT SECTION -1	RESILIENCE PROVISIONS WEST
12	RPW-R-202	RESOURCE AREA IMPACT SECTION -2	RESILIENCE PROVISIONS WEST
13	RPW-R-203	RESOURCE AREA IMPACT SECTION -3	RESILIENCE PROVISIONS WEST
14	NBA-R-201	RESOURCE AREA IMPACT SECTION	NATURE-BASED APPROACHES

KEY MAP
SCALE: 1"=150'

LEGEND:

- = MEAN LOW WATER LINE/LAND UNDER OCEAN EL. −5.16
- = SALT MARSH
- = MEAN HIGH WATER EL. 4.33'
- = COASTAL BEACH/TIDAL FLATS
- = 25−FT RIVERFRONT AREA
- = COASTAL BANK
- = DESIGNATED PORT AREA
- = 100−FT BUFFER TO SALT MARSH
- = 100−FT BUFFER TO COASTAL BEACH/TIDAL FLAT
- = 100−FT BUFFER TO COASTAL BANK
- = 100−YR FLOOD PLAIN
- = APPROXIMATE COASTAL BEACH TIDAL FLATS
- = APPROXIMATE COASTAL BANK
- = PROJECT LIMITS FPE
- = HIGHEST HIGH TIDE LINE EL. 6.5'
- = CHAP. 91 JURISDICTIONAL LIMIT
- = SHELLFISH SUITABILITY AREA
- = PLANTING OF NATIVE SALT MARSH SPECIES AND SEEDING WITH NATIVE SALT TOLERANT SEED MIX
- = SPARTINA ALTERNIFLORA PLUGS



NOTE: ALL ELEVATIONS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

Project:
ISLAND END RIVER FLOOD RESILIENCE PROVISIONS EAST

Weston & Sampson
Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants:

Revisions:

No.	Date	Description

Seal:

Issued For:
PROGRESS PRINT

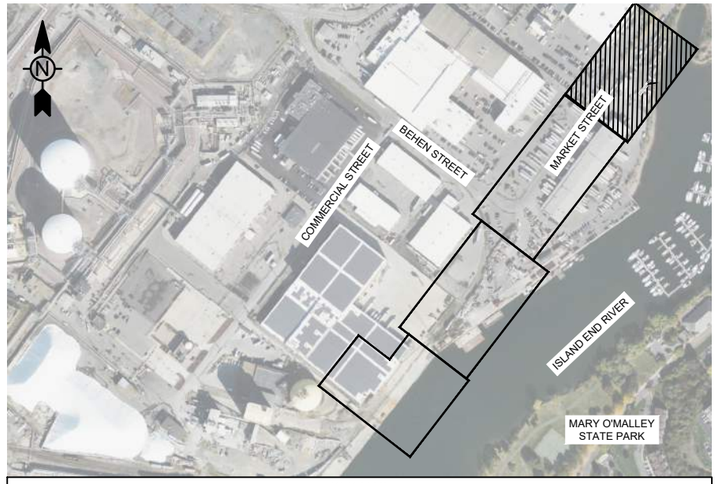
Scale:	AS NOTED
Date:	NOVEMBER 2023
Drawn By:	CFW
Reviewed By:	TPC
Approved By:	BWA
W&S Project No.:	-
W&S File No.:	

Drawing Title:
RESOURCE AREA IMPACT PLAN

Sheet Number:
RPE-R-101

Rev.: 0 Date: 11/2023

I:\wse01\Acad\SEP\Projects\MA\Cam\094\end\Fire Flow Area\CAD\GIS_DESIGN\ISLE\Resource Area Impact Plan_C03_C05.dwg



KEY MAP
SCALE: 1"=300'

LEGEND

- Mystic River Designated Port Area
- Salt Marsh
- Approx. Coastal Bank
- Approx. Coastal Beach Tidal Flats
- 25' Riverfront Offset
- Shellfish Suitability Area
- Historic High Tide Line
- Bordering Vegetated Wetlands
- Asphalt Pavement
- Gravel
- Concrete
- Mean High Water (4.33 NAVD88)
- Mean Highest High Water (4.77 NAVD88)
- Mean Low Water (-5.16 NAVD88)
- Scope of Work Limits

ZONE X
ZONE X*
ZONE X*
ZONE AE

N/F
UNITED STATES POSTAL SERVICE
12731/79
LOT 8A–2
PLAN No. 1318 OF 1974
#138 MARKET STREET
[H0–15–000010]

MARKET STREET
(PUBLIC–40' WIDE)
18972/455, PLAN No. 437 OF 1988

MARKET ST

PROPOSED 7' HIGH, 40' WIDE SLIDE GATE FLOOD BARRIER

CONCRETE FLOOD BARRIER

EDGE OF CONCRETE FOOTING

REGRADE AND REPAVE MARET STREET

SEE SHEET RPE-R-101
RESOURCE AREA IMPACT PLAN FOR RESILIENCE PROVISIONS EAST

100-YEAR FLOODPLAIN, TYP.

LIMIT OF EXCAVATION, TYP.

PROP. GUARD RAIL

PROPERTY LINE/LIMIT OF DISTURBANCE

HISTORIC HIGH TIDE LINE, TYP.

SHELLFISH SUITABILITY LIMIT, TYP.

EXISTING RIP RAP LIMITS

PROPOSED EASEMENT FOR THE CONSTRUCTION AND MAINTENANCE OF THE EVERETT FLOOD BARRIER

MIGRATION BARRIER WALL (APPROX. LOCATION) (BELOW GRADE)

N/F
AUCTION NOMINEE TRUST
#155 MARKET STREET
[H0–15–000081]

N/F
THE COMMONWEALTH OF MASSACHUSETTS

EVERETT
CHELSEA

WOBURN
MIDDLESEX COUNTY
SUFFOLK COUNTY

U.S. PIERHEAD AND BULKHEAD LINE OF JULY 31, 1920

JERSEY BARRIERS

MATCHLINE A–A

0 20 40
SCALE: 1"=20'

TETRA TECH
www.tetratech.com
498 7TH AVENUE, 15TH FLOOR
NEW YORK, NY 10018
PHONE: (646) 576-4034

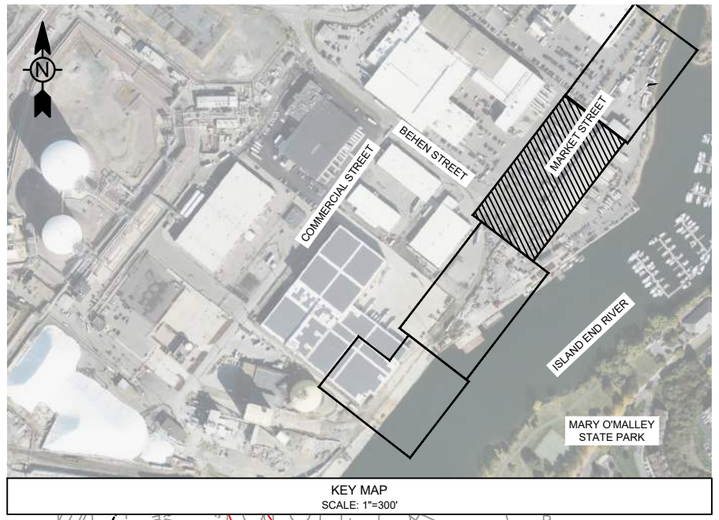
MARK	DATE	DESCRIPTION	BY

CITY OF EVERETT
ISLAND END RIVER FLOOD PROVISIONS WEST
RESOURCE AREA IMPACT PLAN - 1

PROJ: 200-01291-22002
DESN: TBD
DRWN: TBD
CHKD: JO

RPW-R-101

Bar measures 1 inch, otherwise drawing not to scale



KEY MAP
SCALE: 1"=300'

LEGEND

- Mystic River Designated Port Area
- Salt Marsh
- Approx. Coastal Bank
- Approx. Coastal Beach Tidal Flats
- 25' Riverfront Offset
- Bordering Vegetated Wetlands
- Scope of Work Limits
- Shellfish Suitability Area
- Historic High Tide Line
- Asphalt Pavement
- Gravel
- Loam and Seed
- Concrete
- Mean High Water (4.33 NAVD88)
- Mean Highest High Water (4.77 NAVD88)
- Mean Low Water (-5.16 NAVD88)

MATCHLINE B–B

MATCHLINE A–A

HISTORIC HIGH TIDE, TYP.

N/F
BEACHAM STREET REALTY LLC
60408/81
LOT F
PLAN No. 182 OF 1966
LOT 8A–3
PLAN No. 1318 OF 1974
PLAN No. 858 OF 1989
#201 BEACHAM STREET
[H0–15–000029]

PROP. CATCH BASINS AND DRAIN LINE

MARKET ST

(PUBLIC–VARIABLE WIDTH)

MARKET STREET

(PUBLIC–80' WIDE)

PLAN No. 437 OF 1882

N/F
P.W. MARKS, LLC
28051/561
LOT D1–D
PLAN No. 1379 OF 1966
LOT V–II
PLAN No. 736 OF 1983
#87 BEHEN STREET
[H0–12–000044]

PROPOSED 20' WIDE DRAINAGE EASEMENT

REGRADE AND REPAVE MARET STREET

CONCRETE FOOTING

PROP. TRENCH DRAIN

CONCRETE FLOOD BARRIER

PROP. TRENCH DRAIN

PROPOSED 7' HIGH, 40' WIDE SLIDE GATE FLOOD BARRIER

PROPOSED 7' HIGH, 30' WIDE SLIDE GATE FLOOD BARRIER

PROPOSED GUARD RAIL

100-YR FLOODPLAIN, TYP.

ZONE X
ZONE X*
ZONE AE

0 20 40
SCALE: 1"=20'

NOTE:
COASTAL BANK LINE IS THE 100-YEAR FLOODPLAIN WHERE THE COASTAL BANK TERMINATES IN THE EXISTING BULKHEAD.

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NEW YORK, NY 10018
PHONE: (646) 576-4034

MARK	DATE	DESCRIPTION	BY

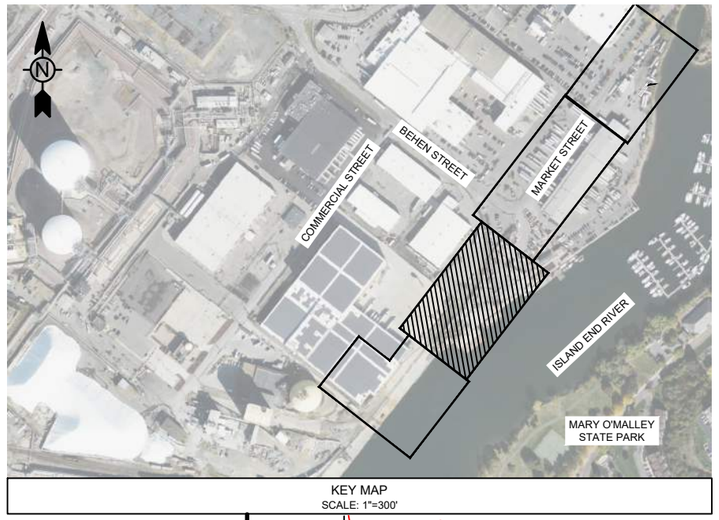
CITY OF EVERETT
ISLAND END RIVER FLOOD PROVISIONS WEST
RESOURCE AREA IMPACT PLAN - 2

PROJ:	200-01291-22002
DESN:	TBD
DRWN:	TBD
CHKD:	JO

RPW-R-102

Bar measures 1 inch, otherwise drawing not to scale

11/8/2023 5:39:01 PM - \\TT-LOCAL\IER\PROJECTS\NEW YORK\012911\200-01291-22002\CAD\SUPPORTFILES\RESOURCE AREA CALCS\C-101 LAYOUT AND MATERIALS PLAN_REV.DWG - RETTA, AMANDA



KEY MAP
SCALE: 1"=300'

LEGEND

- Mystic River Designated Port Area
- Salt Marsh
- Approx. Coastal Bank
- Approx. Coastal Beach Tidal Flats
- 25' Riverfront Offset
- Bordering Vegetated Wetlands
- Scope of Work Limits
- Shellfish Suitability Area
- Historic High Tide Line
- Asphalt Pavement
- Gravel
- Concrete
- Confined Disposal Facility
- Mean High Water (4.33 NAVD88)
- Mean Highest High Water (4.77 NAVD88)
- Mean Low Water (-5.16 NAVD88)

MATCHLINE C–C

RESTRIPED PARKING LOT

CONCRETE FOOTING

CONCRETE FLOOD BARRIER

EXISTING GATE

PROPOSED GUARD RAIL

EXISTING PERIMETER WALL AT 60 COMMERCIAL STREET

SHELLFISH SUITABILITY LIMIT, TYP.

HISTORIC HIGH TIDE, TYP.

PROPOSED 6.5' HIGH, 20' WIDE SLIDE GATE FLOOD BARRIER

EDGE OF CONCRETE FOOTING

MATCHLINE B–B

ZONE X*
ZONE AE

BENCHMARK MAG NAIL ELEV.=8.48'

RR TRACKS

CRUSHED STONE

ROW OF CONCRETE JERSEY BARRIERS

HOESCH WALL (APPROX. LOCATION) (BELOW GRADE)

LIMIT OF STACKED TRAILERS

14" IPS (BY REC)

16" IPS (BY REC)

18" IPS (BY REC)

CB RIM=10.23'

DMH RIM=10.29'

DMH RIM=8.44'

DMH RIM=8.4

MHW

MLW

EDGE OF SEAWALL

SCALE: 1"=20'

NOTE:
ENTIRE PLAN IS LOCATED WITHIN THE FEMA 100-YEAR FLOODPLAIN AND COASTAL BANK LINES, EXCEPT WEST OF THE 95 BEHAN STREET BULKHEAD, WHERE THE COASTAL BANK IS DELINEATED.

TETRA TECH
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NEW YORK, NY 10018
PHONE: (646) 576-4034

MARK	DATE	DESCRIPTION	BY

CITY OF EVERETT
ISLAND END RIVER FLOOD PROVISIONS WEST

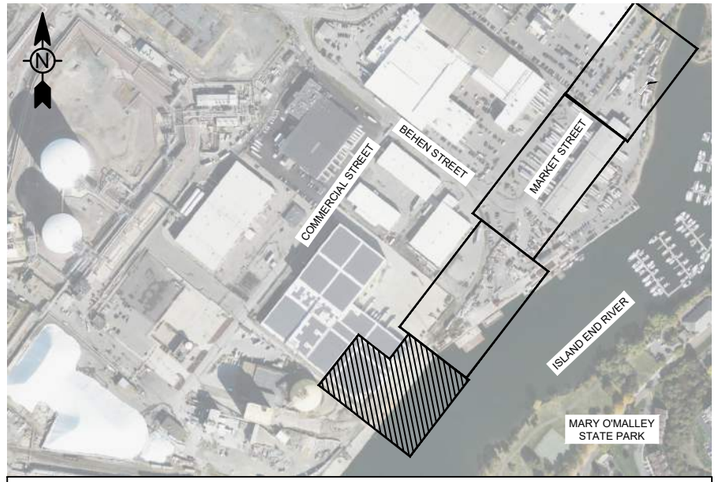
RESOURCE AREA IMPACT PLAN - 3

PROJ:	200-01291-22002
DESN:	TBD
DRWN:	TBD
CHKD:	JO

RPW-R-103

Bar measures 1 inch, otherwise drawing not to scale

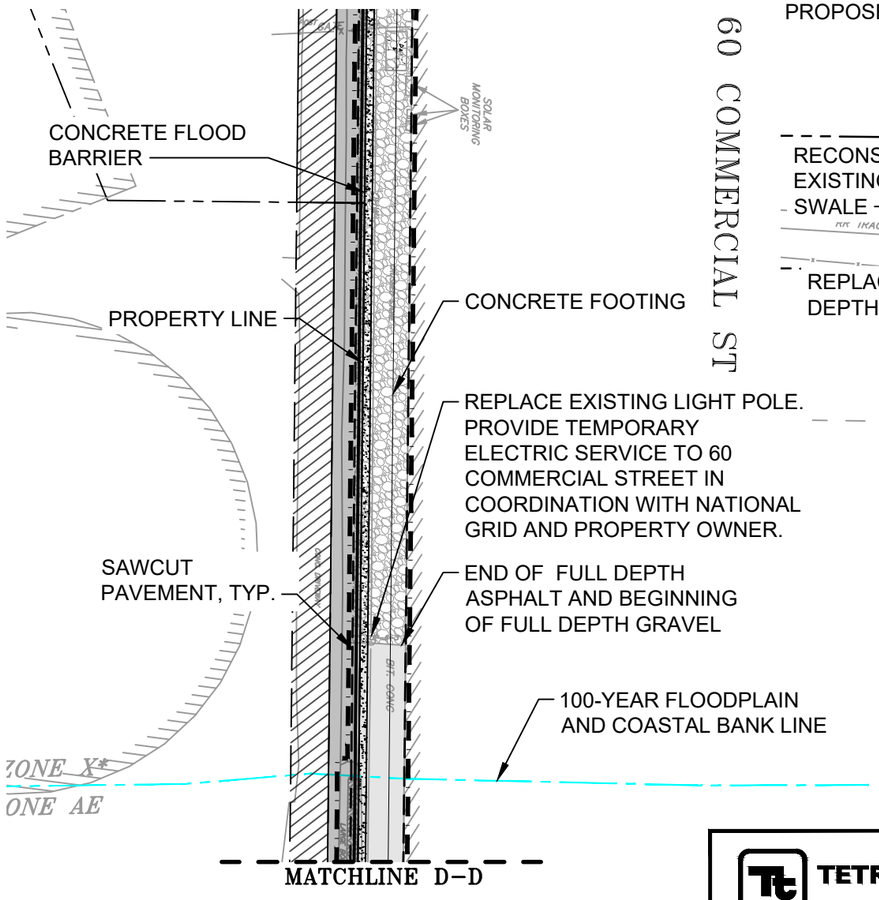
11/6/2023 5:39:31 PM - \\TT-LOCAL\IER\PROJECTS\NEW YORK\012911\200-01291-22002\CAD\SUPPORTFILES\RESOURCE AREA CALC\SIC-101 LAYOUT AND MATERIALS PLAN_REV.DWG - RETTA, AMANDA

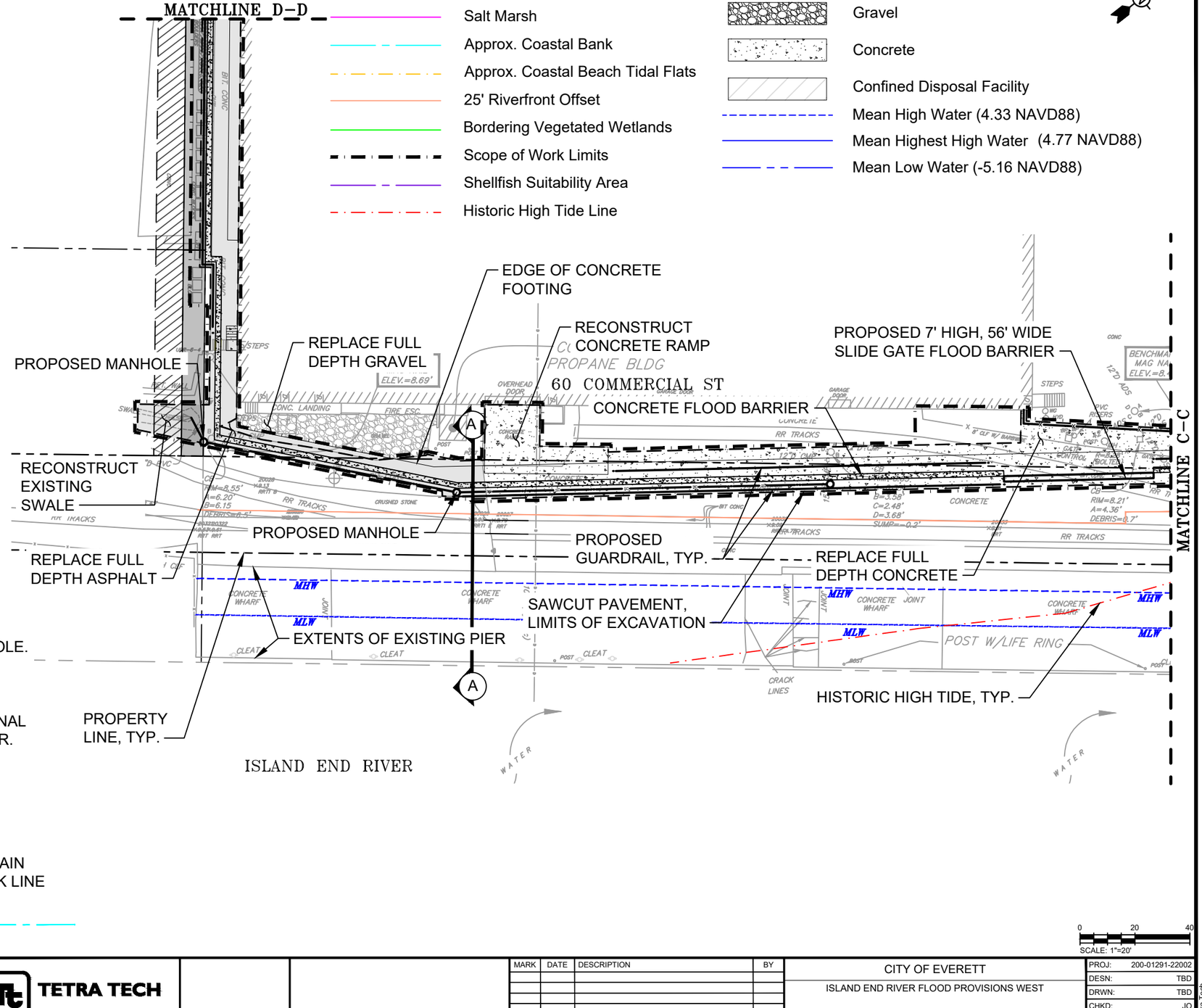


KEY MAP
SCALE: 1"=300'

LEGEND

- Mystic River Designated Port Area
- Salt Marsh
- Approx. Coastal Bank
- Approx. Coastal Beach Tidal Flats
- 25' Riverfront Offset
- Bordering Vegetated Wetlands
- Scope of Work Limits
- Shellfish Suitability Area
- Historic High Tide Line
- Asphalt Pavement
- Gravel
- Concrete
- Confined Disposal Facility
- Mean High Water (4.33 NAVD88)
- Mean Highest High Water (4.77 NAVD88)
- Mean Low Water (-5.16 NAVD88)





SCALE: 1"=20'

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NEW YORK, NY 10018
PHONE: (646) 576-4034

MARK	DATE	DESCRIPTION	BY

CITY OF EVERETT
ISLAND END RIVER FLOOD PROVISIONS WEST
RESOURCE AREA IMPACT PLAN - 4

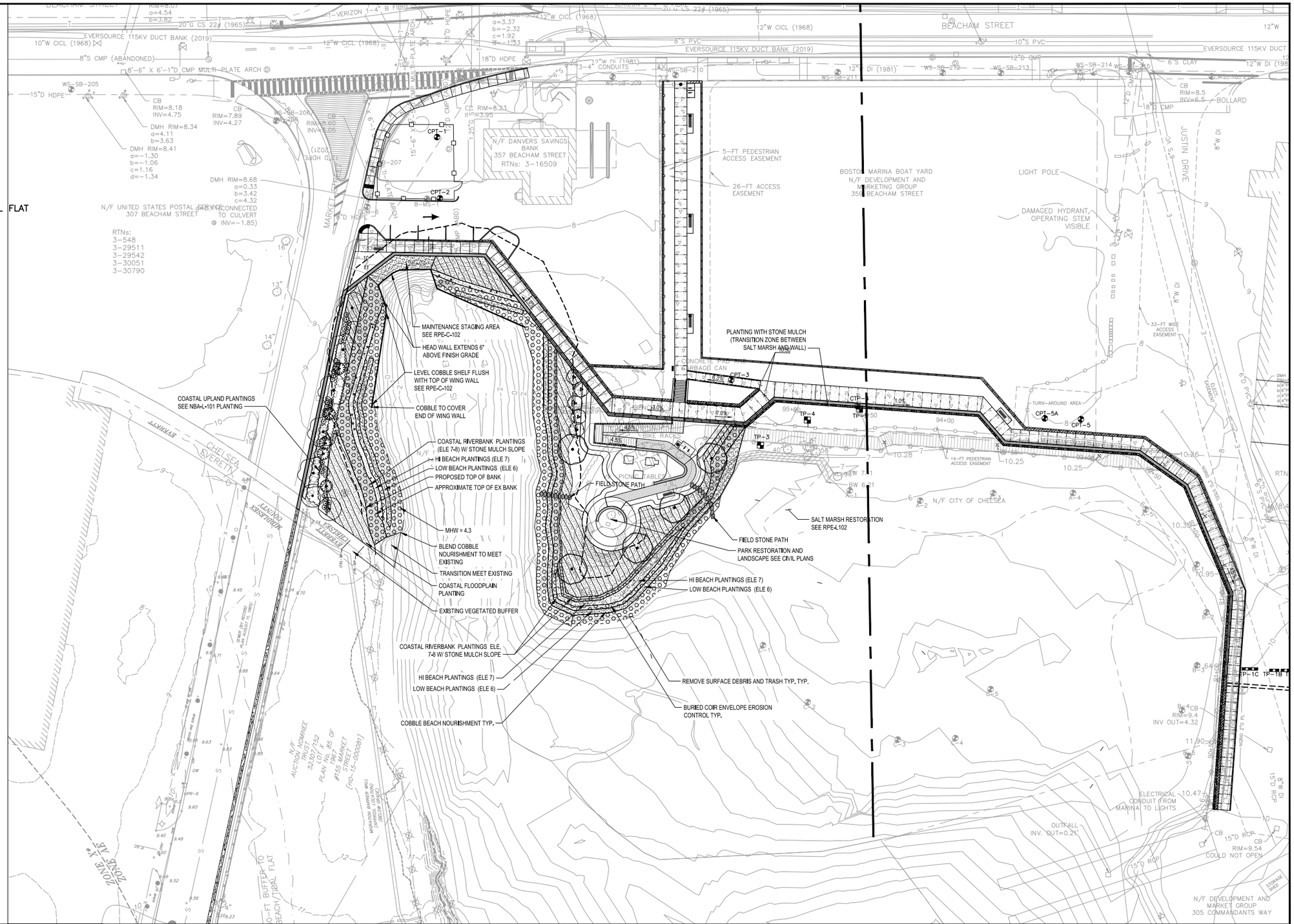
PROJ:	200-01291-22002
DESN:	TBD
DRWN:	TBD
CHKD:	JO

RPW-R-104

Bar measures 1 inch, otherwise drawing not to scale

LEGEND:

- = MEAN LOW WATER LINE/LAND UNDER OCEAN EL. −5.16
- = SALT MARSH
- = MEAN HIGH WATER EL. 4.33'
- = COASTAL BEACH/TIDAL FLATS
- = 25−FT RIVERFRONT AREA
- = COASTAL BANK
- = DESIGNATED PORT AREA
- = 100−FT BUFFER TO SALT MARSH/BVW
- = 100−FT BUFFER TO COASTAL BEACH/TIDAL FLAT
- = 100−FT BUFFER TO COASTAL BANK
- = PROJECT LIMITS
- = 100−YR FLOOD PLAIN
- = HIGHEST HIGH TIDE LINE EL. 6.5'
- = APPROX. MHHW EL. 4.77'
- = CHAP. 91 JURISDICTIONAL LIMIT
- = NATIVE SALT TOLERANT SEED MIX
- = SPARTINA ALTERNIFLORA PLUGS



Legend

- COBBLE BEACH NOURISHMENT/ STABILIZATION
- COASTAL RIVERBANK PLANTED WITH COBBLE MULCH
- COSTAL BEACH (LOW, HI) PLANTING
- COSTAL FLOODPLAIN PLANTING SALT FLOOD TOLERANT UPLAND PLANTINGS

Mass EOEA

Island End River

RESOURCE AREA IMPACT PLAN

Everett & Chelsea, MA

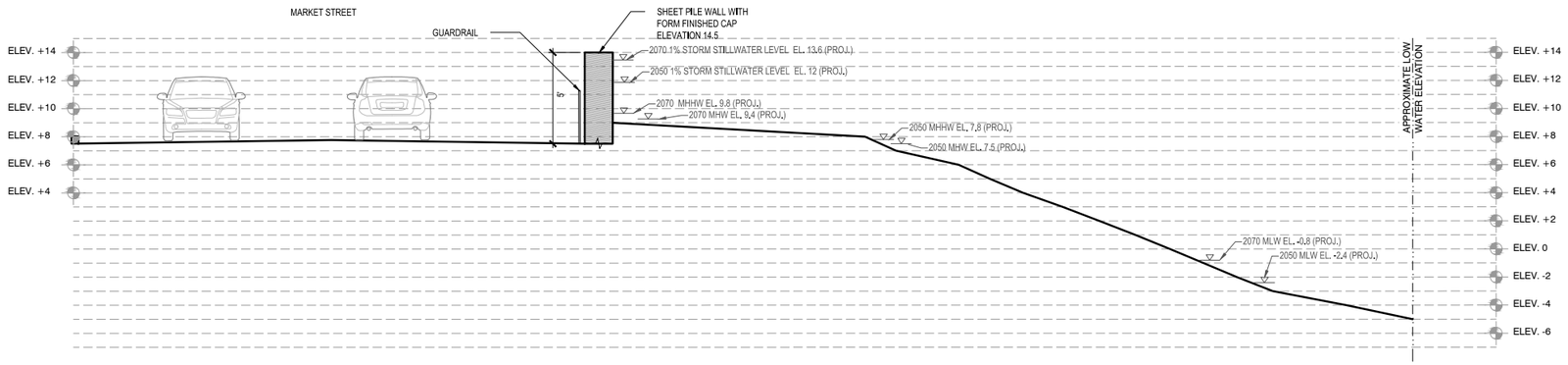
SHEET - NBA-R-101
DEIR

SCALE: 1" = 30'
0 15 30 60 FEET

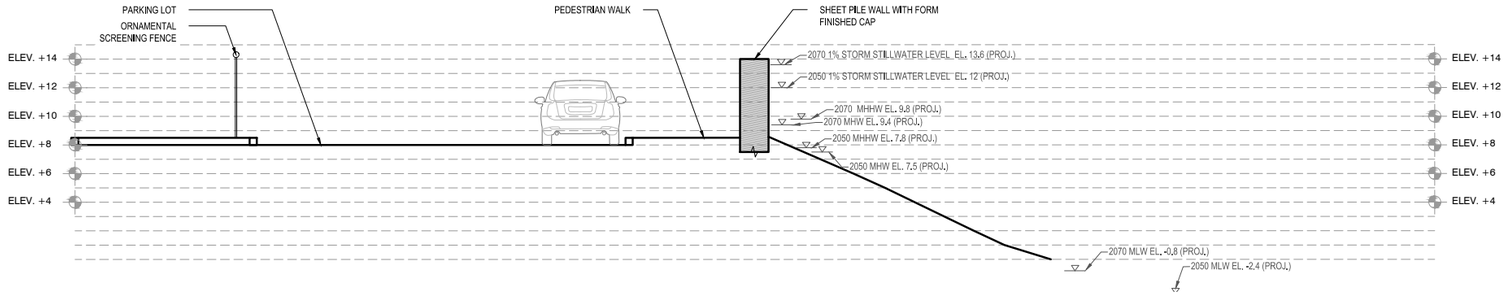
BSC GROUP
803 Summer Street
Boston, Massachusetts
02127
617 896 4300

DATE: 10 / 26 / 2023
FILE AT: \\bscbos\wor\Projects-WOR\B956105\...

SECTION A



SECTION B



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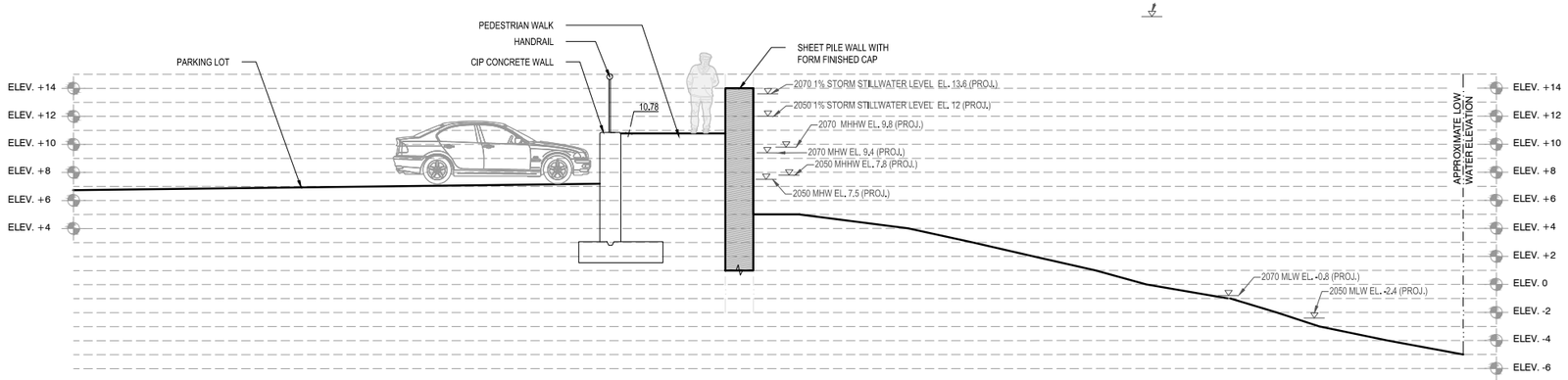

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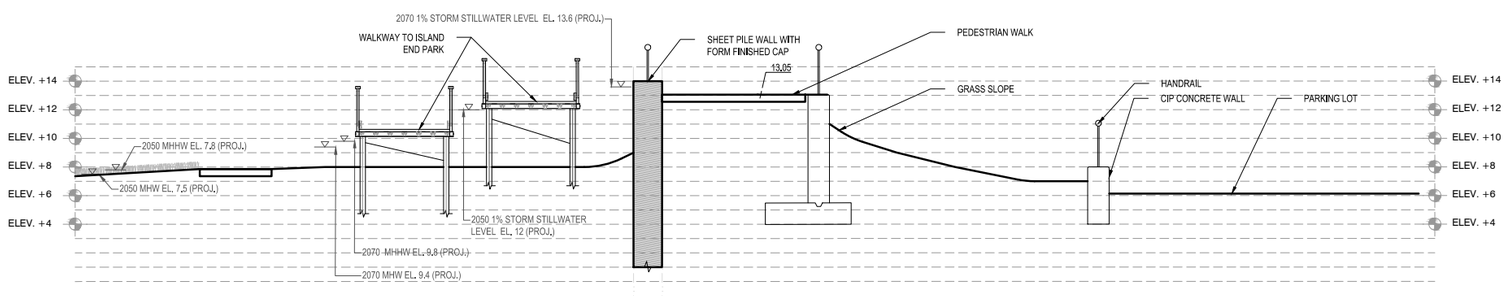


5 2.5 0 5 10
VERTICAL AND HORIZONTAL
SCALE: 1"=5'

Project:
ISLAND END RIVER FLOOD RESILIENCE PROVISIONS EAST

Weston & Sampson
Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants:

Revisions:

No.	Date	Description

Seal:

Issued For:

PROGRESS PRINT

Scale:	AS NOTED
Date:	NOVEMBER 2023
Drawn By:	LC, FD
Reviewed By:	BK
Approved By:	BWA
W&S Project No.:	-
W&S File No.:	

Drawing Title:

RESOURCE AREA IMPACT SECTION - 1

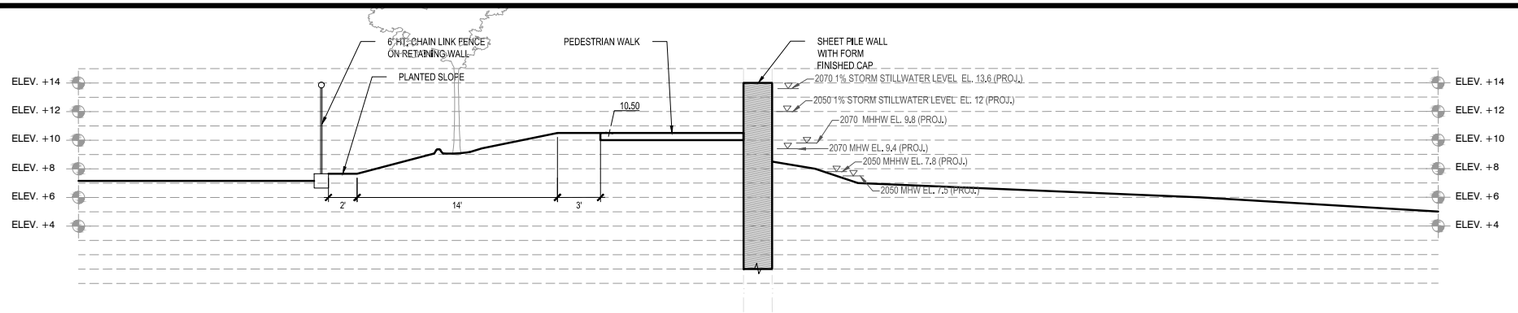
Sheet Number:

RPE-R-201

Rev: 1.8 Date: 11/2023

\\wes03-bos\WSP\Projects\RIVER\Island Maker\ End River Area\CADD\RPE_CIP\DWG\RPE-CP-C113 - Layout and Materials ● Resource Section Views.dwg

SECTION E



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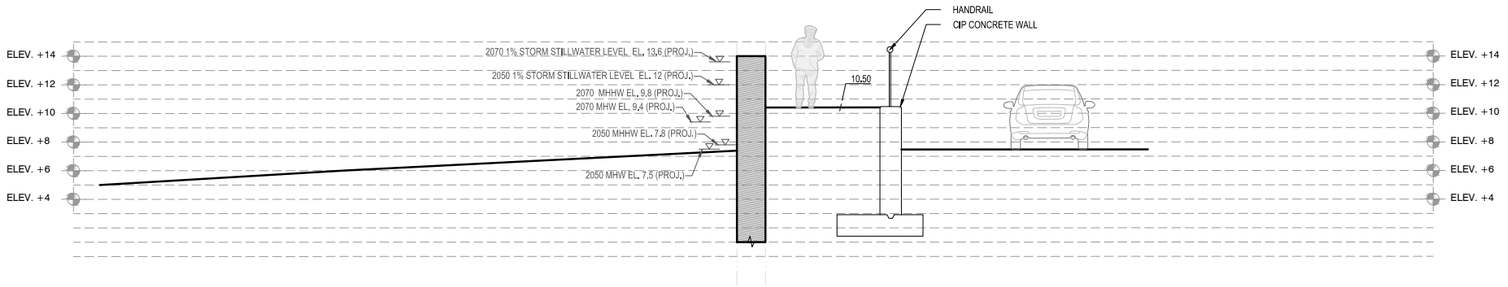

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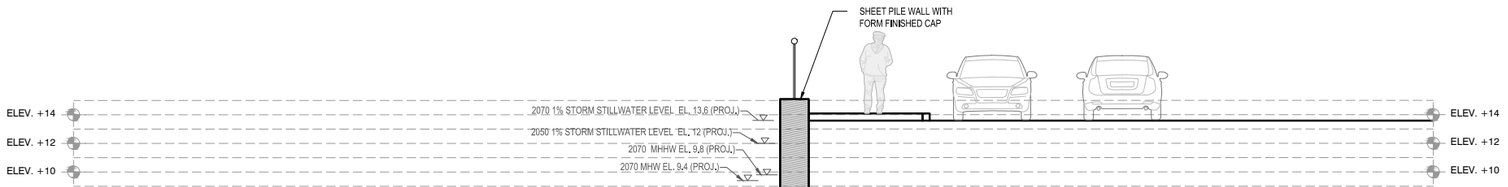
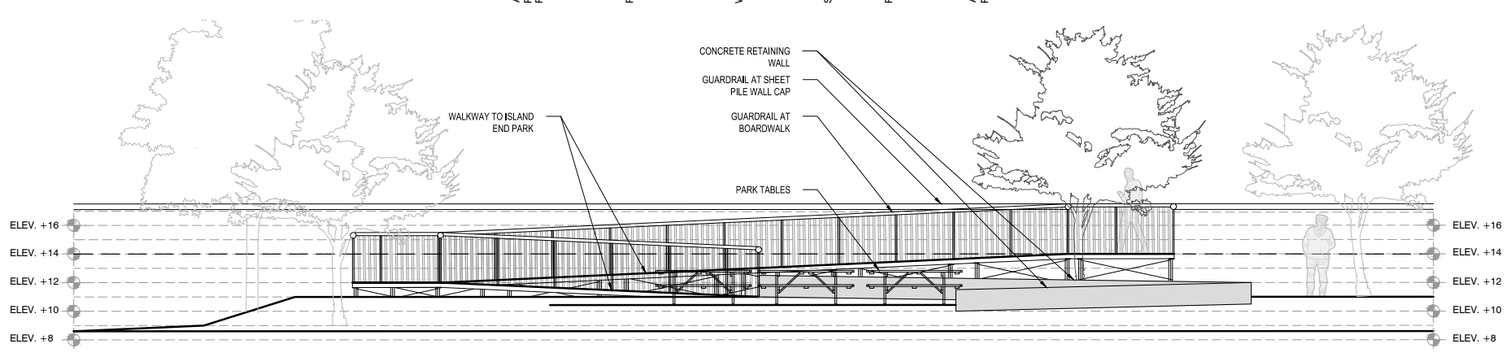


SECTION H

ELEVATION A



5 2.5 0 5 10
VERTICAL AND HORIZONTAL
SCALE: 1"=5'

Project:
ISLAND END RIVER FLOOD RESILIENCE PROVISIONS EAST

Weston & Sampson
Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants:

Revisions:

No.	Date	Description

Seal:

Issued For:
PROGRESS PRINT

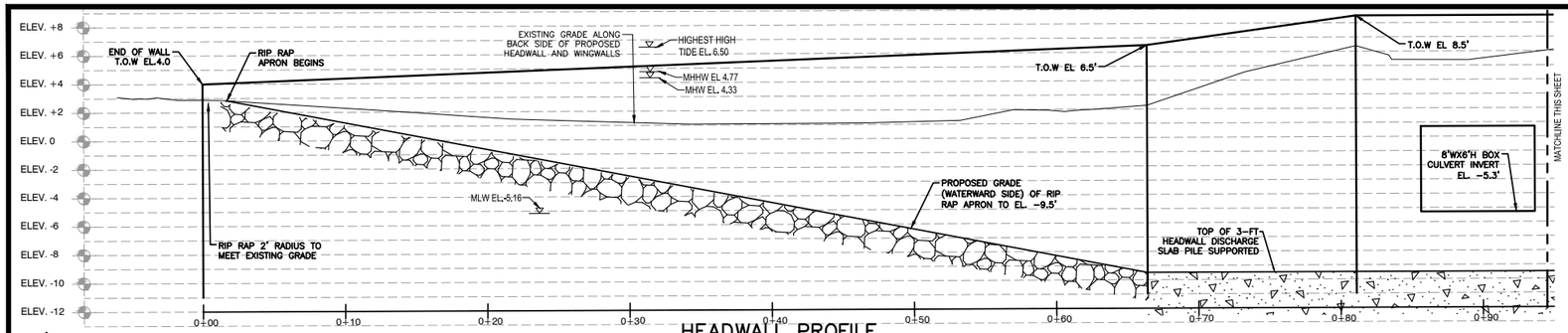
Scale:	AS NOTED
Date:	NOVEMBER 2023
Drawn By:	LC, FD
Reviewed By:	BK
Approved By:	BWA
W&S Project No.:	-
W&S File No.:	

Drawing Title:
RESOURCE AREA IMPACT SECTION - 2

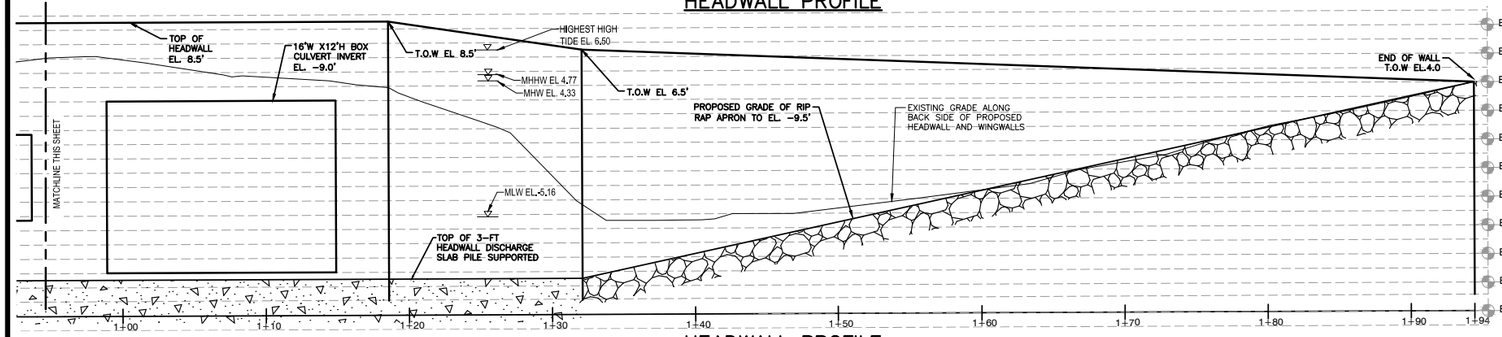
Sheet Number:
RPE-R-202

Rev: 1.6 Date: 11/2023

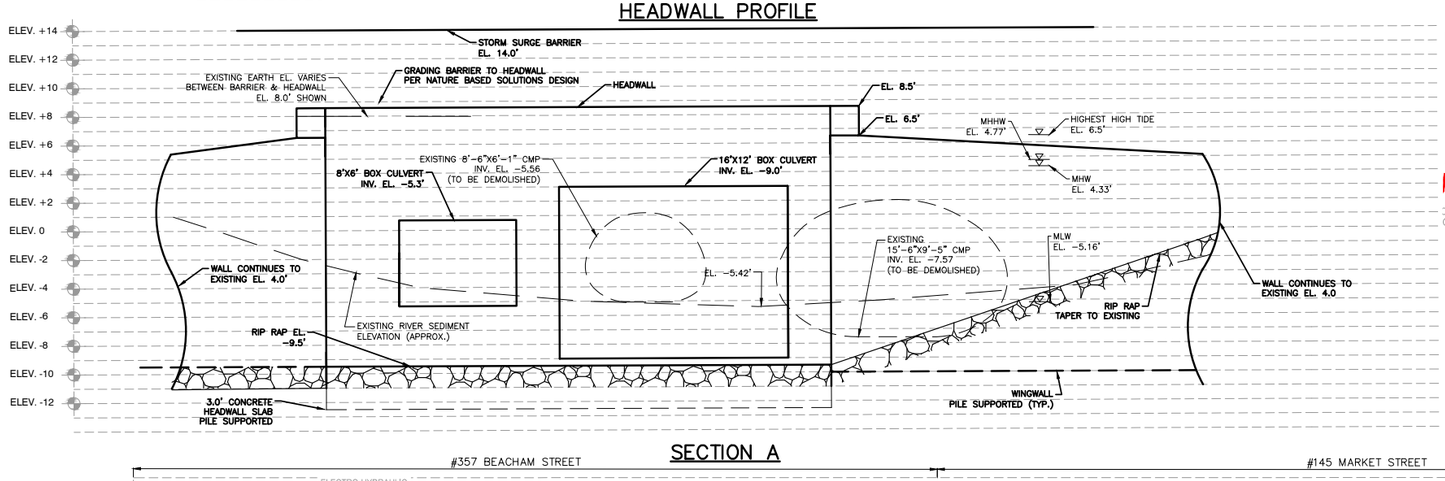
\\wse02\pub\0357\Projects\MA\Everett\Island End River Area\CAD\01_DESIGN\01-01-1 Layout and Materials + Resource Section Views.dwg

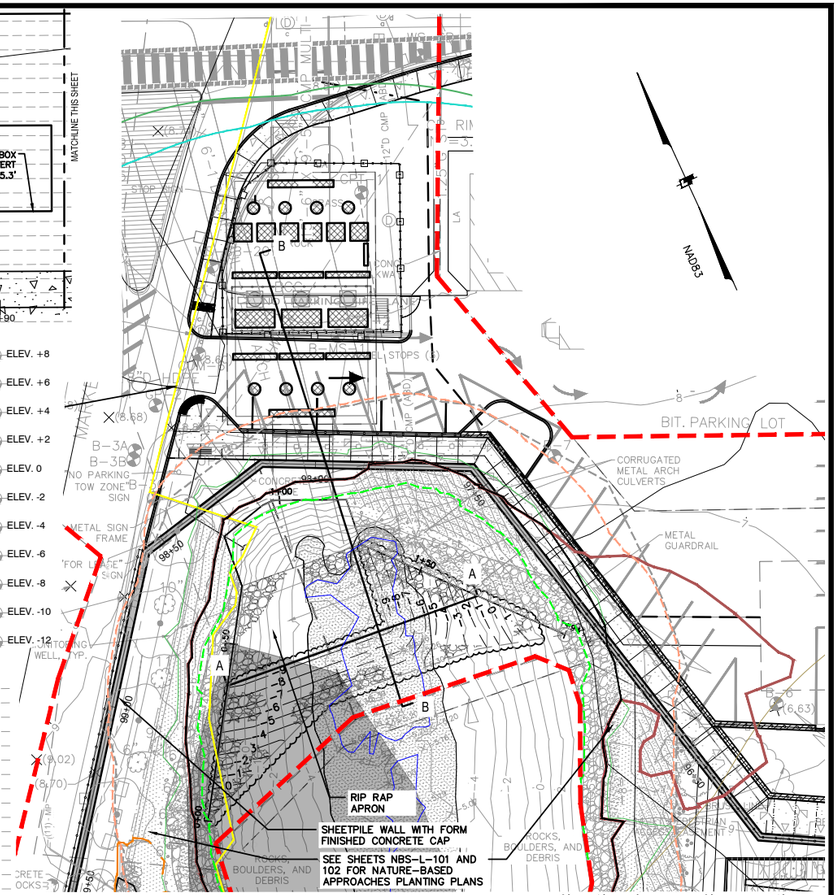


HEADWALL PROFILE



HEADWALL PROFILE



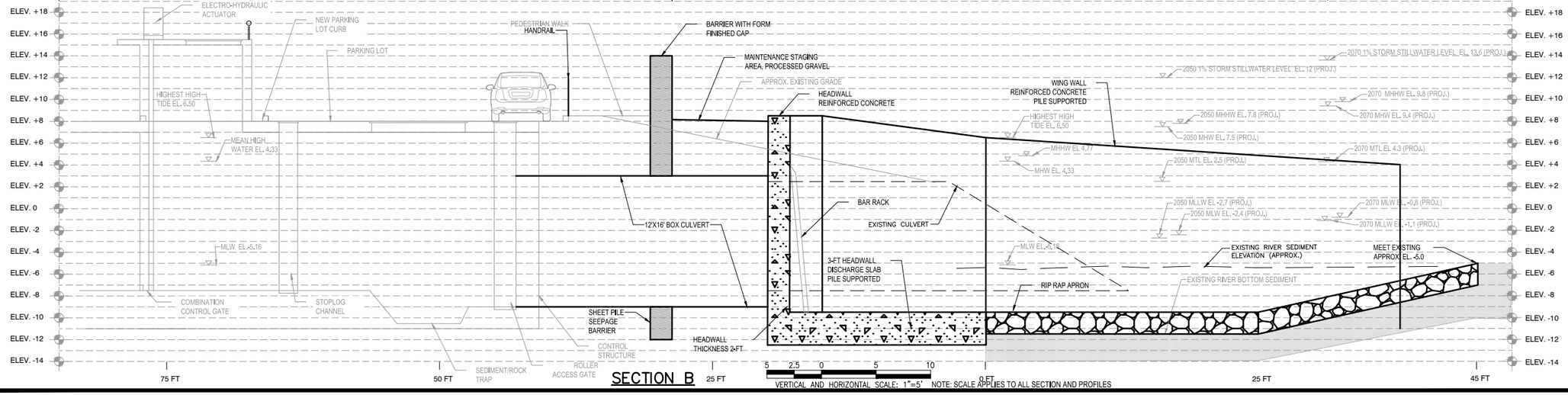


PLAN

LEGEND:

- = MEAN LOW WATER LINE/LAND UNDER OCEAN EL. -5.16
- = SALT MARSH
- = MEAN HIGH WATER EL. 4.33'
- = COASTAL BEACH/TIDAL FLATS
- = 25-FT RIVERFRONT AREA
- = COASTAL BANK
- = DESIGNATED PORT AREA
- = CHAP. 91 JURISDICTIONAL LIMIT
- = 100-FT BUFFER TO SALT MARSH
- = 100-FT BUFFER TO COASTAL BEACH/TIDAL FLAT
- = 100-FT BUFFER TO COASTAL BANK
- = 100-YR FLOOD PLAIN
- = APPROXIMATE COASTAL BEACH TIDAL FLATS
- = APPROXIMATE COASTAL BANK
- = PROJECT LIMITS
- = HIGHEST HIGH TIDE LINE EL. 6.5'

SECTION A



SECTION B

VERTICAL AND HORIZONTAL SCALE: 1"=5' NOTE: SCALE APPLIES TO ALL SECTION AND PROFILES

Project:

ISLAND END RIVER FLOOD RESILIENCE PROVISIONS EAST

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants:

Revisions:

No.	Date	Description

Seal:

Issued For:

PROGRESS PRINT

Scale:	AS NOTED
Date:	NOVEMBER 2023
Drawn By:	CFW
Reviewed By:	TPC
Approved By:	BWA
W&S Project No.:	-
W&S File No.:	

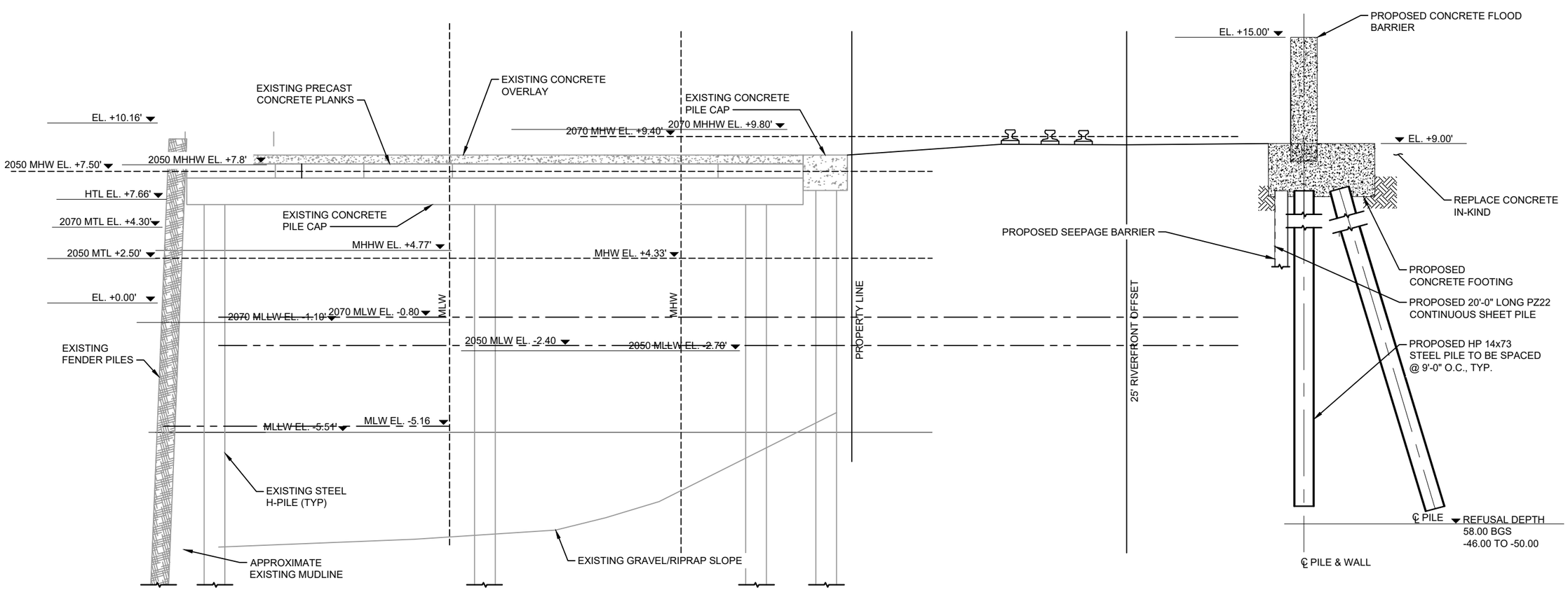
Drawing Title:

HEADWALL SECTIONS

Sheet Number:

SSCF-R-201

Rev. 1.0 Date: 11/2023



1 - SECTION A-A

NOTE:

ALL ELEVATIONS REFERENCE VERTICAL DATUM NAVD88

SCALE: 1"=2'

TETRA TECH
www.tetratech.com
498 7TH AVENUE, 15TH FLOOR
NEW YORK, NY 10018
PHONE: (646) 576-4034

MARK	DATE	DESCRIPTION	BY

CITY OF EVERETT

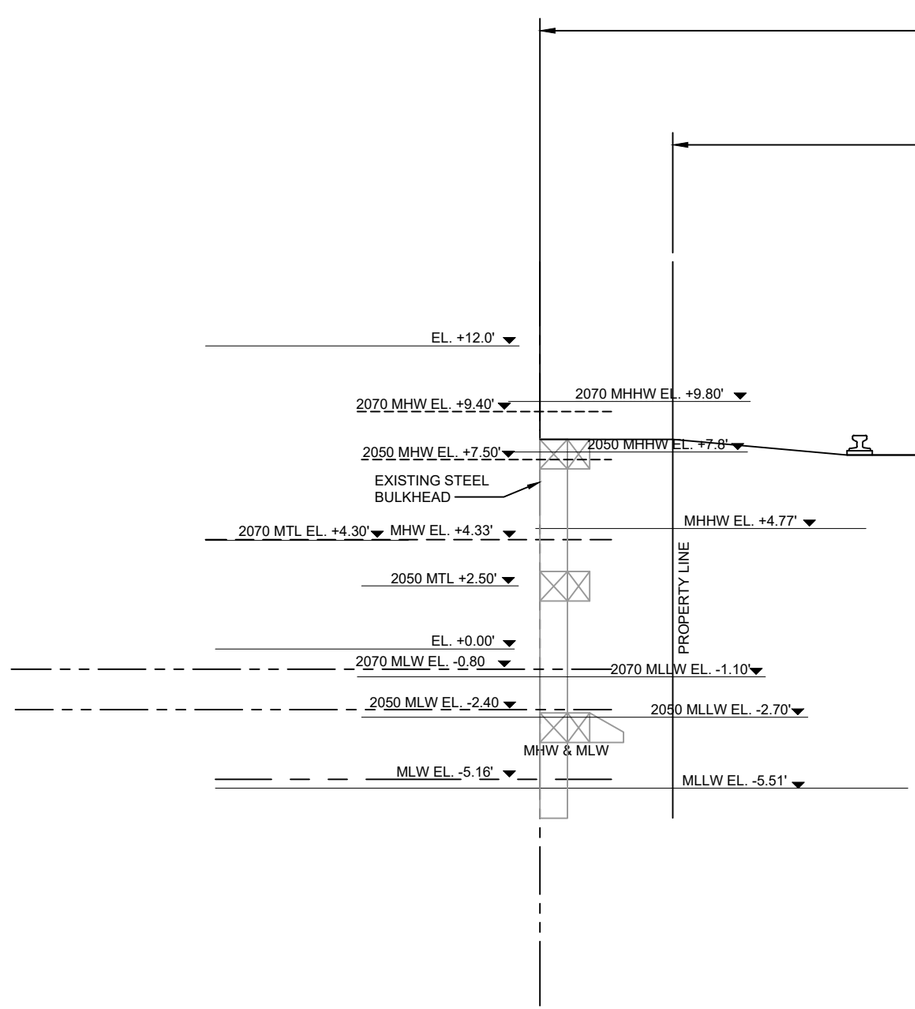
ISLAND END RIVER FLOOD PROVISIONS WEST

RESOURCE AREA IMPACT SECTION - 1

PROJ:	200-01291-22002
DESN:	TBD
DRWN:	TBD
CHKD:	JO

RPW-R-201

Bar measures 1 inch, otherwise drawing not to scale



2 SECTION B-B

NOTE:

ALL ELEVATIONS REFERENCE VERTICAL DATUM NAVD88

SCALE: 1"=2'

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www.tetratech.com
498 7TH AVENUE, 15TH FLOOR
NEW YORK, NY 10018
PHONE: (646) 576-4034

MARK	DATE	DESCRIPTION	BY

CITY OF EVERETT

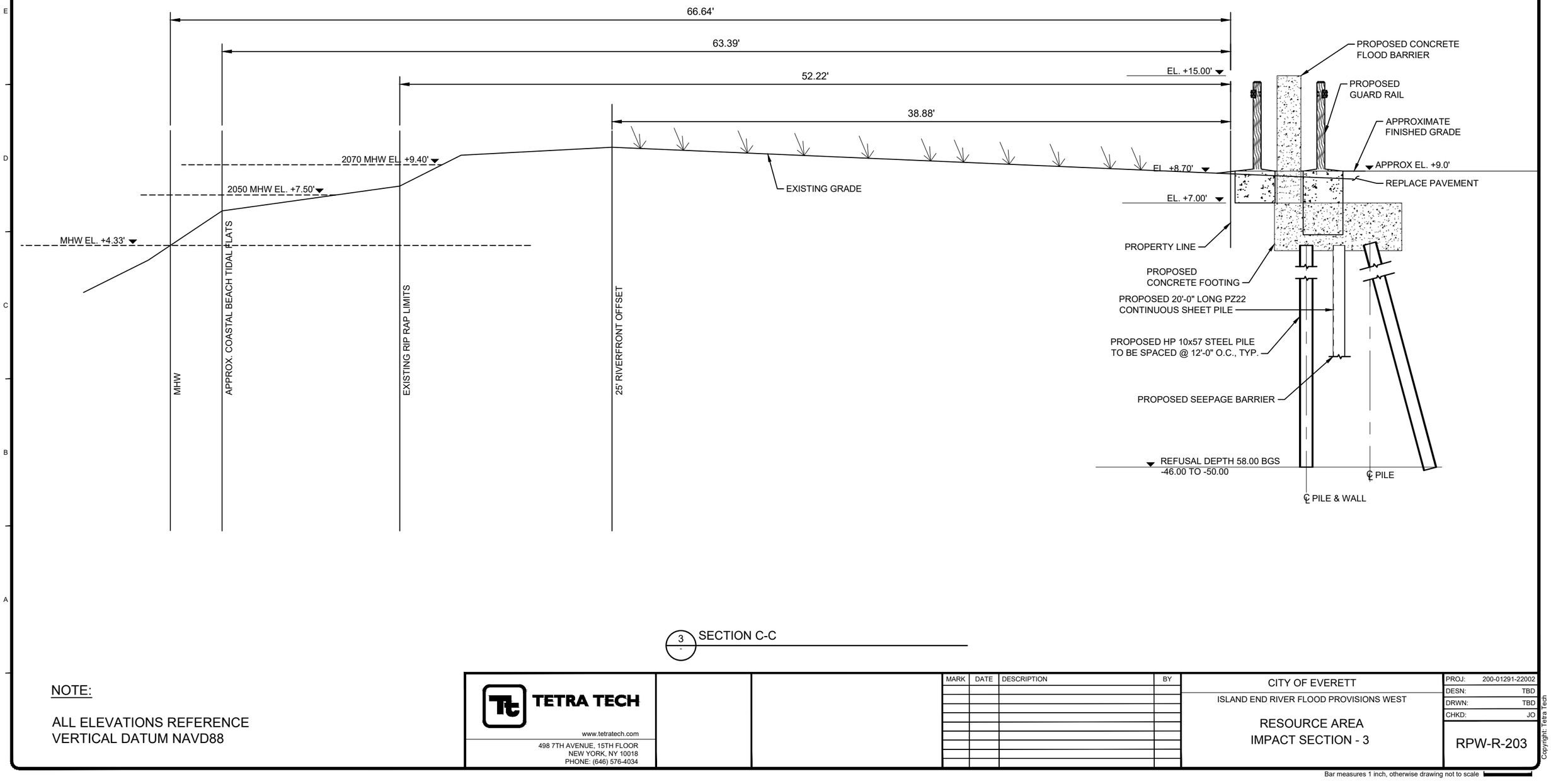
ISLAND END RIVER FLOOD PROVISIONS WEST

RESOURCE AREA IMPACT SECTION - 2

PROJ:	200-01291-22002
DESN:	TBD
DRWN:	TBD
CHKD:	JO

RPW-R-202

Bar measures 1 inch, otherwise drawing not to scale



3 - SECTION C-C

NOTE:

ALL ELEVATIONS REFERENCE VERTICAL DATUM NAVD88

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NEW YORK, NY 10018
PHONE: (646) 576-4034

MARK	DATE	DESCRIPTION	BY

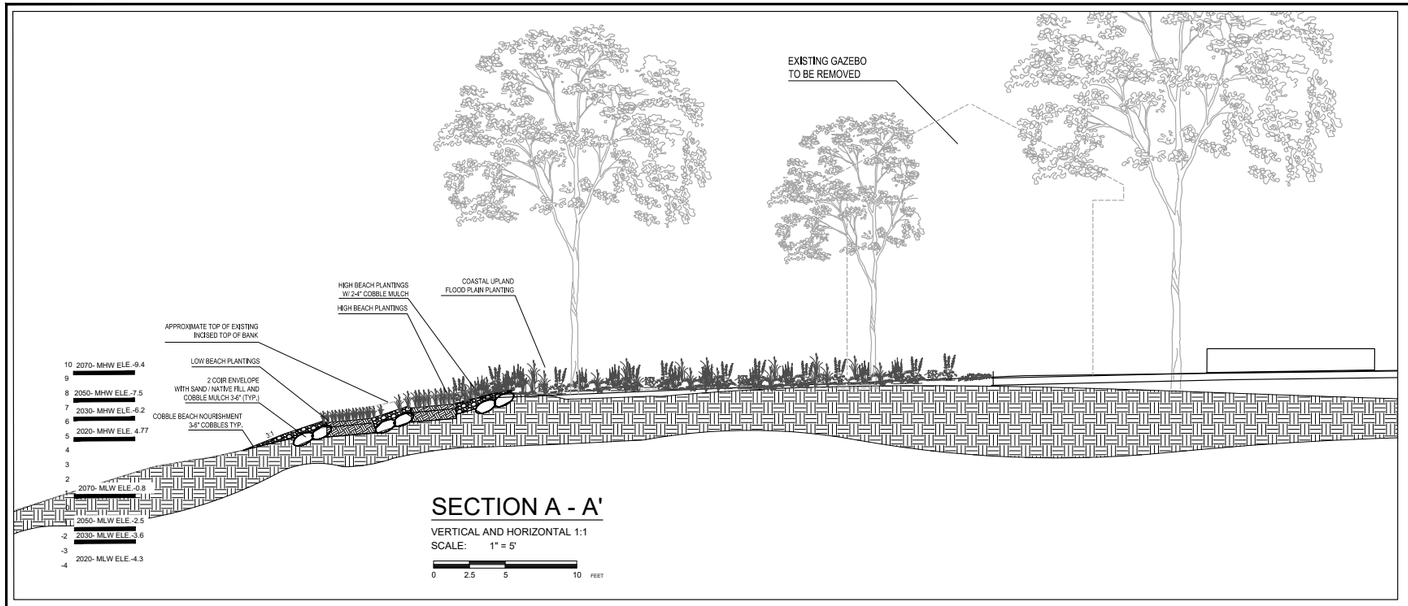
CITY OF EVERETT
ISLAND END RIVER FLOOD PROVISIONS WEST

RESOURCE AREA
IMPACT SECTION - 3

PROJ:	200-01291-22002
DESN:	TBD
DRWN:	TBD
CHKD:	JO

RPW-R-203

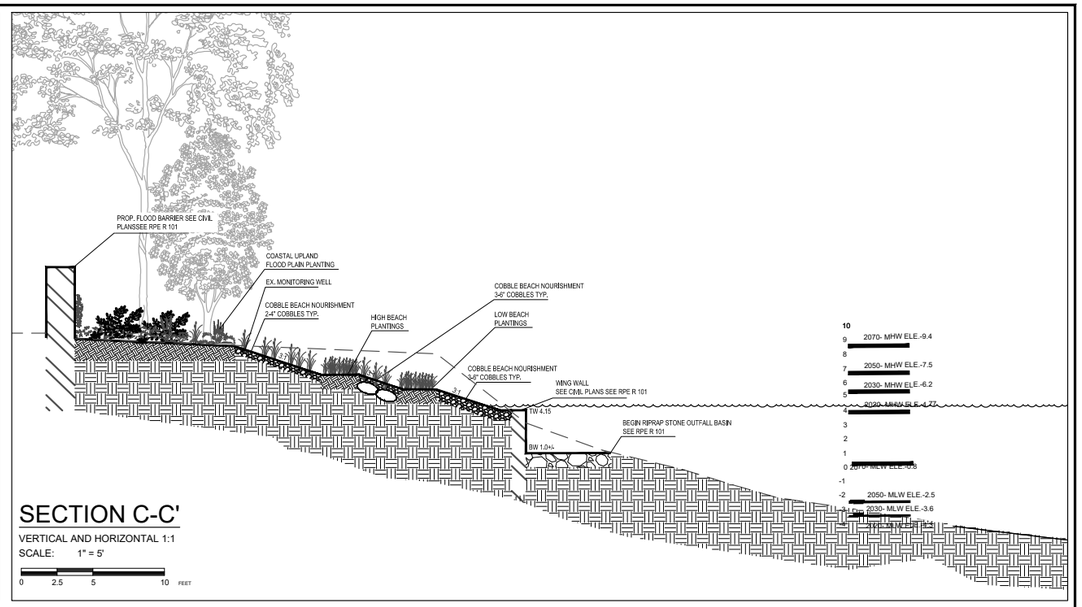
Bar measures 1 inch, otherwise drawing not to scale



SECTION A - A'

VERTICAL AND HORIZONTAL 1:1
SCALE: 1" = 5'

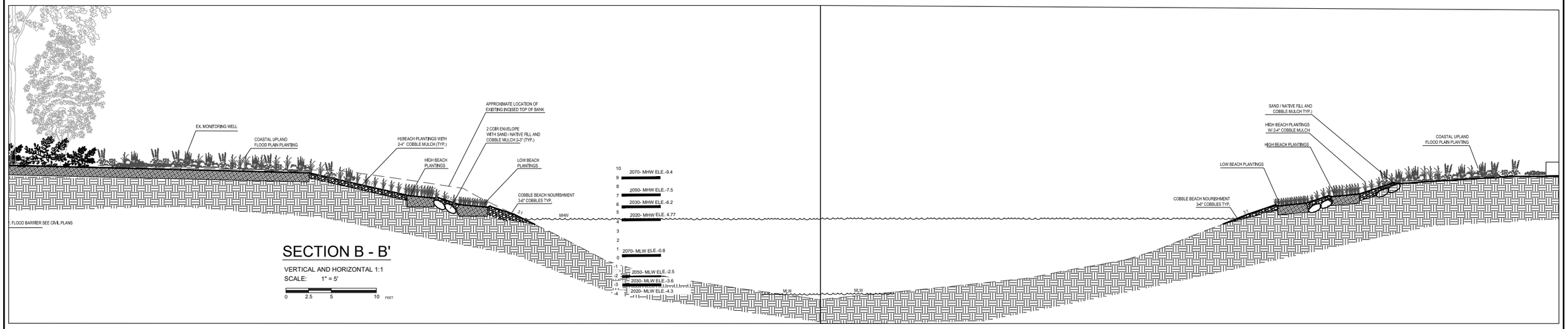
0 2.5 5 10 FEET



SECTION C-C'

VERTICAL AND HORIZONTAL 1:1
SCALE: 1" = 5'

0 2.5 5 10 FEET



SECTION B - B'

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SCALE: 1" = 5'

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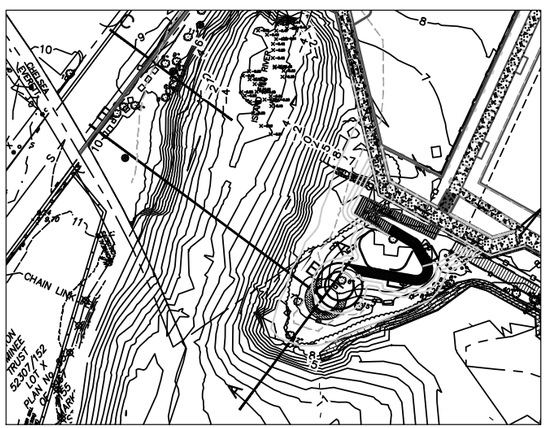

KEY PLAN
SCALE : 1" = 50'

Mass EOEA

Island End River

RESOURCE AREA IMPACT SECTION - (PLANTING SECTIONS)

Everett & Chelsea, MA

SHEET - NBA-R-201

BSC GROUP
803 Summer Street
Boston, Massachusetts
02127
617 896 4300

DATE: 10 / 26 / 2023
FILE AT: \\bscboe\wor\Projects-WOR\896105\...

Attachment I

SALT MARSH RESTORATION PLAN

Weston & Sampson

westonandsampson.com

55 Walkers Brook Drive, Suite 100
Reading, MA 01867
tel: 978.532.1900

Salt Marsh Wetland Replication Plan

Island End River Flood
Resilience Provisions East

City of Chelsea

Island End Park
Chelsea, MA

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1.0 INTRODUCTION

The area surrounding Island End Park is dominated by commercial properties and has been heavily developed. This has resulted in a number of unavoidable site constraints which have been used to determine the ultimate alignment of the proposed flood barrier. Although this barrier has been located as far landward as is physically possible, a small amount of Salt Marsh impact is unavoidable due to the location of the existing boardwalk. Based on the proposed barrier alignment 1,856 SF of salt marsh will be permanently impacted. In order to provide mitigation for these impacts a new salt marsh replication area has been developed on site. This salt marsh replication area is 2,745 SF in size in order to provide more than the required 1:1 mitigation.

Additionally, the existing salt marsh contains bare spots which provide lower value habitat and minimizes public enjoyment of this natural resource area. Smooth cordgrass *(Spartina alterniflora*) supplemental planting is proposed in these devoid areas to restore vegetation cover.

Proposed improvements to the salt marsh located at the Island End River Flood Resilience project area are broken down into two categories:

A. Enhancement of Existing Salt Marsh

B. Salt Marsh Replication

The strategies for each of these proposed improvements are elaborated below. This proposed work will occur between elevations 2.0 NAVD88 and 7.0 NAVD88.

2.0 ENHANCEMENT OF EXISTING SALT MARSH

2.1 Smooth Cordgrass (Spartina alterniflora) Planting

Based on a review of vegetation composition, substrate materials, and elevation two areas within the low marsh have been identified as having the appropriate conditions for salt marsh vegetation that are currently devoid of vegetation. These two areas have exposed wetland substrate (peat) above elevation 2.0 NAVD88 which is over two feet above the mid-tide line (EL -0.42 NAVD88). The cause for a lack of vegetation in these areas is unknown and could be due to a number of factors including animal predation. In an attempt to restore vegetation to these two areas, this project proposes to plant smooth cordgrass (*Spartina alterniflora*) plugs at 2-foot on center intervals across the two devoid areas.

2.2 Monitoring

Monitoring of these two supplemental planting areas should be done concurrently with the bi-annual monitoring efforts described below for the wetland replication area. Monitoring will occur two times per year (spring and fall) for a minimum of two years following planting. A general assessment of re-growth and overall vegetative coverage within these two devoid areas should be detailed in the monitoring reports.

After the initial installation and/or during the monitoring events if it is determined that additional planting is necessary than supplemental plugs may be added to the restoration areas at the direction of a wetland scientist.

After each monitoring event, proper documentation will be kept for reference and to be used for future monitoring and control of each site. The information gathered during the monitoring events will be submitted to the Conservation Commission and other reviewing agencies as required.

3.0 SALT MARSH REPLICATION

Based on historical mapping of the area, much of the development that has historically taken place around Island End Park was on top of areas that at one time were salt marsh. A series of soil borings were completed on site as part of the design efforts for the flood barrier. These soil borings suggest that the substrate located below the proposed replication area is composed of urban fill material and will not be suitable for plating without some soil amendment. In order to create a suitable substrate the salt marsh replication area will be over excavated to allow for 12 inches of amended soil to be brought in prior to planting..

3.1 Construction Sequence

Construction of the wetland replication area has been designed to minimize erosion, prevent sediment from entering adjacent wetlands, and to minimize the establishment of planted vegetation. The areas will be constructed per the following:

1. A survey crew shall stake out the limits of the proposed 2,745 SF wetland replication area.
2. Prior to all earthwork activities, erosion control barriers shall be installed along the downgradient edge of the wetland replication area.
3. Once erosion control measures are in place heavy equipment situated in the uplands will be utilized to bring the proposed replication area down to 12 inches below final grade by removing the upper layer of asphalt, gravel and fill. Removal of material will continue until the replication area matches the grade of the adjacent, existing salt marsh, at which point an additional 12 inches of material will be removed to allow for the addition of planting substrate. The excavated sediment will be removed from the site or used on site within the upland project area as fill. minor modification to this grading plan may be made in the field by the wetland scientist in response to subsurface hydrologic conditions. the supervising wetland scientist will inspect the sub-grade of the replication area to ensure that the proper hydrology has been established.
4. Planting substrate. The amended soils will be composed of four parts coarse-

sand and one part compost.

5. Once final grade has been achieved and erosion control barrier will be placed along the upgradient edge of the wetland replication area.

3.2 Planting

Once the planting substrate is in place, the salt marsh replication area will be planted with the following salt tolerant species:

SPECIES	SIZE (height)	SPACING	NUMBER
Saltgrass (*Distichlis spicata*)	Plugs	2-foot on center	155
Saltmarsh Hay (*Spartina patens*)	Plugs	2-foot on center	155
Smooth Cordgrass (*Spartina alterniflora)*	Plugs	2-foot on center	155
		Total	465

The planting season within the restoration area will extend from only after the last frost in the spring through mid-May, and from September 1 until October 15 in the fall. Planting season periods may be extended if weather and soil conditions permit only with the written approval of the Engineer and Owner. Extended or out-of-season planting requirements would include application of antitranspirant and extra water as needed. Planting will not be permitted in frozen ground. The Contractor will be responsible for all plant maintenance, which will begin immediately after each plant is planted and shall continue until completion of the guarantee period and final acceptance of the project.

3.3 Monitoring

Monitoring of the salt marsh replication area will be included in the same monitoring plan that will encompass the salt marsh enhancements. In order to track the progress of new native plant growth and coverage within the salt marsh restoration area, after planting is completed three 1 meter x 1 meter wetland monitoring plots will be located at the site within the salt marsh replication area. Wooden stakes will be driven into the ground at each corner of the monitoring plots and spray painted orange for easy identification.

Monitoring will occur two times per year (spring and fall) for a minimum of two years following planting. The vegetation data plots will be used to determine percent dominance and percent cover of each species identified within the plot. This evaluation will determine the overall health of the replication area. During each monitoring event, the data plots will be photographed from fixed points so that visual comparisons can be made during future monitoring events. After the initial installation and/or during the monitoring events if it is determined that additional planting is necessary than supplemental plugs may be added to the restoration areas at the direction of a wetland scientist.

After each monitoring event, proper documentation will be kept for reference and to be used for future monitoring and control of each site. The information gathered during the monitoring events will be submitted to the Conservation Commission and other reviewing agencies as required.

Attachment J

INVASIVE SPECIES ADAPTIVE MANAGEMENT PLAN

Weston & Sampson

westonandsampson.com

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tel: 978.532.1900

Draft Adaptive Management Plan

Adaptive Management Plan for the Control of Invasive Species – *Phragmites australis*

Island End Park
Chelsea, MA

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APPENDICES

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1.0 INTRODUCTION

A critical component of the proposed work around Island End Park in Chelsea MA is the presence of the existing infestation of non-native *Phragmites australis* (Common Reed). The City of Chelsea is seeking to treat this species as part of the overall strategy at Island End Park. The purpose of this Adaptive Management Strategy is to:

1. Identify the current extents of the *Phragmites australis* infestation
2. Identify short and long term control goals
3. Recommend control practices to meet the goals
4. Evaluate the control practices to determine if the goals have been achieved

The intent of this plan is to establish and adaptive management strategy for the control of the target invasive species (*Phragmites australis*).

2.0 INVASIVE SPECIES OBSERVATIONS

The existing salt marsh located at Island End Park is partially covered by an infestation of the invasive species common reed (Phragmites australis) aka Phragmites which covers 19,134 SF (0.43 acres). Invasive species pose a threat to native plant communities because the introduction of these non-native species can often dominate native counterparts, causing a loss of diversity and habitat degradation. Additionally, this dense stand of Phragmites is causing trash and other vegetative debris to become trapped within the stand. As the tide borne trash settles at the toe of the Phragmites, the buildup raises the surface elevation causing more Phragmites grow and further displacing native species creating a progressing take of salt marsh. The depth of this trash/debris layer was investigated in the field using two transects that measured the distance from the top of the trash/debris to the sediment surface. Based on these probes, estimated material to be removed is approximately 1 FT in depth and totals 708 CY of trash/debris that needs to be removed from below the High Tide Line.

3.0 SHORT AND LONG TERM GOALS

The goals for the proposed control of Common Reed at Island End Park can be broken down into Short Term and Long Term timeframes:

Short Term Goal – Remove Existing Invasive Phragmites

2 Years Post Construction – In the first few treatment cycles the goal of the project is to remove the existing invasive species growth that is present on site, remove accumulated debris, and prevent new growth from occurring. This will occur through bi-annual monitoring efforts. Additionally, the short term goal will be to monitor initial establishment of native salt marsh species.

Long Term Goal – Prevent Future Infestation

>2 Years Post Construction – Long term goals extend beyond the initial two years post construction, and seek to have an ongoing maintenance program and community involvement to continue monitoring the site for any potential invasive species which can then be treated. In the long term the project seeks to have establishment of native salt marsh species.

4.0 REMOVAL/MANAGEMENT METHODOLOGIES

Overview

Per the USDA National Invasive Species Information Center, Common Reed is an herbaceous perennial with widespread origins that was likely introduced to the US in the 1800's likely through ships' ballast (USDA, National Invasive Species Information Center. *Common Reed*. 2021). It is one of the most widely distributed flowering plants, it occurs on every continent except Antarctica and is cosmopolitan in temperate zones. Common Reed is widely distributed in North America and occurs in all US states except Alaska. The NRCS indicates that the four methods for control of this species are mechanical control, black plastic, burning, and chemical control (USDA, NRCS. 2018. *Phalaris arundinacea, 2021)*. Mechanical control (hand removal/pulling) is appropriate for small infestations which can be removed by hand. This method will likely require annual treatment because re-sprouting will occur if the entire root is not removed. Removal of rhizomes is difficult due to the rapid growth rate. Black plastic covering can be used in small areas to produce high temperatures and block out sunlight. This methodology is challenging because the sharp nature of Common Reed re-growth can pierce the plastic and make the treatment ineffective. Additionally, black plastic covering can have adverse impacts on the soil microorganisms and may alter soil chemistry (Avers, 2007). Burning is only an effective solution when the desired treatment area can be immediately flooded or following an herbicide application. Other burning treatments can actually increase the amount of Common Reed present (USDA, NRCS. 2018. *Phalaris arundinacea, 2021)*. Burning as a technique has obvious dangers, including with respect to the natural gas pipeline located adjacent to the wetland restoration area, and the technique requires significant training. Chemical control (herbicides) can be applied utilizing foliar treatment and cut stem treatment. The most effective systematic herbicide for treatment of Common Reed is glyphosate (i.e., Accord, Glypro, Rodeo, Roundup and others) and/or imazapyr (Avers, 2007). These are nonselective herbicides which kills both grasses and broad-leaved plants. According to the National Pesticide Information Center, "Glyphosate is not likely to get into groundwater because it binds tightly to soil."

Manual Controls – Hand Pulling

Manual controls such as hand pulling can be effective at controlling isolated stems and small populations of certain invasive species. This option is preferable, when possible, as it reduces the amount of chemicals utilized near wetland areas. Caution should be utilized to limit soil disturbance and compaction to the maximum extent practicable. When utilizing this methodology, it is essential to remove

the entire root/rhizome to prevent regeneration from remaining pieces. Broken stems can also often resprout, so care must be taken to minimize disturbance to the soil and native vegetation in the area. This type of treatment methodology often requires periodic maintenance in order to be effective. Once the plant material is removed it should be bagged and disposed of offsite. Depending on the species it also may be beneficial to treat the cut material with herbicide before disposal to prevent further spread. The determination of how to treat the remnant plant material shall be made by the qualified invasive species removal professional. This methodology is challenging with Common Reed as the roots often break resulting in regrowth, and it only appropriate for immature single stems.

Chemical Controls

Non-organic chemical controls (herbicides) are extremely effective at treating invasive species, but large-scale spraying of herbicides can pose an environmental risk due to the proximity of the adjacent Island End River. As a result, chemical control via large-scale spraying is not recommended and is not proposed at this site. Instead, chemical treatments should be conducted through localized applications. Herbicides that are least impactful to waterbodies will be utilized. Timing is paramount to any successful chemical treatment to interrupt the lifecycle of the plant. Precautions should be taken to avoid chemical runoff or drift and impacts to pollinators and other nontarget species. Herbicides should only be applied on dry days with minimal to no wind to prevent impacting other species in the area. All applications should comply with local laws, licensing requirements, and manufacturer recommendations. The contractor doing the herbicide application will be properly licensed and will be responsible for submitting any paperwork required for herbicide use.

Two non-organic chemical treatment methods that have proven effective are highlighted below. The use of these methodologies should be used interchangeably at the discretion of the licensed herbicide applicator depending on the conditions observed at the time of treatment.

Based on our review of literature and consultation with an industry expert, organic herbicides are not effective at eradicating invasive plant species, especially in a wetland setting, since they are unable to translocate systemically to the root systems like chemical treatments do. As a result, the use of non-organic herbicides are not proposed for use at this site.

4.1.1 Foliar Application

Foliar application utilizes spraying equipment to apply the desired herbicide to the leaves of the target species. This can be done utilizing a targeted treatment or a broadcast treatment. Targeted treatment is recommended for small stands and individual plants where the herbicide is directed specifically at individual plants. Broadcast treatment is recommended for larger mono-culture areas where herbicide is applied non-selectively over the desired area at a consistent rate. Generally foliar applications utilize a lower concentration of herbicides that are applied at moderate volumes. Caution should be utilized with this herbicide application technique to ensure no unintended vegetation is impacted. Treatment timing will depend on each individual species present, for further details see the species-specific details below. Chemicals should be applied during dry conditions to reduce the chance of point-source pollution. Equipment will be limited to handheld or backpack sprayers in order to reduce impact to the wetland area. This equipment will not be washed down on site to prevent any unwanted transport of chemicals. Although public entry of these wetland areas is prohibited, upon completion of any herbicide applications signs will be posted at the closest public access indicating that recent spraying has occurred. According to "A Guide to the Control and Management of Invasive Phragmites", there has been some evidence that in dense growth stands of Phragmites, mowing/cutting prior to herbicide application can improve success (Avers, 2007). To utilize this approach cutting should be conducted a minimum of 4 weeks prior to herbicide application. This allows for re-growth of leaf and seed heads prior to herbicide application. It is recommended that this cutting occur after July 15 so as to limit any impacts to nesting birds. Phragmites stems should be cut to a stem height of 4-12 inches. If possible and recommended by the licensed herbicide applicator, then pre-herbicide cutting would be preferred.

MDAR reviews and registers aquatic herbicide products which have been approved for use in lakes and ponds in Massachusetts. The proposed herbicide utilized will come from this approved list. MDAR also makes publicly available a "fact sheet" for each active ingredient (i.e. Glyphosate and Imazapyr) which outlines details such as the uses, chemical mechanisms, and health effects. The MDAR active ingredient "fact sheets" for Glyphosate and Imazapyr can be found in Appendix A.

4.1.2 Cut and Wipe

The cut-and-wipe method combines mechanical and chemical treatments. The goal is to avoid large ground disturbances caused by digging up roots. Instead, a chemical treatment is applied to cut stems and/or roots, which require a higher concentration of the herbicide than is used in small scale spray applications but only a very small amount is applied. Stems should be cut as close to the ground as

possible, and herbicide should be applied directly to the cut surface. This application should be done as soon as possible after the plant is cut to ensure effectiveness of the herbicide. The herbicide should be applied manually with a rag or sponge. The idea is to thoroughly wet the cut surface so that the herbicide absorbs into the plant tissues. Treatment timing will depend on each individual species present, for further details see the species-specific details below. Chemicals should be applied during dry conditions to reduce the chance of point-source pollution. This methodology is appropriate for small stands that are less dense.

5.0 PROPOSED MANAGEMENT STRATEGY

Based on a review of the scientific literature, the proposed treatment for the control of Common Reed is is an initial cutting followed by foliar spray further treatments can utilize cut and wipe.

Treatment

Due to the height of this Phragmites stand, the first step in this management plan will be to cut the existing phragmites down around mid-summer. The cut vegetative material should be removed from the site and allowed to dry out before disposal. Once the plant material is dead it can be composted. Several weeks later (once new sprouts are approximately two (2) feet in height) an herbicide application should take place using foliar spray. After herbicide has taken affect (3 – 4 weeks after application), the remaining above ground plant material should be removed along with the accumulated trash/debris until the native substrate surface is exposed. At this point a fall planting of native salt marsh species and seeding with a native salt tolerant seed mix can take place.

Care should be utilized when applying herbicides near wetland resources. Rodeo contains a nonionic surfactant and has been approved for use over water. Avoid a dosage that is too concentrated, or breaking the stems during treatment, as these both will prevent the herbicide from reaching the rhizomes. Utilizing herbicides requires caution as application can also kill surrounding non-target vegetation. Herbicide applications should only be undertaken by a qualified professional.

Follow up herbicide treatments should use a cut and wipe methodology. The cut-and-wipe method combines mechanical and chemical treatments. The goal is to avoid large ground disturbances caused by digging up roots. Instead, a chemical treatment is applied to cut stems and/or roots, which require a higher concentration of the herbicide than is used in small scale spray applications but only a very small amount is applied. Stems should be cut as close to the ground as possible, and herbicide should be applied directly to the cut surface. This application should be done as soon as possible after the plant is cut to ensure effectiveness of the herbicide. The herbicide should be applied manually with a rag or sponge. The idea is to thoroughly wet the cut surface so that the herbicide absorbs into the plant tissues. Treatment timing will depend on each individual species present, for further details see the species-specific details below. Chemicals should be applied during dry conditions to reduce the chance of point-source pollution.

Debris Removal

An accumulated layer of debris has built up within the dense Common Reed stand up to 1 foot in thickness. The removal of this debris layer will allow for the planting of native vegetation and improved tidal flow.

Based on the debris thickness measurements taken on site, upon removal of the debris the surface elevation will be consistent with the adjacent salt marsh. It is not the intention of this proposed debris removal effort to result in a reduction in elevation lower than the surrounding salt marsh environment, to reduce resiliency or cause subsidence. Upon removal of the debris, the area will be plated with native salt marsh plugs for the fastest colonization.

Planting & Seeding

Once the native substrate surface is exposed, new plantings and seed mix will be applied to the area to allow for native plant colonization. The native vegetation composition in the adjacent salt marsh was identified as a mix of saltgrass (Distichlis spicata) and saltmarsh hay (Spartina patens) which are common high marsh species. As prolonged colonization of Phragmites can lead to marsh subsidence, it is also a good strategy to include low marsh species, such as smooth cordgrass (Spartina alterniflora), in order to provide a diverse palette of plantings. The project proposes to plant a mix of plugs with the above-mentioned species at 2 foot on center intervals across the phragmites treatment area. Additionally, any area above the highest high tide line should also be seeded with a salt tolerant seed mix in order to promote additional diversity in areas that are less frequently inundated. The salt tolerant seed mix should be comparable to the following:

New England Coastal Salt Tolerant Grass Mix

Botanical Name	Common Name	Indicator
Elymus canadensis	Canada Wild Rye	FACU+
Festuca rubra	Red Fescue	FACU
Panicum amarum	Atlantic Coastal Panic Grass	FACU-
Andropogon gerardii	Big Bluestem	FAC
Sorghastrum nutans	Indian Grass	UPL
Panicum virgatum	Switch Grass	FAC
Juncus tenuis	Path Rush	FAC

PRICE PER LB. $26.00 MIN. QUANITY 4 LBS. **TOTAL:** $104.00 APPLY: 35 LBS/ACRE :1250 sq ft/lb

The New England Coastal Salt Tolerant Seed Mix contains a selection of native grasses that tolerate salty conditions. This mix is appropriate for drier coastal areas that receive salt spray or mist. Always apply on clean bare soil. The mix may be applied by hydro-seeding, by mechanical spreader, or on small sites it can be spread by hand. Lightly rake, or roll to ensure proper seed to soil contact. Best results are obtained with a Spring seeding. Late Spring and early Summer seeding will benefit with a light mulching of weed-free straw to conserve moisture. If conditions are drier than usual, watering may be required. Late Fall and Winter dormant seeding require an increase in the seeding rate. Fertilization is not required unless the soils are particularly infertile. Preparation of a clean weed free soil surface is necessary for optimal results.

The planting season within the restoration area will extend from only after the last frost in the spring through mid-May, and from September 1 until October 15 in the fall. Planting season periods may be extended if weather and soil conditions permit only with the written approval of the Engineer and Owner. Extended or out-of-season planting requirements would include application of antitranspirant and extra water as needed. Planting will not be permitted in frozen ground.

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6.0 PROPOSED MONITORING

In order to track the progress of new native plant growth and coverage after planting, the treatment area will be subject to monitoring. Monitoring will occur two times per year (spring and fall) for a minimum of two years following planting. Four permanent data plots, 1 meter by 1 meter in size will be, established and utilized as a representative sample for the treatment area. Wooden stakes will be driven into the ground at each corner of the monitoring plots and spray painted orange for easy identification.

The vegetation data plots will be used to determine percent dominance and percent cover of each species identified within the plot. This evaluation will determine the overall health of the restored area. During each monitoring event, the data plots will be photographed from fixed points so that visual comparisons can be made during future monitoring events.

After each monitoring event, proper documentation will be kept for reference and to be used for future monitoring and control of each site. The information gathered during the monitoring events will be submitted to the Conservation Commission and other reviewing agencies as required.

If the presence of invasive species is in excess of 10% coverage within any of the data plots than additional herbicide treatment will be required. If the need for treatment exceeds the time period set forth in the applicable Order of Conditions issued by the Chelsea Conservation Commission, the City will go before the Commission with a remedial plan to address the need for continued intervention.

The Contractor will be responsible for continued maintenance of the restoration area for a year following the completion of the restoration. During this initial one-year period the City will also monitor the restoration area to determine if/when the contractor needs to provide maintenance and/or additional seeding as needed. After the first year, the continued operation and maintenance of this restoration area will be turned over to the City of Chelsea.

7.0 REFERENCES

Avers Barbara et al. *A Guide to the Control and Management of Invasive Phragmites*. Michigan Department of Environmental Quality 2007.

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MDAR Active Ingredient Fact Sheets: https://www.mass.gov/lists/aquatic-herbicide-active-ingredients#adjuvants-

National Pesticide Information Center, Glyphosate General Fact Sheet, Glyphosate General Fact Sheet (orst.edu)

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APPENDIX A

MDAR Active Ingredient Fact Sheets

Attachment K

NBA ADAPTIVE MANAGEMENT PLAN

Operation and Maintenance Plan
Island End River Beach and Riverbanks
Everett, Chelsea, MA
October 2023

Prepared For:
Conservation and Planning
Cities of Everett & Chelsea, Massachusetts

CHAPTER 1: PROJECT DESCRIPTION

1.01 PROJECT DESCRIPTION

The intent of the Project is to improve ecological function at the Island End River and the Island End Park and to improve connections between the park, and the neighborhood, as well as to increase climate resiliency and awareness in the community. This includes soil stabilization and plantings to addressing climate habitat and water quality. Vulnerability on the site includes storm surge, invasive species, and flooding. Although the Project requires work within the resource areas, the Project has been designed to avoid, minimize, and mitigate the potential impacts to these resource areas and buffers to the greatest extent practicable, while still achieving the overall project purpose.

Throughout the Project construction, Best Management Practices (BMPs), including sediment and erosion controls, construction phasing, and site stabilization measures, will be implemented to avoid adverse impacts to resource areas and buffers.

1.02 ADAPTIVE MANAGEMENT

Chapter Two of the Operation and Maintenance plan describe in detail materials, approved actions and leadership responsibilities. Any or all of these may be necessary but in the context of climate change, population and development pressure there is a need to respond quickly to changing conditions and a need for integration of habitat stewardship by the community at large.

Adaptive landscape management is a structured, iterative approach to environmental assessment that aims to sustain natural systems and their native biodiversity. It involves learning by doing and acknowledges uncertainty about how systems may respond to changing conditions and changing management actions. To be successful it requires regular assessments to inform future management and guides for adjustments based on learning. The process will include monitoring, evaluation, and periodic adjustments within allowed parameters.

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BOSTON, MASSACHUSETTS 02127
617-896-4300

Project leaders are responsible for educating and empowering maintenance staff to observe understand and adapt to current conditions instead of following standard operating procedures.

Because of the scale and intensity of pressure on this site maintenance leaders and staff will benefit from educating organizing empowering and leading community volunteers in stewardship activities ranging from monitoring and reporting conditions to assisting in cleanup, maintenance and restoration planting at Island End Park. Their observations will inform management response for maintenance of areas with limited access exclusive to professional maintenance.

Community Mobilization: Gathering training and directing volunteers to assist safely and effectively requires some planning and coordination See appendix A for notes on how to mobilize volunteers.

Citizen Science Methodology: To better understand and track physical and biological conditions on site a monitoring protocol and data collection work sheet are See appendix B for these tools.

Invasive Species Management: Species management is essential to maintaining biodiversity at Island End River. See Appendix C for a guide and visual key to support this effort.
Habitat Management: With Island End Park restored and converted to an ecological resource park there is an opportunity to maximize its effectiveness as an urban habitat See appendix D Features/ Habitat Build Notes for guidance on community driven elements that can be included in the park for this purpose.

As required by Standard 4 and Standard 9 of the Massachusetts Stormwater Handbook, this Long-Term Pollution Prevention Plan has been developed for source control and pollution prevention at the site after construction and ensure that the stormwater management systems function as designed.

2.01 MAINTENANCE RESPONSIBILITY

The enforcement of the Long-Term Operation and Maintenance Plan will be the responsibility of the Municipal authority of Everett, and the Chelsea DPW for this property.

2.02 GOOD HOUSEKEEPING PRACTICES

The site is to be kept clean of trash and debris. Trash, junk, etc. is not to be left outside and will be subject to removal per the ongoing litter management practices.

2.03 NBA NATURE-BASED APPROACH COASTAL BANK

VEGETATED BUFFER FILTER STRIP

Vegetated Buffer/ Filter strips should be maintained as natural areas once the new vegetation is established. The filter strip should be protected from damage by traffic and dense weed growth. Soil adjustment needs should be determined by on-site inspections. Supplemental planting and soil preparation is necessary to complete the establishment of the filter strip most species take 2 to 3 years to become fully established with standard maintenance.

The filter strip should be inspected periodically and after every major rainstorm to determine if the conditions are still uniform and level, and to see if rills have formed. Any problem areas should be repaired promptly to prevent further deterioration.

These Vegetated Filter Strips include invasive species management and should be closely monitored for regrowth of invasive plant species.

The most common threat to new, intertidal vegetation is excessive browsing by geese. Prevention measures include wire lines that make it difficult to take off and land near the planting, and distractor reflective strips attached to these lines. Other prevention measures include predator statues, egg removal, or net and surface stakes.

2.04 PROVISIONS FOR MAINTENANCE OF LAWNS, GARDENS AND OTHER LANDSCAPE AREAS

LEVEL OF MAINTENANCE REQUIRED

All site areas are to be well maintained at all times. The tidal riverbank areas requiring naturalized landscape maintenance specifically designed and intended to acquire an un-kept appearance inherent to riparian habitat. Removal of trash, debris, and invasive species are the primary activities for this area.

Dead, woody debris must be retained and made safe for maintenance access and drainage structures. Vegetation management shall be minimally intensive due to the type of plant materials, the informal

planting concept, the level of visibility, and/or the environmental conditions this includes cutting of invasive species and nuisance species thorns and poison ivy.

MAINTENANCE OPERATIONS & SCHEDULES

More specific information regarding the Maintenance Operations is organized by landscape feature. There is a section for Trees & Shrubs; Naturalized Grassland; and Coastal Beach Vegetation. These sections explain the Landscape Maintenance Operation for the specific landscape features throughout all the Landscape Maintenance Zones.

QUALIFICATIONS OF THE LANDSCAPE MAINTENANCE CONTRACTOR

The Landscape Maintenance Contractor shall be experienced in all aspects of coastal landscape installation and maintenance. A minimum of five (5) years' experience in Landscape Maintenance is required. The Landscape Maintenance Contractor shall furnish the names of at least five current or previous Landscape Maintenance Clients along with a description of the size of the site and the nature and duration of the services provided.

The Landscape Maintenance Contractor shall have on staff or list current qualified sub consultants (sub consultant shall be a person or firm the contractor has worked with within the last five years, sub consultant references must be supplied) in the following fields:

1. a licensed Arborist,
2. a Coastal Zone Specialist, and
3. a Pesticide Applicator.

All Landscape Maintenance personnel shall be qualified and able to perform to the standards stated in this guideline. All applicable licenses required for the performance of the maintenance activities shall be current.

PERFORMANCE STANDARDS

A Landscape Maintenance Supervisor (Supervisor) with overall responsibility for all daily operations shall be designated. This Supervisor shall be on site at all times during Landscape Maintenance operations and shall remain on site until all Landscape Maintenance crewmembers have left the site. The Supervisor is responsible for any necessary coordination with the Municipal authority. The Municipal authority shall be immediately informed if a new Landscape Maintenance Supervisor is designated on a permanent or temporary basis.

All work outlined in this Guideline shall be performed under the appropriate environmental conditions for the specific work task.

Work requiring a license shall be directly supervised or actually performed by the individual holding the applicable license.

The contractor shall perform any incidental work which constitutes good Landscape Maintenance (example: planting of replacement plant material) that will contribute to the health and the appearance of the landscape. This work is to be included even if not specifically stated in these guidelines.

Plant material inspections shall be performed monthly by the Landscape Maintenance Contractor. In particular an inspection shall be performed immediately following severe wind, rain, or ice conditions. Plant materials severely damaged in a winter storm shall be scheduled for spring replacement, soils or cobble beach nourishment shall be restored to the extent practical as soon as the site is safe to access.

SAFETY ISSUES

Safety of people and protection of property is critical. The landscape maintenance work shall be performed in such a manner as to not jeopardize either.

The use of pesticides within the riverfront area is strictly prohibited. It will be the responsibility of the Landscape Maintenance Contractor to approve any weed or pest control procedures.

2.05 MAINTENANCE OPERATIONS

Trees and Shrubs

1. Disease and Pest Management – Prevention of disease or infestation is the first step of pest management. A plant that is in overall good health is far less susceptible to disease. Good general landscape maintenance can reduce the potential and severity of problems from disease.

   Inspections of plant materials for signs of disease or infestation are to be performed annually by the Landscape Maintenance Contractor's Certified Arborist. This is a critical step for early diagnosis. Trees and shrubs that have been diagnosed to have a plant disease or an infestation of insect pests are to be treated promptly with appropriate cultural controls.

2. Fertilization – The use of fertilizer is not included in this work and is prohibited from use on the project site. However individual specimens may—at the discretion of the arborist be treated with supplemental soil, pH modifies, humic acid or other bio-stimulants.

3. Watering – Trees and shrubs will need supplemental watering to remain in vigorous health until established. All new plants will need to be watered once a week, receiving a minimum of 10 gallons per tree, 5 gallons per shrub in cool weather. All new plants will need to be watered twice a week during warm weather, and up to three times in a week during periods of extreme heat and drought.

   Trees and shrubs should be watered in such a manner as to totally saturate the soil in the root zone area. Over-watering or constant saturation of the soil must be avoided as this could lead to instability, or root rot and other disease problems. The use of a soil moisture meter can help you monitor the soil's water intake.

   4. Plant Replacement – Unhealthy plants that may cause widespread infestation of other nearby plants shall be immediately removed from the site. Any vegetation removed from the site must be recorded and submitted with the daily maintenance log. The area shall be treated to prevent further disease or infestation. The plant shall then be replaced with a healthy specimen of the same species and size.

   A spring inspection of all plant materials shall be performed to identify those plant materials that are not in vigorously healthy condition. Unhealthy plant materials shall be evaluated. If the problem is determined to be minor the plant material shall be given appropriate restorative care in accordance with this maintenance guideline until it is restored to a vigorously healthy condition. Unhealthy plant materials that do not respond to restorative care or are determined to be beyond saving, shall be replaced with a healthy specimen of the same species and size. In the case of the necessity of replacing extremely large plant materials the Landscape Architect and the Municipal authority shall determine the size of the replacement plant.

5. Pruning – Proper pruning is the selective removal of branches without changing the plant's natural appearance, or habit of growth. All tree pruning is to be performed by a licensed Arborist. All branches that are structurally unsound should be removed. All cuts should be made at the collar and not cut flush with the base. Pruning shall be done for the following purposes:

a. To maintain or reduce the size of a tree or shrub for utility maintenance access.

b. To prevent damage and reduce hazards to people and property.

Pruning shall only be performed on an "as needed" basis, as determined by the Landscape Manager and approved by the Conservation Agent's Representative. Hand snips should be used to maintain a more natural form.

6. Seasonal Clean Up – A thorough spring cleanup is to be performed. This includes trash cleanup, the removal and replacement of dead or unhealthy plant materials, and the cleanup/ reincorporation of plant debris in habitat features and any general debris that has accumulated over the winter season.

7. Mulching (Duff layer) – Coastal heath, meadow and savannah shall be mulched with native leaflitter, salt-straw, or if needed, weed free compost. Maintain a two (2) inch maximum depth. After the establishment period natural growth should provide sufficient litter to prevent soil exposure. Assess and manage plant density throughout the establishment to achieve this.

Groundcover and Perennials

1. Disease and Pest Management – The use of pesticides and herbicides are prohibited from the riverfront area. Plants should be monitored, and problem areas should be addressed through cultural controls.

2. Water – Groundcovers and Perennials will need supplemental watering in order to become established, healthy plants. All new plants need to be watered once a week in cool weather, twice a week during warm weather, and up to three times in a week during periods of extreme heat and drought. Until established, groundcovers and perennials should be watered in such a manner as to totally saturate the soil in the root zone area, to a depth of 6-inches.

   Once established, perennials shall continue to be watered as necessary to maintain them in a vigorous healthy condition. Over-watering or constant saturation of the soil must be avoided as this could lead to root rot and other disease problems. The use of a soil moisture meter can help you monitor the soil's water intake.

   On-site water shall be furnished by the General contractor. Hose and other watering equipment shall be furnished by the Landscape Maintenance Contractor for the duration of establishment and as needed to prevent systemic damage.

   3. Replacement – Any unhealthy plant/s that may cause widespread infestation of other nearby plants shall be immediately removed from the site. Any vegetation removed from the site must be recorded and submitted with the landscape maintenance log. Assess conditions and change plant selection or type to prevent further infestation. The plant/s shall then be replaced with healthy specimen/s of the approved species and size.

4. Seed Head Maintenance – Remove invasive annual weed seed heads and dispose per IPM. Do not dead head conservation plants. Allow seeds to mature fully and provide ecosystem services. Spent stems can be folded down where visual interest of companion plantings are to be highlighted. It may become advantageous to remove the seed heads of annual ruderals. This determination shall be made by the Landscape Manager.

5. Staking – Temporary Staking of new trees during the first two growing seasons will be necessary. Trees shall be staked with hardwood stakes and arbor-tape. Staking shall be removed as soon as it is determined the root system has achieved stable support.

6. Weeding – Inspect for invasive or aggressive species to control. Weed only by hand. Invasive weed seeds and root stocks are to be pulled and removed from the site. Vegetative material and native weeds should be retained to the extent feasible/ practical to support habitat plantings.

   Herbicide and/ or use of pre-emergent is prohibited in the resource and riverfront area.

7. Winterizing – Perennial groundcover and shrub areas should not be cleaned-up when growth ceases in the fall (only trash and debris are to be removed). They should be inspected for disease, damage, or infestation and treated per the best method outlined in the Integrated Pest Management Plan. Retain and protect foliage of plants that normally die down to the ground as these contain vital saprophytic and macroinvertebrate species essential to soil and ecological health. For aesthetic reasons it may be appropriate to push these materials into the center of beds and mulch edges to maintain defined borders. Divide and replant over-grown clumps.
8. Organic matter Management and Macro-invertebrate support – In order to maintain plant health, vigor and color, nutrients and organic matter must *not* be removed from the site but must be mulched into planting areas to the extent feasible through mulching with the exclusion of invasive weed seeds and root stocks.

Maintenance Schedules

1. MARCH (Weather permitting)
a. Clean up winter debris, trash etc.
b. Apply supplemental planting of coastal beach grasses.
2. APRIL
a. Reseed restore all areas needing attention.
b. Weed control (manual)
3. MAY
a. Weed and trash control (manual)
b. Check for disease and pest problems in both turf and plants.
c. Begin watering protocol
4. JUNE - OCTOBER
a. Weed and trash control (manual)
b. Check for disease and pest problems in both turf and plants, treat as necessary.
c. End watering protocol

Emergency Contacts

1. The Owner will be required to maintain an updated list of Emergency Contacts for the site, for contractors, and for volunteer events.

POST CONSTRUCTION PHASE INSPECTION SCHEDULE AND EVALUATION CHECKLIST

Inspection Date	Inspector	BMP Inspected	Inspection Frequency Requirements	Comments	Recommendation	Follow-up Inspection Required (yes/no)
Varies	Municipal Staff	Slope Stabilizations				

			Four Times Year and After Major Storm Events during construction (24" of Sediment)			
Seasonal	Environmental monitor	Vegetated Filter Strips	Three times per growing season, and once in the off season			

POST CONSTRUCTION PHASE INSPECTION SCHEDULE AND EVALUATION CHECKLIST

Inspection Date	Inspector	BMP Inspected	Inspection Frequency Requirements	Comments	Recommendation	Follow-up Inspection Required (yes/no)
Seasonal	Municipal Staff	Vegetated Filter Strips	Three times per growing season, and once in the off season			
Varies	Municipal Staff	Slope Stabilizations	Seasonally (and after major storm events)			
Varies	Municipal Staff	Pedestrian Access	Annually			

NOTES:

1. *Refer to the Massachusetts Stormwater Handbook Volume Two: Stormwater Technical Handbook (February 2008) for recommendations regarding frequency for inspections and maintenance of specific BMP's.*
2. *Inspections to be conducted by a qualified professional such as an environmental scientist or civil engineer.*
3. *No use of sodium chloride salts, fertilizers or pesticides recommended.*

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Adaptive Management Appendix A

COASTAL RESILIENCE COMMUNITY MOBILIZATION NOTES

Scoping Leadership:

While it is possible to lead large groups, we find a ratio of 1 leader to 10 volunteers is ideal. Above this, and there is a tendency toward loss of direction, motivation, and mistakes.

One way to manage technical leader limits is by breaking up a task into different sessions so volunteers aren't all mobilized at once. Include preparation events and follow-up events.

Organize parallel tasks and sections where the same task is underway with multiple groups.

Public safety in a marine environment is essential. While no volunteer work within water is planned, review access restrictions and the limits of activity at the start of each maintenance session. Review water hazard risks and safety measures, first aid and, personal flotation devices (PFDs). Review potential exposure hazards to avoid and who/how to notify if these are observed.

Training the Leaders:

Preparing community leaders in advance is a way to limit the need for professional and technical staff during an event. Solicit these in advance and train them with the understanding they will train and lead groups later. (Teaching is one of the best ways to learn and retain new skills).

Managing a coastal planting once built is the most important part of the project. Recruit this team early, have a backup team and recruit during events when the idea is most tangible.

Volunteer Tasks:

Have a diverse set of tasks for all ages and abilities to keep people engaged and so it is clear they are part of something big, not just a donation of their effort, but an act of creation and community.

Professional and Staff Tasks:

Get heavy bulk work and deliveries done in advance by contractors or professional city staff. Avoid fatigue and injury to volunteers.

Follow Up:

Plan for a leadership team to follow up and finish details and corrections at the end of the day and again on a follow up day.

Plans for Managing Invasive Plants	
Introduction	• The purpose of the Invasive plant/pest management plan is to organize safe and effective means of managing harmful or nuisance plants and pests.
Background information	• The coastal bank and coastal plain buffer is recently disturbed and susceptible to incursion by aggressive species from adjacent land use and human activity.
Land management goals	• The goal of this invasive plant/pest management plan it to safely minimize potential threats to biodiversity and key habitat species; • And to prevent the spread of invasive species. (Not to look clean)
Assessment of existing conditions	• Due to surrounding influences the existing site is in a poorly balanced condition and requires regular monitoring and maintenance to keep problem species in check
Management strategies and control options	• Our strategy for plant/pest management is to closely monitor the site, remove problem species to the extent practical as soon as they are identified, and to establish strong ecological systems to resist infestation.
Invasive plant management objectives	• Maintenance staff/ volunteers are to Identify potential problems and if resolution is unclear, to submit to the Municipal representative for review. Where directed, maintenance staff/ volunteers to take actions to remove or destroy invasive species to the extent practical without causing unmanageable damage to other landscape elements. • Chemical controls are allowed when applied with caution, but all methods must be approved by the Municipal representative and Site manager to remain consistent with land management goals. Any chemical control shall be by a licensed and permitted practitioner.
Management methods	• Invasive plant species are to be managed by mechanical removal of seeds and roots preferably see weeding guide for most common weeds and their best management. • Invasive pests are to be mitigated through cultural controls washing or removal of affected host. Or host specific pheromone traps where these conflict with human activity.
Monitoring	• Each maintenance team should be familiar with the maintenance manual and have a laminated copy of the weed/ invasive plant ID to allow monitoring to be an aspect of each maintenance session. • This is separate from any scientific monitoring program.
Implementation	• Maintenance manual outlines removal process for outbreak control.

	• Invasive removal activities beyond basic maintenance program may require professional support and should be directed to the Municipal representative.
Evaluation of management plan	• Environmental Scientist has reviewed this IMP for proposed site control and maintenance activities to determine if the objectives stated here are met and may issue amendments to this IMP as needed to support changing field conditions.

1. See attached visual key for common invasive species identified in the area.
2. To Identify perennials for specific seasonal treatments listed below or weeds for management use the following references Cultivated Perennials & Shrubs:
   https://extension.umass.edu/floriculture/plant-identification
   http://hort.uconn.edu/list.php
3. Weeds:
   https://extension.umass.edu/landscape/weed-herbarium

Noxious Invasive plants

Remove root and seed entirely and imediately, dispose by fully contained digestion/ desication

Black Swallow-wort (Cynanchum louiseae)
European Swallow-wort (Cynanchum rossicumi)
flag outbreak areas for treatment

Black Swallow-wort seed pods Ensure disposal of seeds.

Ailanthus altisima (Tree of Heaven)
smoothe stem, rancid peanutbutter smell

Ailanthus altisima sprout get the whole root when possible,

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Invasive plants

Remove root and seed entirely and imediately, dispose by fully contained digestion/ desication

Rhamnus - (Buckthorn, common or glossy) Cut at root and treat with approved herbicide. Dispose of seeds.

Mugwart - (Artemesia vulgaris) Pull roots, drop stems and foliage, dispose of seeds

Quick silver - (Eliagnus angustifolia) Cut at root and treat with approved herbicide. Dispose of seeds.

Garlic Mustard (Alliaria petiolata) invasive annual. Ensure disposal of seeds, drop stems and foliage.

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Noxious Invasive plants

Remove root and seed entirely and imediately, dispose by fully contained digestion/ desication

Knottweed (Polygonum cuspidatum)
Previously known as: Fallopia japonica

Knottweed - Closeup of seed and branch

Phragmities australlis
Cut all stems upto to end of June, where applicable allow regrowth for treatment in late summer

Phragmities australlis

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Noxious Invasive plants

Remove root and seed entirely and imediately, dispose by fully contained digestion/ desication

Porcelain berry (Ampelopsis glandulosa)
Similar to grape vine and virginia creeper. Carefully identify the deep five lobes on a single leaf before pulling, or request assistance.

Oriental bittersweet vine (Celatrus orbiculatus)
Vines, Cut at root and above browsing height do not pull down vines this may do more damage than allowing it to rot in place

Oriental bittersweet vine (Celatrus orbiculatus)
Dispose of seeds.

Oriental bittersweet vine (Celatrus orbiculatus)
Bright orange roots long and shallow, pull as far as possible

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Invasive plants

Remove root and seed entirely and imediately, dispose by fully contained digestion/ desication

Mugwart - (Artemesia vulgaris) Pull roots, drop stems and foliage, dispose of seeds

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WEEDS

Limit the spread of weeds , pull and lay down in place on top of soil to dry, dispose of seeds

Shepherd's Puse (Capsella bursa pastoris)
Annual, Remove seeds

Horse weed (Erigeron canadensis) - Annual, ensure removal seedafter flower/ before seed set

Mullien - ensure removal of root
After flowering/ before seed set

Plaintain - ensure removal of root

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WEEDS

2022 Landscape Maintenance

Annual Winter Rye
Remove seed heads

Secale Winter Rye
Remove seed heads

Persicaria lapathifolia
Remove seed head after flowering/ before seed set

Lollium
Remove seed heads

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WEEDS

2022 Landscape Maintenance

Dock, Green Dock Yellow Dock Curly Dock, (Rumex, crispus-altissimus-obtusifolia) Dispose of seeds, Pull deep tap roots.

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Plan for Managing Plants	
Introduction	• The purpose of the plant/pest management plan is to organize safe and effective means of managing harmful or nuisance plants. And strengthening high habitat value plants.
Background information	• The site is currently affected by multiple identified invasive species and subject to adjacent seed bank of the same. It is recently disturbed by restoration/ construction and susceptible to incursion by aggressive species from adjacent sources. • Buildup of trash drifting in from the channel result in conversion of salt marsh to phragmites fresh marsh. Regular debris removal is essential to maintaining salt marsh function.
Land management goals	• The goal of this plant/pest management plan it to safely minimize potential threats to biodiversity and key habitat species. • And to prevent the spread of invasive species.
Assessment of existing conditions	• Isolation and tidal flushing minimize the potential and speed of incursion outside plants either beneficial or problematic. These conditions mean that plantings require regular monitoring, supplemental seeding and maintenance to keep problem species in check until beneficial plantings are well established.
Management strategies and control options	• The City's strategy for plant/pest management is to closely monitor the site, remove problem species and synthetic litter by hand to the extent practical as soon as they are identified. • Areas where invasive species are removed will be flagged for future monitoring as root or seed sources may remain. • Long term management control is to be achieved through establishment of strong ecological systems that resist infestation by occupying space and resources.
Invasive plant management objectives	• Maintenance staff/ volunteers are to Identify potential problems and submit them to project staff or the Conservation Agent for assessment. • For identified invasive species staff are directed to take immediate action to remove or destroy invasive species to the extent practical without causing unmanageable damage to other landscape elements. • All control methods must be approved by the Conservation Agent to remain consistent with land management goals.
Management methods	• Invasive plant species are to be managed by mechanical removal of seeds and roots only. Non-viable biomass is to be retained. • Invasive pests are to be mitigated through cultural controls washing or removal of affected host. Or host specific pheromone traps where these conflict with human activity.

Monitoring	• Each maintenance team member must be familiar with the maintenance manual and shall have laminated copy of the weed/ invasive plant ID to allow monitoring to be an aspect of each maintenance session. • Environmental scientist and Landscape Architect will inspect all zones at seasonal maintenance review meetings and installation review sessions.
Implementation	• Invasive species monitoring and control shall be implemented immediately upon notice to proceed. • Maintenance must be a sustained effort monthly during the growing season for 3 years and seasonally for a minimum of 5 years. • Management methods and monitoring protocol outline notifications and removal process for outbreak control. • Invasive removal activities beyond basic maintenance program (Large Scale removals) are outside of this project scope and will be detailed in an approved Schedule Of Work.
Evaluation of management plan	• Environmental Scientist shall review site control and maintenance activities annually to determine if the objectives stated here are met and shall issue amendments to this IMP as needed to support changing field conditions. • Proposed updates are to be reviewed and approved by the Conservation Agent.

Contacts:

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Project Manager – Caseylee Bastien cbastien@bscgroup.com 617-896-4523

Wetland Scientist– Hannah Raddatz. hraddatz@bscgroup.com

Adaptive Management Appendix D

FEATURES/ HABITAT BUILD NOTES

Bio-Mimicry:

Coastal bank qualities include lots of places for birds and insects to make their home. These include, open sand, pitted soil, leaf and brush litter, rotting logs and standing stumps and hollow stems. The 'clean ness' of the urban environment is one of the things that makes it unhealthy and unstable. One of the goals of the project is to achieve healthy coastal bank qualities in the urban environment. We will do this until those qualities become emergent properties of our home. Until we have the collection of mature plants and the cultural shift in aesthetics needed to achieve this it means there will be a need for building these features in and maintaining them.

We are building in aspects of a natural coastal bank into disturbed urban landscapes to support diverse species while natural systems heal and return to a state where they can grow and provide stability and structures and systems of its own in a new urban environment.

1. Nest Building/ Habitat Building:

We will not provide detailed instructions for bird and bat boxes here as these plans are readily available from multiple sources online and should be tailored to your target species. Here are some online resources that can help you.

Projects include:

A. Nest Build

- **Bird House:** These are nests designed to protect small songbirds against predation and nest-parasitic species such as the cowbird. More information can be found here: https://www.birds.cornell.edu/k12/educators-guide-to-nest-boxes/
- **Raptor perch**: Mimicking the tops of large dead trees for easy nesting. More information can be found online here: https://efotg.sc.egov.usda.gov/references/public/WY/RaptorPerches.pdf
- **Bat Box:** These structures mimicking the crevices that would naturally be available in ancient trees if we had them More information can be found here: https://www.nwf.org/garden-for-wildlife/cover/build-a-bat-house
- **Owl box, Wood duck box:** More information can be found here: https://www.audubon.org/news/how-build-screech-owl-nest-box
- **Bee Box:** These are Bumblebee nests protected from predators, weather, and wasps. More information can be found here: newsletter@beekeepclub.com
- **Swallow Shelf:** These create **a** safer home for cliff dwelling swallows. More information can be found here: https://www.rspb.org.uk/birds-and-wildlife/wildlife-guides/bird-a-z/swallow/attracting-swallows-to-nest/

B. Habitat Build: Ground Level

- **Thicket:** Home for reptiles, rodents, amphibians, and invertebrates. To create, pile straw brush and rocks loosely to create a matrix of homes; add some standing branches to support spider webs). See Habitat Details for more information.
- **Snag holes**: Leafcutter plasterer, cellophane, and mason bee nests. Drill 3/8”-6” deep holes in dead trees or logs max 3 per tree or log and spread out, roll brown paper onto a straw, and insert it in the hole for a smooth surface mimicking beetle bore.
- **Sand bank:** Nesting for turtles and birds, such as Killdeer. Recommend you install in a sunny, south facing site, and place 12” deep 3’ wide pockets of sand at the toe of slopes. See Habitat Details for more information.
- **Nurse Log**: Mushroom inoculant for soil building. Also creates homes for reptiles, rodents, amphibians, and invertebrates. Place these parallel the toe of a slope. That’s where they can do the most protection.

2. Coastal bank Planting and stabilization

In most urban sites and in freshly turned soils there is poor soil structure and very little biodiversity. Here we are mimicking and expediting the process of succession by planting native pioneer species which will colonize and dominate the landscape, and help to minimize invasives, while the soil heals.

Projects include:

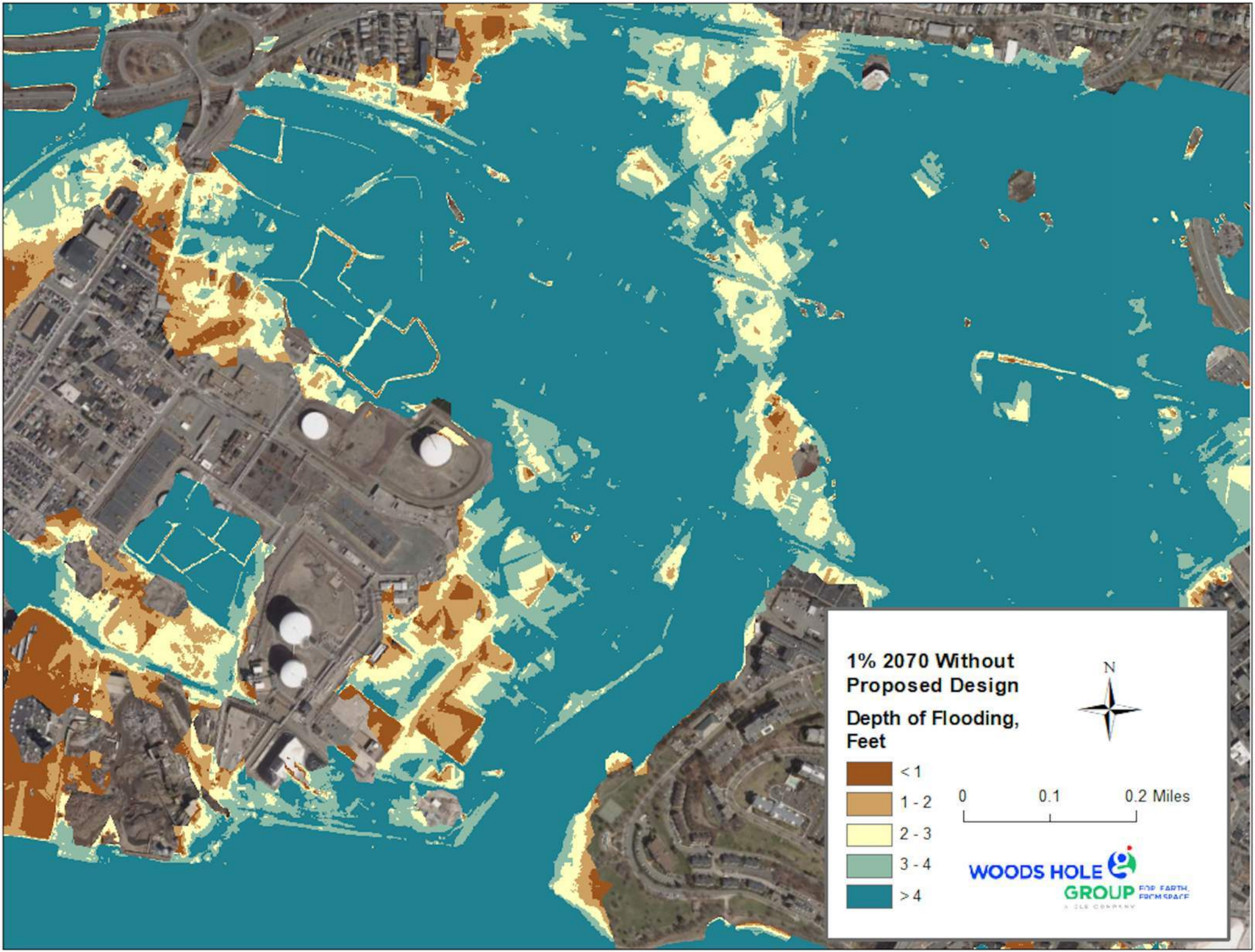
- **Cobble/ shingle banks:** Any excess or displaced cobble can be added to cobble slopes and micro-dunes. These stabilize soil and will become habitat for rock wart and sea creatures as sea level absorbs the site. Storms and humans may disturb these. Observe and adjust as needed. Consider access controls if problems persist.
- **Pit & Mound upland:** When placing soil in the upland or re-planting <u>be sloppy</u>! Create surfaces equivalent to those that have had time for falling trees to create and uneven, natural surface with pits and mounds which create microclimates and spaces for plants and creatures to thrive.
- **Planting/ replanting:** Trees and upland plantings are unlikely to survive sea level rise outside the sea wall, but in the intervening decades they provide shade and habitat. We wany diverse plants for nectar, foliage, and seed forage. We will regularly supplement these original plantings with new plantings of bare-root and some container seedlings. The roots must be spread over soil, layered in, and pressed tight for good soil contact by the root hairs. Any large air pockets can kill off a patch of roots. Common nursery stock is usually grown in a loose matrix—which is not real soil—it lacks the density of micropores and tends to dry out and die, if the new plantings are not watered until the potted roots can reach real soil. Mulch plantings as specified, stake as needed, and provide establishment period watering and monitoring. Intertidal planting should be mulched with clean sand to hold down fine soil particles.

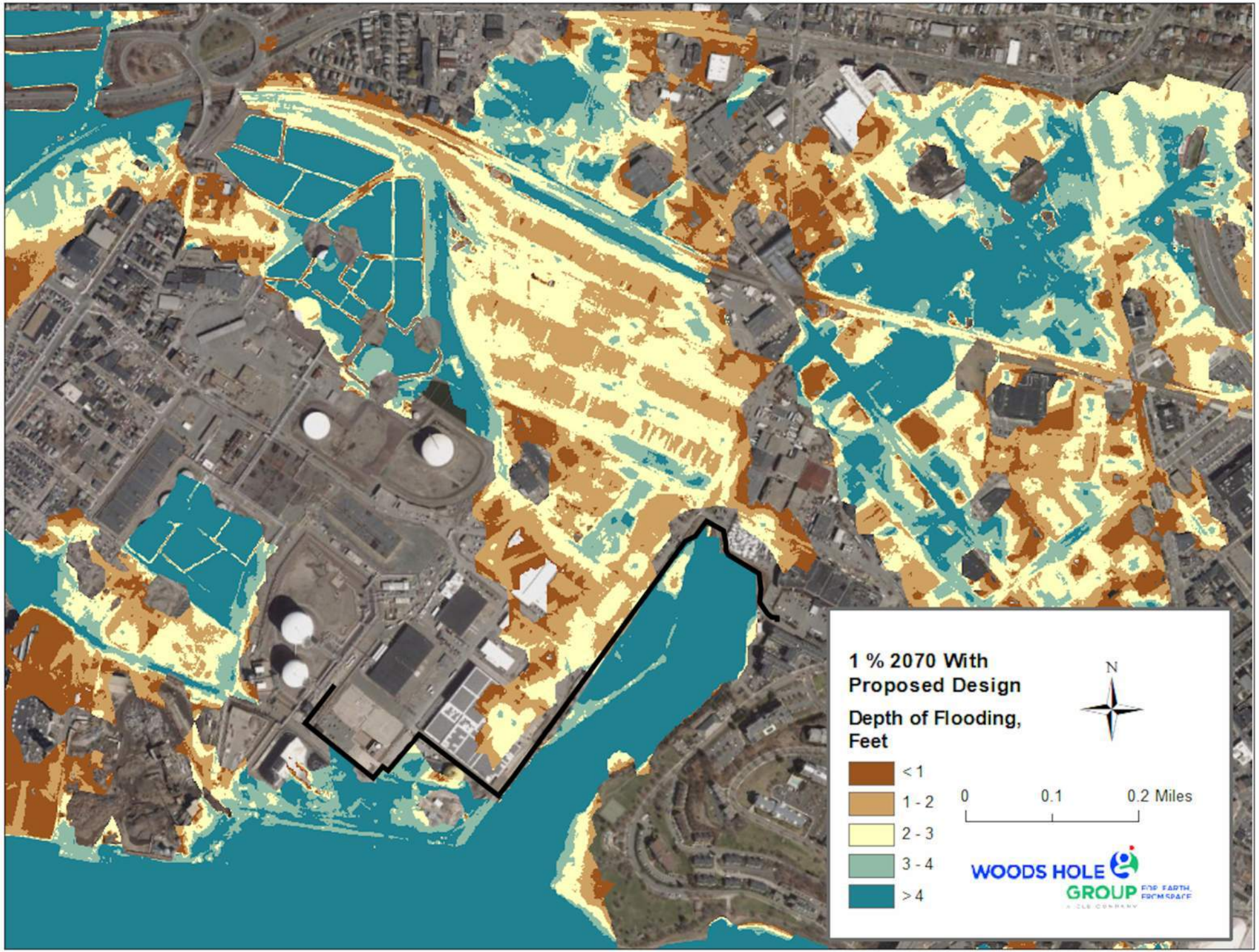
  Upland Soil amendments for individual plantings
- **Place Hydrogel:** This captures short rains and holds moisture slowly releasing it during short droughts. Gel crystals should be pre-mixed with water at a ratio of 5 cups to gel crystals, per 30 gallons of water. It should be mixed into soil and not exceed 1 gallon per the gallon size of the plant or one gallon per bare root.
- **Place Compost:** Compost builds beneficial micro-organism colonies, feeds trees, and supports groundcover plantings. Spread 1-2 inches of compost over the ram board and then seed.

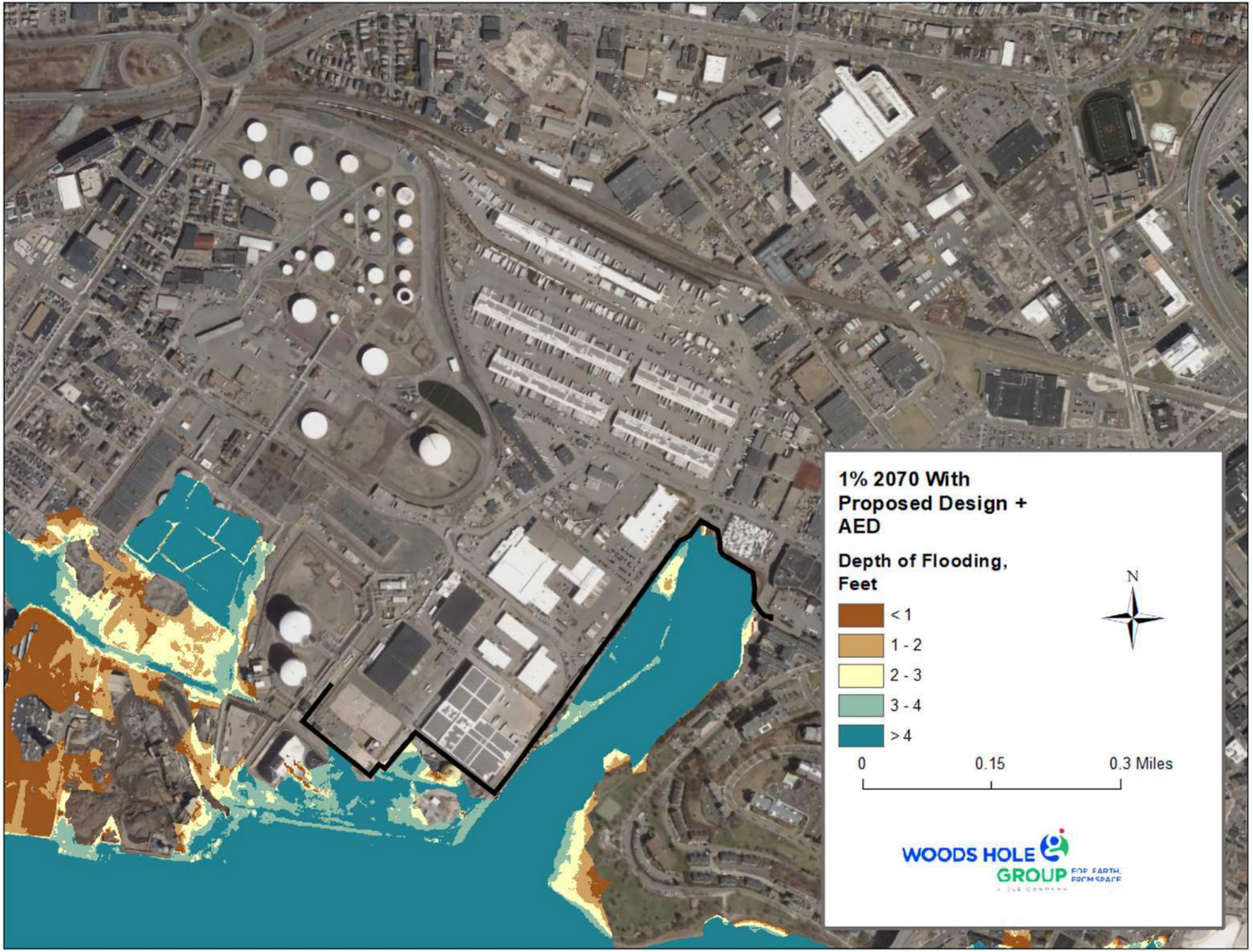
- **Plant Groundcover Nurse Seed:** Nurse seeds capture moisture, block invasives, and builds soil, giving the coastal bank time to develop in a natural setting. There would be a seed bank—including rapid annual seeds—sleeping in the soil, ready to fill in fast after a flood or fire lets in more light.
- **Wrap & Stake Trees:** A lack of diversity in the coastal bank puts excess pressure on wildlife who in turn must eat anything that is available. To get from where we are now to a future where the coastal bank provides balanced food sources, our trees need to survive to maturity. So, we need to protect them while they are young.
- **Inoculate & supplement:** Degraded urban soils, or those recently cleared of invasives, have some imbalances that we can buffer at the time of planting. We don't want to introduce synthetic fertilizers that can cause bacterial blooms, and which can affect water quality. We want to buffer with nitrogen fixing plants and inoculate the soil with fungi, macro-invertebrates, humates/ humic acid and protozoa, these can release nutrients in the right way making, healthier plants and better carbon sequestration. With this we may also apply basalt powder and volcanic ash these provide the minerals that are hard for new plants to get from the damaged soils.
- **Mix Seed, Sand and Supplements for Spreading:** By pre-mixing seed with sand and supplements, this helps us to spread it uniformly and get equal coverage. It also helps the seed stick. A sample mix includes 10 part of sand, 3 part of seed, 1 part of wood ash, 1 part of volcanic ash.

Attachment L

PROJECTED COASTAL FLOOD MAPS & RMAT


1% 2070 Without Proposed Design
Depth of Flooding, Feet
< 1
1 - 2
2 - 3
3 - 4
> 4
N
0
0.1
0.2 Miles
WOODS HOLE GROUP


1 % 2070 With Proposed Design
Depth of Flooding, Feet
< 1
1 - 2
2 - 3
3 - 4
> 4
N
0
0.1
0.2 Miles
WOODS HOLE GROUP


1% 2070 With Proposed Design + AED
Depth of Flooding, Feet
< 1
1 - 2
2 - 3
3 - 4
> 4
N
0
0.15
0.3 Miles
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RMAT Climate Resilience Design Standards Tool Project Report

Island End River Flood Resilience Project

Date Created: 4/23/2021 2:56:30 PM Created By: katie.moniz [Download]

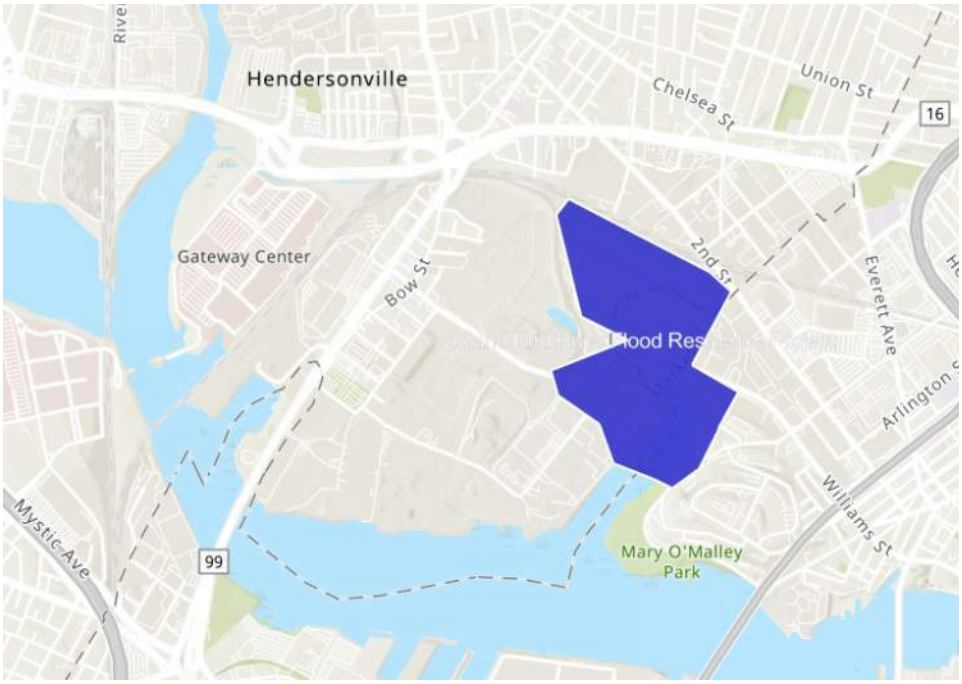
Date Updated: 10/2023 for Draft Environmental Impact Report

Project Summary

Link to Project

Estimated Construction Cost: $67000000.00
End of Life Year: 2073
Project within mapped Environmental Justice neighborhood: Yes

Ecosystem Benefits	Scores
Project Score	Moderate
Exposure	**Scores**
Sea Level Rise/Storm Surge	High Exposure
Extreme Precipitation - Urban Flooding	High Exposure
Extreme Precipitation - Riverine Flooding	Moderate Exposure
Extreme Heat	High Exposure



Asset Summary

Number of Assets: 23

Asset Risk	Sea Level Rise/Storm Surge	Extreme Precipitation - Urban Flooding	Extreme Precipitation - Riverine Flooding	Extreme Heat
Boston Market Terminal	High Risk	High Risk	High Risk	High Risk
New England Produce Center	High Risk	High Risk	High Risk	High Risk
155 Market Street	High Risk	High Risk	Moderate Risk	High Risk
US Post Office	High Risk	High Risk	High Risk	High Risk
Marina at Admirals Hill	High Risk	High Risk	Moderate Risk	High Risk
SPS New England	High Risk	High Risk	Moderate Risk	High Risk
Craft Brewers Guild	High Risk	High Risk	Moderate Risk	High Risk
Amazon Fresh	High Risk	High Risk	Moderate Risk	High Risk
Axis Admiral's Hill Apartments	High Risk	High Risk	Moderate Risk	High Risk
Seaport Academy	High Risk	High Risk	Moderate Risk	High Risk
Signature Breads	High Risk	High Risk	Moderate Risk	High Risk
People's United Bank	High Risk	High Risk	Moderate Risk	High Risk
Lineage Logistics	High Risk	High Risk	Moderate Risk	High Risk
Island End Park	—— Natural Resource project assets do not receive a preliminary climate risk rating. ——			
Mary O'Malley State Park	—— Natural Resource project assets do not receive a preliminary climate risk rating. ——			
Island End River	—— Natural Resource project assets do not receive a preliminary climate risk rating. ——			
Salt Marsh	—— Natural Resource project assets do not receive a preliminary climate risk rating. ——			
Market Street	High Risk	High Risk	Moderate Risk	High Risk

Beacham Street	High Risk	High Risk	High Risk	High Risk
Behen Street	High Risk	High Risk	Moderate Risk	High Risk
MBTA Commuter Rail	High Risk	High Risk	High Risk	High Risk
Private Rail	High Risk	High Risk	Moderate Risk	High Risk
Island End River Flood Resilience Barrier	High Risk	High Risk	High Risk	High Risk

Project Outputs

	Target Planning Horizon	Intermediate Planning Horizon	Percentile	Return Period	Tier
Sea Level Rise/Storm Surge					
Boston Market Terminal	2070	2050		200-yr (0.5%)	Tier 3
New England Produce Center	2070	2050		200-yr (0.5%)	Tier 3
155 Market Street	2070	2050		100-yr (1%)	Tier 3
US Post Office	2070	2050		200-yr (0.5%)	Tier 3
Marina at Admirals Hill	2070	2050		50-yr (2%)	Tier 2
SPS New England	2070	2050		50-yr (2%)	Tier 2
Craft Brewers Guild	2070	2050		100-yr (1%)	Tier 3
Amazon Fresh	2070	2050		100-yr (1%)	Tier 3
Axis Admiral's Hill Apartments	2070	2050		100-yr (1%)	Tier 3
Seaport Academy	2070	2050		50-yr (2%)	Tier 2
Signature Breads	2070	2050		50-yr (2%)	Tier 2
People's United Bank	2070	2050		50-yr (2%)	Tier 2
Lineage Logistics	2070	2050		100-yr (1%)	Tier 3
Island End Park	2030				Tier 1
Mary O'Malley State Park	2030				Tier 1
Island End River	2030				Tier 1
Salt Marsh	2030				Tier 1
Market Street	2050			200-yr (0.5%)	Tier 2
Beacham Street	2050			500-yr (0.2%)	Tier 3
Behen Street	2050			200-yr (0.5%)	Tier 2
MBTA Commuter Rail	2050			500-yr (0.2%)	Tier 3
Private Rail	2050			200-yr (0.5%)	Tier 2
Island End River Flood Resilience Barrier	2070	2050		200-yr (0.5%)	Tier 3
Extreme Precipitation					
Boston Market Terminal	2070			50-yr (2%)	Tier 3
New England Produce Center	2070			50-yr (2%)	Tier 3
155 Market Street	2070			25-yr (4%)	Tier 3
US Post Office	2070			50-yr (2%)	Tier 3
Marina at Admirals Hill	2070			10-yr (10%)	Tier 2
SPS New England	2070			10-yr (10%)	Tier 2
Craft Brewers Guild	2070			25-yr (4%)	Tier 3
Amazon Fresh	2070			25-yr (4%)	Tier 3
Axis Admiral's Hill Apartments	2070			25-yr (4%)	Tier 3
Seaport Academy	2070			10-yr (10%)	Tier 2
Signature Breads	2070			10-yr (10%)	Tier 2
People's United Bank	2070			10-yr (10%)	Tier 2
Lineage Logistics	2070			25-yr (4%)	Tier 3
Island End Park	2030				Tier 1
Mary O'Malley State Park	2030				Tier 1
Island End River	2030				Tier 1
Salt Marsh	2030				Tier 1
Market Street	2050			25-yr (4%)	Tier 2
Beacham Street	2050			50-yr (2%)	Tier 3
Behen Street	2050			25-yr (4%)	Tier 2
MBTA Commuter Rail	2050			50-yr (2%)	Tier 3
Private Rail	2050			25-yr (4%)	Tier 2
Island End River Flood Resilience Barrier	2070			100-yr (1%)	Tier 3

Extreme Heat			
Boston Market Terminal	2070	90th	Tier 3
New England Produce Center	2070	90th	Tier 3
155 Market Street	2070	50th	Tier 3
US Post Office	2070	90th	Tier 3
Marina at Admirals Hill	2070	50th	Tier 2
SPS New England	2070	50th	Tier 2
Craft Brewers Guild	2070	50th	Tier 3
Amazon Fresh	2070	50th	Tier 3
Axis Admiral's Hill Apartments	2070	50th	Tier 3
Seaport Academy	2070	50th	Tier 2
Signature Breads	2070	50th	Tier 2
People's United Bank	2070	50th	Tier 2
Lineage Logistics	2070	50th	Tier 3
Island End Park	2030	50th	Tier 1
Mary O'Malley State Park	2030	50th	Tier 1
Island End River	2030	50th	Tier 1
Salt Marsh	2030	50th	Tier 1
Market Street	2050	50th	Tier 2
Beacham Street	2050	90th	Tier 3
Behen Street	2050	50th	Tier 2
MBTA Commuter Rail	2050	50th	Tier 3
Private Rail	2050	50th	Tier 2
Island End River Flood Resilience Barrier	2070	90th	Tier 3

Scoring Rationale - Exposure

Sea Level Rise/Storm Surge

This project received a "High Exposure" because of the following:

- Located within the predicted mean high water shoreline by 2030
- Exposed to the 1% annual coastal flood event as early as 2030
- Historic coastal flooding at project site

Extreme Precipitation - Urban Flooding

This project received a "High Exposure" because of the following:

- Historic flooding at the project site
- Maximum annual daily rainfall exceeds 10 inches within the overall project's useful life
- Existing impervious area of the project site is greater than 50%
- No increase to impervious area

Extreme Precipitation - Riverine Flooding

This project received a "Moderate Exposure" because of the following:

- Project site has a history of riverine flooding
- The project is not within a mapped FEMA floodplain [outside of the Massachusetts Coast Flood Risk Model (MC-FRM)]
- Project is more than 500ft from a waterbody
- Project is not likely susceptible to riverine erosion

Extreme Heat

This project received a "High Exposure" because of the following:

- 30+ days increase in days over 90 deg. F within project's useful life
- Existing impervious area of the project site is greater than 50%
- Located within 100 ft of existing water body
- No increase to the impervious area of the project site
- No tree removal

Scoring Rationale - Asset Risk Scoring

Asset - Boston Market Terminal
Primary asset criticality factors influencing risk ratings for this asset:

- Asset must be operable at all times, even during natural hazard event
- Loss/inoperability of the asset would have state-wide or greater impacts
- The building/facility provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.
- Inoperability of the asset would not be expected to result in injuries
- Cost to replace is between $30 million and $100 million
- Spills and/or releases of hazardous materials would be relatively easy to clean up

Asset - New England Produce Center
Primary asset criticality factors influencing risk ratings for this asset:

- Asset may inaccessible/inoperable during natural hazard event, but must be accessible/operable within one day after natural hazard event
- Loss/inoperability of the asset would have state-wide or greater impacts
- The building/facility provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.
- Some alternative programs and/or services are available to support the community
- Cost to replace is between $30 million and $100 million
- There are no hazardous materials in the asset

Asset - 155 Market Street
Primary asset criticality factors influencing risk ratings for this asset:

- Asset may inaccessible/inoperable for more than a day but less than a week after natural hazard event
- Loss/inoperability of the asset would have state-wide or greater impacts
- The building/facility provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.
- Some alternative programs and/or services are available to support the community
- Inoperability may moderately impact other facilities, assets, or buildings, but is not expected to affect their ability to operate
- There are no hazardous materials in the asset

Asset - US Post Office
Primary asset criticality factors influencing risk ratings for this asset:

- Asset may inaccessible/inoperable during natural hazard event, but must be accessible/operable within one day after natural hazard event
- Loss/inoperability of the asset would have state-wide or greater impacts
- The building/facility provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.
- Few alternative programs and/or services are available to support the community
- Cost to replace is between $10 million and $30 million
- There are no hazardous materials in the asset

Asset - Marina at Admirals Hill
Primary asset criticality factors influencing risk ratings for this asset:

- Asset can be inaccessible/inoperable more than a week after natural hazard event without consequences
- Less than 1,000 people would be directly affected by the loss/inoperability of the asset
- The building/facility provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.
- Some alternative programs and/or services are available to support the community
- Cost to replace is less than $10 million
- Spills and/or releases of hazardous materials would be moderately difficult to clean up

Asset - SPS New England
Primary asset criticality factors influencing risk ratings for this asset:

- Asset may inaccessible/inoperable for more than a day but less than a week after natural hazard event
- Loss/inoperability of the asset would have impacts limited to local area and/or municipality
- The building/facility provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.
- Some alternative programs and/or services are available to support the community
- Inoperability is likely to significantly impact other facilities, assets, or buildings and will likely affect their ability to operate
- There are no hazardous materials in the asset

Asset - Craft Brewers Guild
Primary asset criticality factors influencing risk ratings for this asset:

- Asset can be inaccessible/inoperable more than a week after natural hazard event without consequences
- Loss/inoperability of the asset would have state-wide or greater impacts
- The building/facility provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.
- Inoperability of the asset would not be expected to result in injuries
- Inoperability may moderately impact other facilities, assets, or buildings, but is not expected to affect their ability to operate
- There are no hazardous materials in the asset

Asset - Amazon Fresh
Primary asset criticality factors influencing risk ratings for this asset:

- Asset may inaccessible/inoperable for more than a day but less than a week after natural hazard event
- Greater than 10,000 people would be directly affected by the loss/inoperability of the asset

- The building/facility provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.
- Some alternative programs and/or services are available to support the community
- Cost to replace is between $10 million and $30 million
- There are no hazardous materials in the asset

Asset - Axis Admiral's Hill Apartments
Primary asset criticality factors influencing risk ratings for this asset:

- Asset may inaccessible/inoperable for more than a day but less than a week after natural hazard event
- Loss/inoperability of the asset would have impacts limited to local area and/or municipality
- The building/facility provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.
- Inoperability of the asset would be expected to result in minor impacts to people's health, including minor injuries or minor impacts to chronic illnesses
- Cost to replace is between $30 million and $100 million
- Impact on natural resources can be mitigated naturally with the inoperability of the asset

Asset - Seaport Academy
Primary asset criticality factors influencing risk ratings for this asset:

- Asset may inaccessible/inoperable for more than a day but less than a week after natural hazard event
- Less than 1,000 people would be directly affected by the loss/inoperability of the asset
- The building/facility provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.
- Few alternative programs and/or services are available to support the community
- Cost to replace is less than $10 million
- There are no hazardous materials in the asset

Asset - Signature Breads
Primary asset criticality factors influencing risk ratings for this asset:

- Asset can be inaccessible/inoperable more than a week after natural hazard event without consequences
- Less than 1,000 people would be directly affected by the loss/inoperability of the asset
- The building/facility provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.
- Some alternative programs and/or services are available to support the community
- Cost to replace is between $10 million and $30 million
- There are no hazardous materials in the asset

Asset - People's United Bank
Primary asset criticality factors influencing risk ratings for this asset:

- Asset may inaccessible/inoperable for more than a day but less than a week after natural hazard event
- Less than 10,000 people would be directly affected by the loss/inoperability of the asset
- The building/facility provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.
- Some alternative programs and/or services are available to support the community
- Cost to replace is less than $10 million
- There are no hazardous materials in the asset

Asset - Lineage Logistics
Primary asset criticality factors influencing risk ratings for this asset:

- Asset may inaccessible/inoperable for more than a day but less than a week after natural hazard event
- Loss/inoperability of the asset would have regional impacts
- The building/facility provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.
- Some alternative programs and/or services are available to support the community
- Cost to replace is between $10 million and $30 million
- Spills and/or releases of hazardous materials would be relatively easy to clean up

Asset - Island End Park
Primary asset criticality factors influencing risk ratings for this asset:

No score available

Asset - Mary O'Malley State Park
Primary asset criticality factors influencing risk ratings for this asset:

No score available

Asset - Island End River
Primary asset criticality factors influencing risk ratings for this asset:

No score available

Asset - Salt Marsh
Primary asset criticality factors influencing risk ratings for this asset:

No score available

Asset - Market Street

Primary asset criticality factors influencing risk ratings for this asset:

- Asset may inaccessible/inoperable during natural hazard event, but must be accessible/operable within one day after natural hazard event
- Loss/inoperability of the asset would have state-wide or greater impacts
- The infrastructure provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.
- Inoperability of the asset would not be expected to result in injuries
- Inoperability is likely to significantly impact other facilities, assets, or buildings and will likely affect their ability to operate
- There are no hazardous materials in the asset

Asset - Beacham Street
Primary asset criticality factors influencing risk ratings for this asset:

- Asset may inaccessible/inoperable for more than a day but less than a week after natural hazard event
- Loss/inoperability of the asset would have state-wide or greater impacts
- The infrastructure provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.
- Infrastructure functions as an evacuation route during emergencies
- Inoperability is likely to significantly impact other facilities, assets, or buildings and will likely affect their ability to operate
- There are no hazardous materials in the asset

Asset - Behen Street
Primary asset criticality factors influencing risk ratings for this asset:

- Asset may inaccessible/inoperable for more than a day but less than a week after natural hazard event
- Loss/inoperability of the asset would have state-wide or greater impacts
- The infrastructure provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.
- Inoperability of the asset would not be expected to result in injuries
- Inoperability is likely to significantly impact other facilities, assets, or buildings and will likely affect their ability to operate
- There are no hazardous materials in the asset

Asset - MBTA Commuter Rail
Primary asset criticality factors influencing risk ratings for this asset:

- Asset may inaccessible/inoperable during natural hazard event, but must be accessible/operable within one day after natural hazard event
- Loss/inoperability of the asset would have state-wide or greater impacts
- The infrastructure provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.
- Inoperability of the asset would be expected to cause a loss of confidence in government agency
- Cost to replace is greater than $100 million
- There are no hazardous materials in the asset

Asset - Private Rail
Primary asset criticality factors influencing risk ratings for this asset:

- Asset may inaccessible/inoperable for more than a day but less than a week after natural hazard event
- Loss/inoperability of the asset would have state-wide or greater impacts
- The infrastructure provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.
- Inoperability of the asset would not be expected to result in injuries
- Cost to replace is between $30 million and $100 million
- Spills and/or releases of hazardous materials would be relatively easy to clean up

Asset - Island End River Flood Resilience Barrier
Primary asset criticality factors influencing risk ratings for this asset:

- Asset must be operable at all times, even during natural hazard event
- Greater than 100,000 people would be directly affected by the loss/inoperability of the asset
- The infrastructure provides services to populations that reside within Environmental Justice neighborhoods or climate vulnerable populations.
- Inoperability of the asset would be expected to result in possible loss of life
- Inoperability will result in debilitating cascading impacts that will render other facilities, assets, or buildings inoperable and/or prevent the functionality of major regional or statewide facilities and/or delivery of critical services
- Spills and/or releases of hazardous materials are expected with difficult remediation and pose a severe threat to public health or safety

Project Design Standards Output

Asset: Boston Market Terminal — Building/Facility

Sea Level Rise/Storm Surge — High Risk

Target Planning Horizon: 2070
Intermediate Planning Horizon: 2050
Return Period: 200-yr (0.5%)

Applicable Design Criteria

Tiered Methodology: Tier 3

Projected Tidal Datums: Yes

Planning Horizon	MHHW	MHW	MTL	MLW	MLLW
	(ft-NAVD88)				
2050	7.8	7.5	2.5	-2.4	-2.7
2070	9.8	9.4	4.3	-0.8	-1.1

Limitations: Tidal datums are recommended based on the user drawn polygon, user responses to the useful life of the selected asset, and intersection of the project polygon with the mean high water (MHW) polygon for 2030. Tidal datum values provided are based on the MC-FRM, developed by Woods Hole Group in coordination with UMass Boston. For additional information on how these values were generated, review the link here. The values provided within should be used to inform design, but they do not provide guarantees for resilience. The guidance provided within is general and people are encouraged to do their own due diligence as part of planning and design.

Projected Water Surface Elevation: Yes

Asset Name	Recommmended Planning Horizon	Recommmended Return Period	Max	Min	Area Weighted Average
			(ft - NAVD88)		
Boston Market Terminal	2050	0.5% (200-Year)	12.7	12.2	12.2
	2070		14.3	14	14

Limitations: Projected water surface elevations are recommended based on the user drawn polygon, and user responses to the useful life of the selected asset. The projected water surface elevation values provided are based on the MC-FRM, developed by Woods Hole Group in coordination with UMass Boston. For additional information on how these values were generated, review the link here. The values provided within should be used to inform design, but they do not provide guarantees for resilience. The guidance provided within is general and people are encouraged to do their own due diligence as part of planning and design.

Projected Wave Action Water Elevation: Yes

Asset Name	Recommmended Planning Horizon	Recommmended Return Period	Max	Min	Area Weighted Average
			(ft - NAVD88)		
Boston Market Terminal	2050	0.5% (200-Year)	15.8	12.2	13.3
	2070		17.4	14	15.2

Limitations: Projected dynamic flood elevations are recommended based on the user drawn polygon, and user responses to the useful life of the selected asset. The projected dynamic flood elevation values provided are based on the MC-FRM, developed by Woods Hole Group in coordination with UMass Boston. For additional information on how these values were generated, review the link here. The values provided within should be used to inform design, but they do not provide guarantees for resilience. The guidance provided within is general and people are encouraged to do their own due diligence as part of planning and design.

Projected Wave Heights: Yes

Asset Name	Recommmended Planning Horizon	Recommmended Return Period	Max	Min	Area Weighted Average
			(Feet)		
Boston Market Terminal	2050	0.5% (200-Year)	4.5	0	1.7
	2070		4.5	0	1.9

Limitations: Projected wave heights are recommended based on the user drawn polygon, and user responses to the useful life of the selected asset. The projected wave height values provided are based on the MC-FRM, developed by Woods Hole Group in coordination with UMass Boston. For additional information on how these values were generated, review the link here. The values provided within should be used to inform design, but they do not provide guarantees for resilience. The guidance provided within is general and people are encouraged to do their own due diligence as part of planning and design.

Projected Duration of Flooding: Yes
Projected Design Flood Velocity: Yes
Projected Scour & Erosion: No

Extreme Precipitation — High Risk

Target Planning Horizon: 2070
Return Period: 50-yr (2%)

Applicable Design Criteria

Tiered Methodology: Tier 3

Projected Total Precipitation Depth & Peak Intensity for 24-hr Design Storms: Yes

Asset Name	Recommended Planning Horizon	Recommended Return Period (Design Storm)	Projected 24-hr Total Precipitation Depth (inches)	Step-by-Step Methodology for Peak Intensity
Boston Market Terminal	2070	50-Year (2%)	9.7	Downloadable Methodology PDF

Limitations: While precipitation depth is useful for project planning and design, rainfall distribution and peak intensity of the design storm is recommended to also be considered. Lower-intensity, longer-duration storms allow time for infiltration and reduce the load on the infrastructure system over the duration of the storm. Higher-intensity, shorter-duration storms often have higher runoff volumes because the water does not have enough

time to infiltrate and infrastructure systems (e.g., catch basins) and may overflow or back up during such storms. In the Northeast, short -duration high intensity rain events are becoming more frequent, and there is often little early warning for these events, making it difficult to plan operationally. These events can result in the rapid inundation of the asset project location. Design should consider both short- and long-duration precipitation events and how they may impact the asset.

The precipitation values provided by this Tool (version 1) are recommended to inform planning and design, but they do not guarantee that the asset will be protected from or be able to withstand an extreme precipitation event. The planning, design, and review guidance accompanying these values is general and projects are encouraged to do their own due diligence to understand the vulnerability of their asset.

Projected Riverine Peak Discharge & Peak Flood Elevation: Yes

Extreme Heat High Risk

Target Planning Horizon: 2070
Percentile: 90th Percentile

Applicable Design Criteria

Tiered Methodology: Tier 3

Projected Annual/Summer/Winter Average Temperatures: Yes
Projected Heat Index: Yes
Projected Growing Degree Days: No
Projected Days Per Year With Max Temp > 95°F, >90°F, <32°F: Yes
Projected Number of Heat Waves Per Year & Average Heat Wave Duration: Yes
Projected Cooling Degree Days & Heating Degree Days (base = 65°F): Yes

Asset: New England Produce Center Building/Facility

Sea Level Rise/Storm Surge High Risk

Target Planning Horizon: 2070
Intermediate Planning Horizon: 2050
Return Period: 200-yr (0.5%)

Applicable Design Criteria

Tiered Methodology: Tier 3

Projected Tidal Datums: Yes

Planning Horizon	MHHW	MHW	MTL	MLW	MLLW
	(ft-NAVD88)				
2050	7.8	7.5	2.5	-2.4	-2.7
2070	9.8	9.4	4.3	-0.8	-1.1

Limitations: Tidal datums are recommended based on the user drawn polygon, user responses to the useful life of the selected asset, and intersection of the project polygon with the mean high water (MHW) polygon for 2030. Tidal datum values provided are based on the MC-FRM, developed by Woods Hole Group in coordination with UMass Boston. For additional information on how these values were generated, review the link here. The values provided within should be used to inform design, but they do not provide guarantees for resilience. The guidance provided within is general and people are encouraged to do their own due diligence as part of planning and design.

Projected Water Surface Elevation: Yes

Asset Name	Recommmended Planning Horizon	Recommmended Return Period	Max	Min	Area Weighted Average
			(ft - NAVD88)		
New England Produce Center	2050	0.5% (200-Year)	12.7	12.2	12.2
	2070		14.3	14	14

Limitations: Projected water surface elevations are recommended based on the user drawn polygon, and user responses to the useful life of the selected asset. The projected water surface elevation values provided are based on the MC-FRM, developed by Woods Hole Group in coordination with UMass Boston. For additional information on how these values were generated, review the link here. The values provided within should be used to inform design, but they do not provide guarantees for resilience. The guidance provided within is general and people are encouraged to do their own due diligence as part of planning and design.

Projected Wave Action Water Elevation: Yes

Asset Name	Recommmended Planning Horizon	Recommmended Return Period	Max	Min	Area Weighted Average
			(ft - NAVD88)		
New England Produce Center	2050	0.5% (200-Year)	15.8	12.2	13.3
	2070		17.4	14	15.2

Limitations: Projected dynamic flood elevations are recommended based on the user drawn polygon, and user responses to the useful life of the selected asset. The projected dynamic flood elevation values provided are based on the MC-FRM, developed by Woods Hole Group in coordination with UMass Boston. For additional information on how these values were generated, review the link here. The values provided within should be used to inform

design, but they do not provide guarantees for resilience. The guidance provided within is general and people are encouraged to do their own due diligence as part of planning and design.

Projected Wave Heights: Yes

Asset Name	Recommmended Planning Horizon	Recommmended Return Period	Max	Min	Area Weighted Average
			(Feet)		
New England Produce Center	2050	0.5% (200-Year)	4.5	0	1.7
	2070		4.5	0	1.9

Limitations: Projected wave heights are recommended based on the user drawn polygon, and user responses to the useful life of the selected asset. The projected wave height values provided are based on the MC-FRM, developed by Woods Hole Group in coordination with UMass Boston. For additional information on how these values were generated, review the link here. The values provided within should be used to inform design, but they do not provide guarantees for resilience. The guidance provided within is general and people are encouraged to do their own due diligence as part of planning and design.

Projected Duration of Flooding: Yes
Projected Design Flood Velocity: Yes
Projected Scour & Erosion: No

Extreme Precipitation High Risk

Target Planning Horizon: 2070
Return Period: 50-yr (2%)

Applicable Design Criteria

Tiered Methodology: Tier 3

Projected Total Precipitation Depth & Peak Intensity for 24-hr Design Storms: Yes

Asset Name	Recommended Planning Horizon	Recommended Return Period (Design Storm)	Projected 24-hr Total Precipitation Depth (inches)	Step-by-Step Methodology for Peak Intensity
New England Produce Center	2070	50-Year (2%)	9.7	Downloadable Methodology PDF

Limitations: While precipitation depth is useful for project planning and design, rainfall distribution and peak intensity of the design storm is recommended to also be considered. Lower-intensity, longer-duration storms allow time for infiltration and reduce the load on the infrastructure system over the duration of the storm. Higher-intensity, shorter-duration storms often have higher runoff volumes because the water does not have enough time to infiltrate and infrastructure systems (e.g., catch basins) and may overflow or back up during such storms. In the Northeast, short -duration high intensity rain events are becoming more frequent, and there is often little early warning for these events, making it difficult to plan operationally. These events can result in the rapid inundation of the asset project location. Design should consider both short- and long-duration precipitation events and how they may impact the asset.

The precipitation values provided by this Tool (version 1) are recommended to inform planning and design, but they do not guarantee that the asset will be protected from or be able to withstand an extreme precipitation event. The planning, design, and review guidance accompanying these values is general and projects are encouraged to do their own due diligence to understand the vulnerability of their asset.

Projected Riverine Peak Discharge & Peak Flood Elevation: Yes

Extreme Heat High Risk

Target Planning Horizon: 2070
Percentile: 90th Percentile

Applicable Design Criteria

Tiered Methodology: Tier 3

Projected Annual/Summer/Winter Average Temperatures: Yes
Projected Heat Index: Yes
Projected Growing Degree Days: No
Projected Days Per Year With Max Temp > 95°F, >90°F, <32°F: Yes
Projected Number of Heat Waves Per Year & Average Heat Wave Duration: Yes
Projected Cooling Degree Days & Heating Degree Days (base = 65°F): Yes

Asset: 155 Market Street Building/Facility

Sea Level Rise/Storm Surge High Risk

Target Planning Horizon: 2070
Intermediate Planning Horizon: 2050
Return Period: 100-yr (1%)

Applicable Design Criteria

Tiered Methodology: Tier 3

Projected Tidal Datums: Yes

Planning Horizon	MHHW	MHW	MTL	MLW	MLLW
	(ft-NAVD88)				
2050	7.8	7.5	2.5	-2.4	-2.7
2070	9.8	9.4	4.3	-0.8	-1.1

Limitations: Tidal datums are recommended based on the user drawn polygon, user responses to the useful life of the selected asset, and intersection of the project polygon with the mean high water (MHW) polygon for 2030. Tidal datum values provided are based on the MC-FRM, developed by Woods Hole Group in coordination with UMass Boston. For additional information on how these values were generated, review the link here. The values provided within should be used to inform design, but they do not provide guarantees for resilience. The guidance provided within is general and people are encouraged to do their own due diligence as part of planning and design.

Projected Water Surface Elevation: Yes

Asset Name	Recommmended Planning Horizon	Recommmended Return Period	Max	Min	Area Weighted Average
			(ft - NAVD88)		
155 Market Street	2050	1% (100-Year)	12.3	11.7	11.7
	2070		13.9	13.6	13.6

Limitations: Projected water surface elevations are recommended based on the user drawn polygon, and user responses to the useful life of the selected asset. The projected water surface elevation values provided are based on the MC-FRM, developed by Woods Hole Group in coordination with UMass Boston. For additional information on how these values were generated, review the link here. The values provided within should be used to inform design, but they do not provide guarantees for resilience. The guidance provided within is general and people are encouraged to do their own due diligence as part of planning and design.

Projected Wave Action Water Elevation: Yes

Asset Name	Recommmended Planning Horizon	Recommmended Return Period	Max	Min	Area Weighted Average
			(ft - NAVD88)		
155 Market Street	2050	1% (100-Year)	15	11.7	12.7
	2070		16.7	13.6	14.7

Limitations: Projected dynamic flood elevations are recommended based on the user drawn polygon, and user responses to the useful life of the selected asset. The projected dynamic flood elevation values provided are based on the MC-FRM, developed by Woods Hole Group in coordination with UMass Boston. For additional information on how these values were generated, review the link here. The values provided within should be used to inform design, but they do not provide guarantees for resilience. The guidance provided within is general and people are encouraged to do their own due diligence as part of planning and design.

Projected Wave Heights: Yes

Asset Name	Recommmended Planning Horizon	Recommmended Return Period	Max	Min	Area Weighted Average
			(Feet)		
155 Market Street	2050	1% (100-Year)	4	0	1.5
	2070		4	0	1.7

Limitations: Projected wave heights are recommended based on the user drawn polygon, and user responses to the useful life of the selected asset. The projected wave height values provided are based on the MC-FRM, developed by Woods Hole Group in coordination with UMass Boston. For additional information on how these values were generated, review the link here. The values provided within should be used to inform design, but they do not provide guarantees for resilience. The guidance provided within is general and people are encouraged to do their own due diligence as part of planning and design.

Projected Duration of Flooding: Yes
Projected Design Flood Velocity: Yes
Projected Scour & Erosion: No

Extreme Precipitation High Risk

Target Planning Horizon: 2070
Return Period: 25-yr (4%)

Applicable Design Criteria

Tiered Methodology: Tier 3

Projected Total Precipitation Depth & Peak Intensity for 24-hr Design Storms: Yes

Asset Name	Recommended Planning Horizon	Recommended Return Period (Design Storm)	Projected 24-hr Total Precipitation Depth (inches)	Step-by-Step Methodology for Peak Intensity
155 Market Street	2070	25-Year (4%)	8.5	Downloadable Methodology PDF

Limitations: While precipitation depth is useful for project planning and design, rainfall distribution and peak intensity of the design storm is recommended to also be considered. Lower-intensity, longer-duration storms allow time for infiltration and reduce the load on the infrastructure system over the duration of the storm. Higher-intensity, shorter-duration storms often have higher runoff volumes because the water does not have enough

Attachment M

SSCF O&M PLAN

STORM SURGE CONTROL FACILITY

OPERATION & MAINTENANCE PLAN - DRAFT

ISLAND END FLOOD RESILIENCE PROJECT

CITY OF CHELSEA / CITY OF EVERETT

DRAFT OCTOBER 2023

1.0 INTRODUCTION

The Island End River Storm Surge Control Facility (SSCF) a piece of regional stormwater and flood control infrastructure proposed by the City of Chelsea and Everett to prevent impactful and damaging coastal storm flowage in the Island End River (IER) district via backwater flow through the existing storm drainage network during extreme coastal events. The SSCF is part of a multi-faceted regional flood resilience program that includes barriers at-grade in Chelsea and Everett, nature-based approaches to shoreline restoration, and salt marsh improvements. The proposed barriers consist of free standing reinforced concrete walls, adapted waterfront bulkheads, sheet pile walls with architectural form finished concrete cap, earthen berms, and flood gates at road and rail crossings.

The SSCF is located at the head of the Island End River in Chelsea. The Island End River is a tributary to the Mystic River, near its mouth at Boston Harbor, and is tidally influenced. The SSCF is proposed to be located on the southeast corner of the intersection of Market Street and Beacham Street. The facility is proposed to be installed in public and private lands including in the public right-of-way in Beacham Street, private property #357 Beacham Street (M&T Bank), and private property #145 Market Street (marine parcel). Where in private properties, easements for land rights will be secured.

The structure will be operated “normally open” to allow regular tidal flushing of brackish water from the IER through the Market Street culvert to the upstream open channel. During impactful coastal storm surge events, gates will be closed to prevent backwater through the storm drain infrastructure.

2.0 FACILITY COMPONENTS

The following is a summary of SSCF components relevant to operation and maintenance. Refer to Preliminary Design Report Section 4, Basis of Design, and Preliminary Design Plans for further details.

Combination flap gates – Gates will be raised when the water surface level is below the trigger elevation to allow bi-directional flow. When closed, the gates act as normal flap gates, allowing the storm drain system to drain when hydraulically feasible to do so, but prevent backwater flow that could cause flooding and damage. The three combination flap gates are proposed to be 96 inches by 96 inches. Combining the three openings, the total cross-sectional area is 192 square feet, equivalent to the nominal cross-sectional area of the proposed 16’ wide by 12’ high Market Street

Culvert and significantly greater than the cross-sectional area of the existing 15'6" wide by 9'6" tall arch culvert. The benefit of combination flap gates are that if impounded stormwater runoff ever exceeds coastal storm surge water levels, the pressure head differential will automatically regulate to relieve impounded waters even in a gate closed condition

Self-contained electro-hydraulic actuators – These actuators provide failsafe operation for the combination flap gates in the event of a power outage, as they can maintain enough charge to open and close for a number of cycles. They can also be designed to fail closed. Since they are able to operate for a time after loss of primary power, no permanent backup generator is required and less complex electrical equipment can be supplied, such as a receptacle for a portable generator and manual transfer switches.

Stop logs – Stop logs provide isolation around the combination flap gates during inspection or maintenance periods. Brackets for the stop logs are permanently installed but the stop log sections are normally stored off-site.

Bar racks – Bar racks (trash racks) are provided on both sides of the gates to help reduce the likelihood of gate failure to close or seat due to debris in the gate openings. Inland of the gates the bar rack is located within the structure. The goal of this rack is to prevent large debris from progressing to the gates and river beyond, especially any debris introduced in the open channel section of the storm drain system. On the river side of the gates, the bar rack is located at the outfall of the storm surge control structure discharge culvert.

Inlet and outlet culverts – The storm surge control facility is proposed to be connected to the Market Street culvert and the Island End River via a 16' wide by 12' tall box culvert. This proposed inlet and outlet culvert is sized equal to the proposed replacement culvert spanning between the open channel and the SSCF. Dewberry Engineers performed hydraulic modeling 2018 to 2020 to inform size of proposed culvert, which they determined optimally sized as a 16' wide by 12' tall box given site constraints and design flow requirements. In 2021 the section of the culvert in private property adjacent to the open-air channel was replaced with this recommended size. Chelsea and Everett plan to replace the remainder of the culvert with same sized pipe in Market Street. As the SSCF will be constructed prior to the right-of-way culvert segment, the SSCF inlet pipe will transition to the inside diameter of the smaller arch culvert via custom fabricated fiberglass reinforced pipe slip connection and reinforced concrete collar. The outlet culvert will tie into the headwall of the outfall structure.

Roller gates – In case of major maintenance or desire for double isolation during manned entry of the facility, roller gates are provided at the inlet and outlet culverts. These gates are provided with lifters and are stored off-site, similar to stop logs.

Outfall structure – The outfall structure is used to transition flow between the culverts and the Island End River. It consists of a headwall, slab, wing walls, and transitional rip rap area between the concrete and natural river bottom. The outfall structure will also support the river side bar rack for the Market Street culvert as well as the Beacham Street storm drain flap gate.

Flap gate – The Beacham Street storm drain is not directly attached to the storm surge control facility as it does not require bi-directional flow to upgradient resource areas. To prevent damaging flooding

via the Beacham Street storm drain, a flap gate valve is proposed to be located at the outfall structure.

Facility access – Access will be via 36" diameter manhole frames and covers and removable access plates as shown in the drawings. The access points below the design flood elevation and on the river side of the control gates will be bolted and watertight to prevent flooding through those access points. All other access points will be bolted for security purposes but not watertight.

Sediment control – Rock traps are provided on both sides of the gates to facilitate maintenance of sediment and heavy debris. These low points in the facility floor are designed to allow vactor truck operations or mechanical lifting of larger debris. Inland of the gates the rock trap receives debris that has been caught on the bar rack and pushed down. On the river side of the gates, the rock trap is the bottom of a sloped floor and will likely see more sediment than larger debris due to relative elevations of the outfall structure and assumed river bottom. To help reduce maintenance requirements, the openings for the combination flap gates are proposed to be raised above the facility floor in case there is sediment build-up from the river on that side of the structure at the time of gate closure and re-opening.

Connection to potential future pump station – The regional stormwater systems that find confluence proximate the SCCF will likely require stormwater pumping added to supplement capacity during periods of high coastal tailwater. The SSCF design includes knockout panels to allow for a 60" stormwater pipe connection to a potential future pump station. The Cities of Chelsea and Everett are committed to further developing concept for regional stormwater collection hydraulics improvements in calendar year 2024.

Electrical equipment – An enclosure will be provided onsite that will house the programmable logic controller (PLC), manual transfer switch for backup power, communications equipment, portable generator receptacle, and other required electrical components. Actuators will also have local control stations at the site.

Instrumentation – Beyond the instrumentation required for the actuators, ultrasonic level transducers will be used on both sides of the gate and inland of the bar rack for control of the gates and monitoring the status of the bar rack. The river side level transducer will be used to trigger the gates to close and open. The two level transducers on either side of the bar rack will be used to evaluate differential head across the screen to indicate blinding and the need for maintenance to clear the screen. Float switches will also be used for backup.

3.0 OPERATION

The SSCF will operate as a sluice gate under normal operating conditions, allowing the free flow of tide waters in both directions, but close on incoming storm surge at a predetermined set point, as described herein, to prevent flooding of lands through surcharge of the upgradient channel and stormwater collection system. Points subject to surcharge include manholes, catch basins, and open-air channel segment upgradient of the storm surge control facility. The combination gates will operate as a conventional top hinged drainage flap gate in the down or closed position under trigger conditions.

Operation of the storm surge control facility will be controlled based on the water surface elevation on the river side of the structure. Water levels will be measured by a series of ultrasonic level transducers with backup float switches. The level control system will consist of a Programmable Logic Controller (PLC), which will determine the sequence of operation of the gate actuators. The PLC will control the gate operation, indicate water levels, and activate alarms. The PLC will contain switches and relays for indication of alarm conditions and interfacing with a remote terminal unit to signal operations personnel.

The level control panel will respond to a rising and falling water level on the ocean side of the control structure, as follows:

- As the water level rises to the GATE CLOSE elevation, the activator energizes and closes the gate.
- When the water level drops to the GATE OPEN elevation, the activator energizes and opens the gate.

The control structure operation will be based on the water surface elevation on the river side of the gate. The storm surge control facility is not proposed to be manually closed to create capacity in advance of weather events. Partial closures will not be part of the operational scheme. The initial operational set points are shown in Table 1.

Table 1: Operational Set Points

Operational Condition	Elevation (NAVD 88)
Gate Close	7.0 feet
Gate Open	4.0 feet

The goal of gate operation is to maximize elevation of salt water into the upgradient habitat without causing flooding to abutting properties. The set points described here are starting points and future adjustments will likely be required to achieve the goal. An Advisory Committee for the SSCF, discussed later in this plan, will monitor operation and assess the need for future adjustments. No changes shall be made to the set points without review and approval by the Advisory Committee.

The gate will not be continuously manned and will use a passive alarm system, or it will activate only when an alarm occurs. The Remote Terminal Unit (RTU) will be programmed to initiate the dialing sequence upon sensing a power failure. Each alarm is annunciated on the gate control panel and transmitted to a RTU with cellular modem. The RTU will transmit the alarm to browser accessed user interface and will auto-dial pre-set telephone numbers and emails for individual contact of operators. The RTU will contain an online interface for configuration and data acquisition.

4.0 MAINTENANCE

The Cities of Chelsea and Everett are committed to performing long-term maintenance of the systems.

General Inspection & Maintenance

The SSCF should be visited monthly for general inspection of condition and system performance. Maintenance activities should be scheduled on an annual and semiannual basis, as described herein, by qualified technicians. The numbered list below describes general inspection and maintenance practices.

1. Visit the SSCF monthly or after significant storms to systematically check and operate all electrical, control, and mechanical equipment. Perform inspection using a recorded log tailored to SSCF configuration. This system will be used to document operator's inspection and maintenance and other aspects of the SSCF operation which have been evaluated.
2. Maintain and service equipment in accordance with manufacturer recommendations and requirements. Maintenance at the SSCF should be performed on a scheduled basis during regular inspection. Maintenance shall include exercise and testing of gate equipment and controls at a minimum semiannually.
3. Conduct preventive maintenance semiannually including the following:
    a. Control and instrumentation inspection of relay, contact, and level transducer equipment involved with the controls/instrumentation.
    b. Inspection of the gates and service equipment within the SSCF. Motors will be checked for amperage draw and connections.
    c. Alarm functions will be tested to minimize or eliminate possible failure during emergency conditions.
4. Prepare a report following semiannual maintenance recommending changes in the operation and/or maintenance practices followed by the personnel responsible for the operation.
5. Prepare for 24-hour on-call service for the SSCF with on-call service providers.

Recommended maintenance practices and required equipment are summarized in Table 2.

Table 2: Maintenance and Inspection Task Checklist

Task	# of Staff	Equipment	Events per Year
Regular Inspection	2	Tool Truck	12*
Bar Rack Cleaning	2	Tool Truck, Rake	12*
Rock Trap Cleaning	3	Tool Truck, Vactor Truck	12*
Gate & Actuator Maintenance	2	Tool Truck	2
Electrical Maintenance	2	Tool Truck	2
Comprehensive Inspection	4	Tool Truck, Crane	1

** Inspection and cleaning should occur post storm event and as needed to keep grates clear and facility operational*

Roller Gates & Stop Logs

Installation and removal of stop logs will be required for most gate maintenance as well as any activity requiring personnel access. Table 3 below is a summary of required stop logs for this facility.

Table 3: Isolation Equipment Summary

Type / Purpose	Unit Size	# Units
Roller Gate / Inland Culvert Isolation	16 feet long by 5 feet high	3
Roller Gate / River Culvert Isolation	16 feet long by 4.17 feet high	4
Stop Log / Gate Isolation	11 feet long by 1.5 feet high	10
	Total:	17

The City will need to designate a covered space to store the roller gates and stop logs. It is estimated that a storage space of minimum dimensions 30 feet by 30 feet will be required. It is currently envisioned that this space would be identified within an existing City facility such as the nearby City of Chelsea Public Works Yard. Equipment such as a forklift or loader and truck will be needed to load, unload, and transport the stop logs. A portable crane will be needed for installing/removing the stop logs and gates. Equipment such as a knuckle boom truck may be an option to satisfy several requirements. It is recommended that the portable crane be sized to lift approximately 1,600 pounds, which should be adequate for gate or stop log removal.

Gates, Actuators, and Motors

Gates, actuators, and motors should be inspected at least once a year, when issues are noted, and per manufacturer's recommendations. Lubrication of moving parts will be required for the gates and actuators.

Bar Racks and Rock Traps

The bar racks and associated rock traps will need occasional inspection and cleaning. Initially, the bar racks should be inspected and rock traps should be cleaned once a month, however, this time frame may need to be adjusted based on how much material is collected. Differential water levels across the rack may also be an indicator of screen blockage. The rock traps and bar racks will be accessible for cleaning from above ground. At the inland rock trap, equipment can be inserted through an opening in the top slab of the structure. A vactor truck is anticipated to be needed for the majority of the cleaning but a clam shell bucket may be needed for debris that cannot be removed with the vactor truck. A specialized rake will be used for cleaning the bar rack, also from above ground. The bar rack on the river side of the Market Street culvert will need to be cleaned in a similar manner. Access to this bar rack will be at the surface from beyond the headwall structure.

Structure

The City should expect to replace electrical and mechanical equipment at least once during the first 50 years of operation of the storm surge control facility. Concrete spall repair within the structure should also be anticipated once during the first 50 years of operation.

Maintenance of SSCF in Context of Island End River Flood Resilience Program

Annual and periodic maintenance of the SSCF is presented coordinated with the broader suite of components comprising the Island End River Flood Resilience Program in Appendix A, *Preliminary Operation and Maintenance Schedule.* Table A-1 identifies annual maintenance activities including estimated duration to fulfill and required resource allocation. Table A-2 identifies periodic, larger, capital improvements tasks required to maintain the system through lifecycle. The tables identify whether tasks are estimated to be performed by municipal staff or by contract services or construction partners.

5.0 OPERATION AND MAINTENANCE MANUAL

An operation and maintenance manual for the storm surge control facility will be kept on file, in paper and digital formats, with system operators. The manual shall be updated when applicable to reflect replacements or modifications to the components throughout the life of the unit. The manual will include the following components:

- Table of contents and Index
- Brief description of each system and components
- Manual and programmed operational procedures
- Special operating instructions
- Routine maintenance procedures
- Manufacturers printed operating and maintenance instructions, parts list, illustrations, and diagrams
- Wiring diagram
- Approved shop drawings and layout drawing
- List of spare parts, manufacturer's price, and recommended quantity,
- Name, address, and telephone number of local service representatives

6.0 ADVISORY COMMITTEE

An Advisory Committee for the storm surge control facility will be established to monitor system operation and assess the need for future adjustments. The Advisory Committee will assess and update the monitoring and operations plan periodically, review monitoring data, review environmental and operational conditions, prescribe modifications to SSCF operation as needed, and consult with the U.S. Army Corps of Engineers to ensure that any major modifications are consistent with the Army Corps permit.

The Advisory Committee may consist of the following members, subject to their approval:

- City of Chelsea Commissioner of Public Works
- City of Chelsea Director of Housing and Community Development
- City of Everett Conservation Agent
- City of Everett City Engineer
- Massachusetts Department of Environmental Protection

- United States Environmental Protection Agency (US EPA) Region 1, Office of Ecosystem Protection

No changes shall be made to the set points without review and approval by the Advisory Committee. The Advisory Committee will have 30 days to review and comment on the proposed changes. The established set points shall be achieved not later than 60 days following modification. Should the set points not be able to be reached within this period, written explanation shall be provided to the Advisory Committee.

7.0 OPERATIONS RESPONSIBILITY

The City of Chelsea Department of Public Works will be responsible for the operation, maintenance and adjustment of the storm surge control facility under the direction of the Advisory Committee. Should immediate response to conditions adversely affecting the control structure or surrounding properties become necessary, the local component of the Advisory Committee will discuss and authorize appropriate actions with notification to agency representatives to follow immediately thereafter.

APPENDIX A

PRELIMINARY OPERATION AND MAINTENANCE SCHEDULE

ISLAND END RIVER FLOOD RESILIENCE PROGRAM

APPENDIX A

City of Chelsea, City of Everett — **PRELIMINARY OPERATION AND MAINTENANCE SCHEDULE** — by Weston & Sampson

ISLAND END RIVER FLOOD RESILIENCE PROGRAM — with support from AECOM and Tetra Tech

TABLE A-1: Annual Operation and Maintenance Expense Estimate

#	Task Description	Staff (#)	*Note*	Equipment (desc.)	Event Duration (hr/event)	Annual Incidents (events)	Frequency (desc.)
1	Regular Inspection	2	(1)	Tool Truck	8	12	monthly
2	Gate, Actuator, Motor Maintenance	2	(2)	Tool Truck	16	2	semiannual
3	Generator and Electrical Maintenance	2	(2)	Tool Truck	4	2	semiannual
4	Comprehensive Inspection Control Structure	4	(3)	Tool Truck, Crane	24	1	annual
5	Bar Rack Cleaning	2	(1)	Tool Truck, Rake	6	12	monthly
6	Rock Trap Cleaning	3	(3)	Tool Truck, Clamshell Bucket	4	12	monthly
7	Landscaping	4	(2)	Tool Truck	16	12	monthly
8	Irrigation and lighting system maintenance	2	(2)	Tool Truck	16	2	semiannual
9	Utility service (power, water, telecommunications)						
10	Trash Removal (receptacles, tide borne trash)	2	(1)	Tool Truck	4	52	weekly[4]
11	Engineering Support of O&M	2	(1)		20	12	monthly
12	Administrative Support of O&M	2	(1)		4	12	monthly
13	Maintenance of Security Provisions	1	(1)	Cameras	2	12	monthly

TABLE A-2: Periodic Operation & Maintenance Expense Estimate

#	Task Description	Year	Current Cost Estimate			Future Value[7]
			Construction[5]	Engineering & Administr.[6]	Total	
1	Refurbishment of SSCF Gates, Screens, & Mechanical	15	$500,000	$150,000	$650,000	$1,012,679
2	Refurbishment or Replacement of Above-Grade Flood Gates	20	$900,000	$270,000	$1,170,000	$2,113,150
3	Refurbishment or Replacement of SSCF Gates, Screens, & Mechanical	25	$3,600,000	$1,080,000	$4,680,000	$9,798,881
4	Refurbishment or Replacement of Above-Grade Flood Gates	40	$900,000	$270,000	$1,170,000	$3,816,584
5	Refurbishment of Gates, Screens, & Mechanical	40	$500,000	$150,000	$650,000	$2,120,325
6	Coating and Surface Maintenance	10	$1,000,000	$300,000	$1,300,000	$1,747,091
7	Coating and Surface Maintenance	20	$1,000,000	$300,000	$1,300,000	$2,347,945
8	Coating and Surface Maintenance	30	$2,000,000	$600,000	$2,600,000	$6,310,882
9	Coating and Surface Maintenance	40	$1,000,000	$300,000	$1,300,000	$4,240,649
10	Upgrade Electrical and Control Systems	10	$100,000	$30,000	$130,000	$174,709
11	Upgrade Electrical and Control Systems	20	$200,000	$60,000	$260,000	$469,589
12	Upgrade Electrical and Control Systems	30	$100,000	$30,000	$130,000	$315,544
13	Upgrade Electrical and Control Systems	40	$200,000	$60,000	$260,000	$848,130
14	Refurbishment or Replacement of Deck, Walkways, Rails, Bollards, Fences	20	$1,500,000	$450,000	$1,950,000	$3,521,917
15	Refurbishment or Replacement of Deck, Walkways, Rails, Bollards, Fences	40	$1,500,000	$450,000	$1,950,000	$6,360,974
16	Lighting System Replacement	25	$500,000	$150,000	$650,000	$1,360,956
17	Irrigation System Replacement	25	$50,000	$15,000	$65,000	$136,096
		Subtotal:	$15,550,000	$4,665,000	$20,215,000	$46,696,100

Notes:

1) Assumes performed by municipal staff
2) Assumes contract maintenance services
3) Assumes wage rate construction contract
4) Tasks performed regularly at frequency noted, additionally as needed following storm events, and adjusted seasonally where relevant
5) Estimate assumes work performed by construction contractor secured via competitive bid
6) Assumed 30% of construction cost for engineering assessment, design, bid, construction administration, and inspection
7) Future value assumes average 3% inflation from basis cost through lifecycle
8) Annual O&M costs basis is November 2021
9) Note does not include maintenance of wetlands improvements and nature based approaches at shoreline.