New Bedford Harbor Superfund Site

U.S. Army Corps of Engineers New England District

Draft Final Intertidal Work Plan for West Zone 1 Revision 1

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New Bedford Harbor Superfund Site

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Document history and status

Revision	Date	Description	By	Review	Approved

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Tables

Appendix

Acronyms and Abbreviations

cy	cubic yards
EPA	U.S. Environmental Protection Agency
ft	foot/feet
Generic Work Plan	Draft Final Generic Upper Harbor Intertidal Work Plan Revision 1
GPS	Global Positioning System
IA	immunoassay
mg/kg	milligrams per kilogram
MHHW	mean higher high water
NAE	U.S. Army Corps of Engineers, New England District
NBHSS	New Bedford Harbor Superfund Site
PCB	polychlorinated biphenyl
PECC	pre-excavation confirmatory congener
RAL	remedial action level
ROD	Record of Decision
RTK	Real Time Kinematic
sf	square feet
TCL	target cleanup level
TSCA	Toxic Substances Control Act
UCL	upper confidence limit

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1.0 Introduction

This Work Plan for West Zone 1 provides information concerning shoreline remediation and restoration pursuant to the New Bedford Harbor Superfund Site (NBHSS), including maps and figures of the excavation areas, equipment access plans, sample locations, and existing and proposed wetland cover and topography. The *Draft Final Generic Upper Harbor Intertidal Work Plan Revision 1* (Generic Work Plan; Jacobs 2019a) describes the means and methods for intertidal excavation, material stabilization, drainage water management, transport and disposal of polychlorinated biphenyl (PCB)-contaminated intertidal sediments, restoration of excavated areas and post-remediation monitoring and maintenance. This zone-specific work plan provides additional detail and documents deviations from the procedures in the Generic Work Plan.

As described herein, certain areas of the sediment and soil on the parcels contain PCB contamination that exceeds the established target cleanup levels (TCLs) for intertidal sediment. The PCB TCLs are provided in the 1998 U.S. Environmental Protection Agency (EPA) Record of Decision (ROD) for the NBHSS (EPA 1998). The TCLs for intertidal shoreline areas in West Zone 1 are 25 milligrams per kilogram (mg/kg) for the top 1 foot (ft) (95% upper confidence limit [UCL] of the mean concentration), and 50 mg/kg below 1 ft landward of the mudflats (not-to-exceed value). The 25 mg/kg TCL is being used because of the anticipated construction of a recreational public walking path along the Upper Harbor western shoreline. The TCL for Upper Harbor mudflats and subtidal areas is 10 mg/kg, which must be attained as an average on an Upper Harbor-wide basis. Sediment and soil with PCB concentrations exceeding the TCLs will be removed and disposed of in an off-site Toxic Substances Control Act (TSCA) permitted landfill. Following contaminated sediment removal, areas that originally supported vegetative cover will be backfilled with clean topsoil and restored with a similar vegetation type and restored to the original elevation. Unvegetated areas (i.e., mudflats) will be backfilled as needed to stabilize the shoreline.

2.0 Parcel Description

The intertidal management area referred to as West Zone 1 is located on the western shore of the Acushnet River in New Bedford, MA. West Zone 1 consists of four parcels: 116-132, 116-86, 116-100, and 112-65; portions of each parcel will be remediated. A site location map showing the West Zone 1 parcels and the limit of planned excavation is provided in Figure 2-1.

Parcels 116-132 and 116-86 are comprised of commercially-developed land in the western portion with a relatively narrow area of undeveloped land in the eastern portion. The shoreline of these parcels consists of mudflats, low marsh, and upland. The parcels are bounded to the north by Wood Street, to the west by River Road, to the south by Parcel 116-100, and to the east by New Bedford Harbor.

Parcel 116-100 is comprised of commercially-developed land in the western portion with a relatively narrow area of undeveloped land in the eastern portion. The shoreline of this parcel consists of mudflats, low marsh, the invasive grass *Phragmites australis*, and upland. The parcel is bounded to the north by Parcel 116-86, to the west by River Road, to the south by Parcel 116-94, and to the east by New Bedford Harbor.

Parcel 116-94 is comprised of commercially-developed land in the western portion with a relatively narrow area of undeveloped land in the eastern portion. The shoreline of this parcel consists of mudflats, low marsh, the invasive grass *Phragmites australis*, and upland. The parcel is bounded to the north by Parcel 116-100, to the west by River Road, to the south by Parcel 112-65, and to the east by New Bedford Harbor.

Parcel 112-65 is comprised of commercially-developed land in the western portion with a relatively narrow area of undeveloped land in the eastern portion. The shoreline of this parcel includes mudflats, low marsh, the invasive grass *Phragmites australis*, and upland. The parcel is bounded to the north by Parcel 116-94, to the west by Belleville Avenue, to the south by Parcel 112-88, and to the east by New Bedford Harbor.

The existing wetland vegetation for West Zone 1 was surveyed in 2017. The mapped survey results and the outlines of the excavation areas are provided in Figure 2-2a through Figure 2-2d. Sediment and soil samples collected during the site investigation/characterization phase were analyzed for total PCBs by both immunoassay (IA) and congener methods. The analytical results summarized in Table 2-1a through Table 2-1d were used to support remediation planning. The PCB characterization sample locations used to delineate the extent of PCB contamination within West Zone 1 are shown in Figure 2-3a through Figure 2-3d.[1] A subset of these locations was also designated as confirmatory sample locations, which are described further in Section 3.3.

3.0 Excavation

3.1 Site Preparation

Access to the portions of the parcels requiring remediation will be through private property that is currently under access agreements obtained by EPA. The existing parking lot will be used to access Parcel 116-86. For the other parcels, temporary roads will be built to create equipment access to the remediation areas. The temporary roads will be constructed using a geotextile base covered by either 12 inches of dense-grade aggregate or by construction mats. The use of aggregate or mats will be determined in the field when the roads are cleared. Approximately 1,083 linear ft of temporary access roads will be constructed. The roads will be approximately 15 ft wide. A construction site plan showing the excavation areas and temporary access roads is provided as Figure 3-1.

Prior to any site clearing or grubbing necessary to build the access road to the excavation areas, mature, non-invasive tree and shrub species will be marked in the field and preserved when possible during construction. A native tree and shrub inventory is included as Appendix A. Other vegetation will be cleared from the site as necessary to permit access road construction and remedial excavation. Construction access was designed to minimize disturbance of the property to the maximum extent practicable.

3.2 Excavation Plan

Using PCB data collected through multiple rounds of sampling, a 3-dimensional excavation model was developed as depicted in the West Zone 1 Excavation Plan in Figure 3-2a through Figure 3-2d. The horizontal and vertical extents of the excavations include all sample locations with total PCB concentrations exceeding TCLs (for non-mudflat locations) and mudflat locations with PCB concentrations exceeding the subtidal/mudflat remedial action level (RAL) of 30 mg/kg. All of the 0-1 ft sample locations outside of the excavation area have total PCB concentrations below 25 mg/kg. The cut depth, areal extent of contamination and pre-excavation surface elevations for the excavation areas are shown on Figure 3-2a for Parcels 116-132 and 116-86, on Figure 3-2b for Parcel 116-100, on Figure 3-2c for Parcel 116-94, and on Figure 3-2d for Parcel 112-65. The vertical extent of

[1] PCB-contaminated soil at location WS116 on Parcel 112-65 is not included in the intertidal excavation area because it is assumed to be associated with upland contamination from the former Aerovox site immediately to the south.

contamination was not delineated at some locations in Parcels 116-86, 116-94, and 112-65 because either the maximum hand-coring depth was reached, or refusal was encountered. The depth of the excavations in these areas is assumed to be at the bottom of the deepest sample interval. Depending on conditions encountered during excavation, the bottoms of the excavations in these areas may be lined with a geotextile.

At Parcel 116-86, a small portion of the excavation lies on top of the concrete-lined electrical conduit shown in Figure 3-1. The conduit is approximately 380 ft long and demarcated by manholes on the north and south ends of the property. At Parcel 112-65, no excavation is planned along the southern portion of the shoreline in order to maintain the integrity of the Aerovox interim cap. In the small excavation area immediately north of the interim cap, the depth of excavation is shown as 1 ft, but deeper excavation will be attempted based on field conditions to a maximum depth of 5 feet. The total area to be excavated is approximately 40,500 square feet (sf) and has a corresponding volume of 3,469 cubic yards (cy).

Contaminated sediment will be removed in the mudflat, saltmarsh and upland areas. If *Phragmites* roots come up as a single mass that is thicker than the cut depth, the entire mass will be removed. Following excavation, the area will be smoothed with the excavator as needed to create an even surface prior to placement of backfill.

3.3 Post Excavation Compliance

Confirmation of compliance with the TCLs will be based on pre-excavation confirmatory congener (PECC) sampling and collection of post-excavation survey data to demonstrate that the excavation achieved the horizontal and vertical design limits. The PECC sample locations shown in Figures 2-3a, 2-3b, 2-3c, and 2-3d include excavation sidewall and floor locations where PCB congener concentrations were previously determined to be below the TCLs. PECC sample locations for saltmarsh and upland areas are spaced at approximate 100-ft intervals along the excavation sidewalls and floor with the following exceptions:

- Sidewall at the north end of Parcel 116-86: the sample from location WS129 could not be collected at the sidewall of the planned excavation because of refusal, and samples from locations WS104 and WS105 were collected in the gravel parking lot because the edge of the planned excavation abuts the parking lot.
- Floor in the south-central part of Parcel 116-86: cores collected from the portion of the excavation area in the parking lot encountered refusal at 2.5-2.9 ft below the surface. In addition, PCB contamination above the TCL extends to the maximum coring depth of 5-6 ft below the surface in the area below the mean higher high water (MHHW) line.
- Floor in the southern part of Parcel 116-94: PCB contamination above the TCL extends to the maximum coring depth of 3-6 ft below the surface; refusal was encountered between 1-3 ft below the surface in the western portion of the excavation area.
- Sidewall at the south end of Parcel 116-94: a sidewall sample was not collected because the edge of the excavation area abuts a paved parking lot.
- Parcel 112-65: the excavation area terminates at the top of the slope, and the top-of-bank locations are set back slightly from the sidewall. In addition, the vertical extent of contamination was not delineated at two locations (WS116 and WS143) that abut the Aerovox interm cap.

PECC sample results are shown in Tables 2-1a, 2-1b, 2-1c, and 2-1d. PECC locations are not needed on the eastern side of the excavation because it will be subtidal after excavation. Post-excavation confirmatory samples

for mudflats that are subtidal after excavation will be collected as part of the subtidal confirmatory sampling program.

Compliance survey locations are spaced at approximate 100-ft intervals along the excavation sidewalls and floors. Design elevation compliance measurements at the compliance survey locations will be made using a real-time kinematic (RTK) global positioning system (GPS) with vertical and horizontal accuracies of less than 0.1 ft. Compaction by heavy equipment after excavation will be avoided until target elevations are confirmed by RTK survey. Table 3-1 provides a survey control table to document the pre- and post-excavation compliance measurements and compliance survey locations are shown in Figure 3-3a through Figure 3-3d. Additional removal will be performed if the post-excavation elevation survey indicates that a compliance survey location was not excavated to the target elevation or horizontal extent. Any additional removal will be performed as described in Section 4.5 of the Generic Work Plan.

If the PECC approach is proven to be ineffective at East Zone 1 Parcels 25-24 and 25-31, or if the West Zone 1 remediation precedes East Zone 1, then post-excavation confirmatory samples will be collected at the PECC locations, and the excavation will not be backfilled until it is confirmed to be below the TCLs.

4.0 Backfill

Upon verification that compliance with the TCLs has been met based on post-excavation elevation survey data, and, if implemented prior to East Zone 1, resampled PECC locations, the excavations will be backfilled with clean manufactured topsoil. The topsoil will meet the quality requirements identified in the *Draft Final Topsoil Acceptance Plan* (Jacobs 2019b). Backfill will consist of 12 inches of topsoil to support vegetation regrowth and achieve the restoration design provided in Section 7.0. Where excavation depth exceeds 1 ft, a 3-inch minus clean gravel substrate will be placed to within 1 ft of the target grade and topsoil will be placed on top of the substrate to bring the surface to the target elevation. A specification for the gravel backfill is provided in the Generic Work Plan. The gravel substrate and topsoil will be delivered to the restoration areas by over-the-road dump trucks and offloaded into stockpiles near the excavation area. A clean, decontaminated all-terrain dump truck or tracked excavator will transport the topsoil for spreading. Post-backfill saltmarsh topography will closely match the pre-excavation topography with a tolerance of +/- 0.3 ft as described in Section 7.0. The surface may be restored to an elevation of 0.1 to 0.2 ft. above the planned grade to allow for natural soil compaction. During the restoration process, the elevation of the placed topsoil will be checked periodically with the GPS Rover and with the excavator bucket. Elevation measurements will be taken after each area is backfilled, prior to relocating the excavator. Excavated mudflats will not be backfilled except where needed to provide drainage or slope stability.

5.0 Schedule

The anticipated durations of the remedial activities included in this Work Plan are listed below. A more detailed construction planning schedule will be provided as Appendix C prior to initiation of field activities.

Activity	Anticipated Duration
Excavation	1.0 months
Restoration	2 weeks
After Action Report	3 months

6.0 Air Monitoring

The evaluation of existing PCB congener data (Tables 2-1a, 2-1b, 2-1c, and 2-1d) indicates that the maximum PCB concentration at Parcel 116-86 is 3,400 mg/kg. Particulate and airborne PCB monitoring will be conducted in accordance with the guidelines provided in the *NBHSS Draft Final Ambient Air Monitoring Plan for Remediation Activities Revision 2* (Jacobs 2018a).

7.0 Restoration

All excavated areas except mudflats will be backfilled, regraded, and revegetated to best replicate the pre-remediation conditions and restrict the reestablishment of invasive species as outlined in the Generic Work Plan (Jacobs 2019a). Mudflats will be backfilled to pre-excavation elevations to approximately 10 ft seaward of the low marsh/mudflat boundary, then sloped downward to meet the existing harbor bottom. As specified in the Generic Work Plan, upland areas impacted by remediation activities will be seeded with conservation seed mix. Any trees removed as part of access road construction or excavation will be replaced at the same or nearby suitable location. A pre-construction tree and shrub inventory of plants within the excavation area and access road area is included in Appendix A. Proposed restored vegetation types within the remediation area are shown in plan view in Figure 7-1a, Figure 7-1b, Figure 7-1c, and Figure 7-1d. A conceptual cross section is provided in Figure 7-2 and construction cross sections are provided in Appendix B. Tree and shrub species identified for restoration are included in the Shrub Area Plantings notes included in Figures 7-1a, 7-1b, 7-1c, and 7-1d. The existing and proposed post-restoration acreages of each cover type is included in Tables 7-1a, 7-1b, 7-1c, and 7-1d, and shrub restoration summaries are provided in Tables 7-2a, 7-2b, 7-2c, and 7-2d.

Planting of trees, shrubs and 2-inch bare-root salt grass plugs will be conducted after excavation and backfill in accordance with favorable weather conditions and within the planting season from approximately April 15 to June 30, 2019 or in the early fall (Jacobs 2019a). Salt grass plants will be obtained from a nursery that that can provide plugs grown from a Northeastern U.S. genotype seed stock.

Herbivory deterrents will be used to protect the seedlings during the establishment period (Jacobs 2019a). A combination fence and rope grid system similar to the one installed at the Pierce Mill Cove intertidal restoration area will be constructed (Jacobs, 2018b). If unforeseen conditions are identified that could affect the ability of the restoration to achieve the success standards adopted for the program, appropriate adaptive management measures will be developed and implemented in coordination with the U.S. Army Corps of Engineers, New England District (NAE) and EPA. Monitoring and maintenance in restored areas will be performed as described in the Generic Work Plan (Jacobs 2019a).

No mechanical removal of *Phragmites* is proposed outside of excavation boundaries. All remaining areas of *Phragmites* within 30 ft of the restored marsh will be treated with herbicide in accordance with the guidelines in

the Generic Work Plan (Jacobs 2019a) to promote a *Phragmites* free buffer. At the conclusion of all restoration activities, final vegetation and topographic surveys will be conducted to document the as-built elevation and vegetative cover conditions.

8.0 References

U.S. Environmental Protection Agency. 1998 (September). *Record of Decision for the Upper and Lower Harbor Operable Unit, New Bedford Harbor Superfund Site*. USEPA Region 1 – New England.

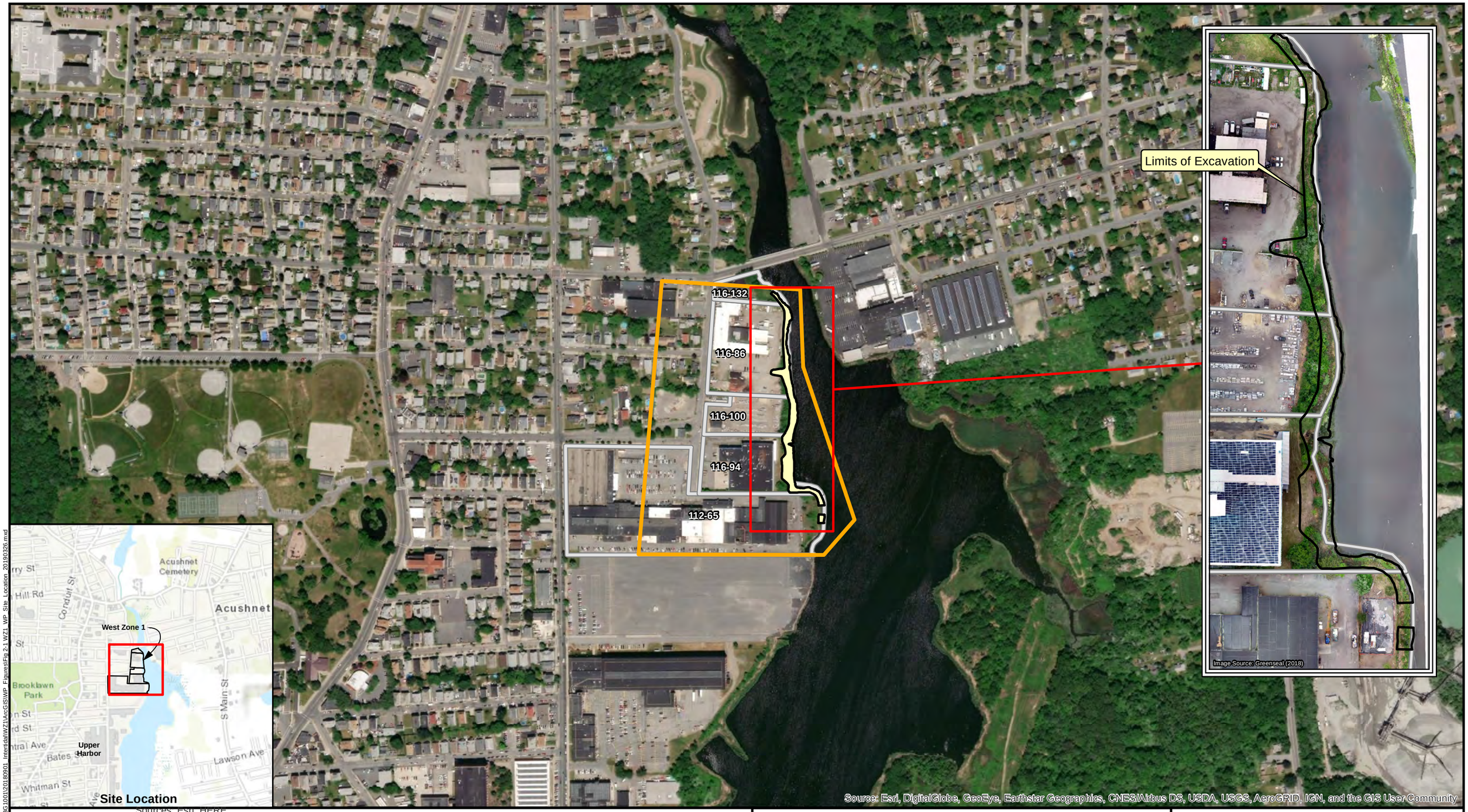
Jacobs. 2019a (May). *Draft Final Generic Upper Harbor Intertidal Work Plan Revision 1*. ACE-J23-35BG2000-M1-0109.

——— 2019b (January). *Draft Final Topsoil Acceptance Plan*. ACE J23 35BG2000 M1-0076.

——— 2018a (April). *Draft Final Ambient Air Monitoring Plan for Remediation Activities Revision 2*. ACE-J23-35BG2000-M17-0034.

——— 2018b (November). *NBHSS Draft Final Pierce Mill Cove Herbivory Control Plan.* ACE-J23-35BG2000-M17-0040.

Figures



Legend

- Proposed Limits of Excavation
- West Zone 1 Management Area
- Parcel Boundary

0 400 800 Feet

Basemap Data Source: MassGIS, ESRI

March 2019

Intertidal West Zone 1
Site Location and Features

New Bedford Harbor Superfund Site

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Figure 2-1

Path: C:\Users\scottga\Documents\NBH\356BG100\120180901_Intertidal\WZ1\ArcGIS\WP_Figures\Fig 2-1 WZ1_WP_Site_Location_20190326.mxd

Legend

- 0-1' Excavation Depth
- 1-2' Excavation Depth
- 2-3' Excavation Depth
- 3-4' Excavation Depth
- 4-5' Excavation Depth
- 5-6' Excavation Depth
- Mean Lower Low Water
- Mean Higher High Water
- Parcel Boundary
- 1-foot Contour
- Low Marsh
- Mudflat
- Phragmites
- Upland
- Unvegetated Fill

0 50 100 Feet

January 2019

Basemap Data Source: MassGIS

Vertical Datum: NAVD88

Note: Existing vegetative cover was surveyed by Nearview, LLC (October 2017).

Intertidal West Zone 1
Parcels 116-132/116-86
Existing Vegetation, Topography, and Excavation Areas

New Bedford Harbor Superfund Site

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Figure 2-2a

Legend

- 0-1' Excavation Depth
- 1-2' Excavation Depth
- 2-3' Excavation Depth
- 3-4' Excavation Depth
- Mean Higher High Water
- Mean Lower Low Water
- Parcel Boundary
- 1-foot Contour
- Low Marsh
- Mudflat
- Phragmites
- Upland

0 50 100 Feet

January 2019

Basemap Data Source: MassGIS

Vertical Datum: NAVD88

Note: Existing vegetative cover was surveyed by Nearview, LLC (October 2017).

Intertidal West Zone 1
Parcel 116-100
Existing Vegetation, Topography, and Excavation Areas
New Bedford Harbor Superfund Site

JACOBS

Figure 2-2b

Legend

- 0-1' Excavation Depth
- 1-2' Excavation Depth
- 2-3' Excavation Depth
- 3-4' Excavation Depth
- 4-5' Excavation Depth
- 5-6' Excavation Depth
- Mean Higher High Water
- Mean Lower Low Water
- Parcel Boundary
- 1-foot Contour
- Low Marsh
- Mudflat
- Phragmites
- Unvegetated Fill
- Upland
- Upland/Lawn

0 50 100 Feet

January 2019

Basemap Data Source: MassGIS

Vertical Datum: NAVD88

Note: Existing vegetative cover was surveyed by Nearview, LLC (October 2017).

Intertidal West Zone 1
Parcel 116-94
Existing Vegetation, Topography, and Excavation Areas
New Bedford Harbor Superfund Site

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Figure 2-2c

Legend

- 0-1' Excavation Depth
- 1-2' Excavation Depth
- Mean Higher High Water
- Mean Lower Low Water
- Parcel Boundary
- 1-foot Contour
- Aerovox Cap Zone 1
- Aerovox Cap Zone 3
- Low Marsh
- Mudflat
- Phragmites
- Upland

0 50 100 Feet

January 2019

Basemap Data Source: MassGIS

Vertical Datum: NAVD88

Note: Existing vegetative cover was surveyed by Nearview, LLC (October 2017).

Intertidal West Zone 1
Parcel 112-65
Existing Vegetation, Topography, and Excavation Areas
New Bedford Harbor Superfund Site

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Figure 2-2d

S-4038
WS101
S-3632
116-132
WS128
S-18
WS102
WS129
WS117
WS147
MA4
WS118
WS104
INT184
S-20
S-3633
WS105
INT185
WS149
116-86
WS106
WS119
WS135
MA9
WS107
WS123
WS130B
INT187
WS130
WS151
WS136
INT186
S-22
WS131
WS137
WS132
WS138
INT188
INT189
116-100
0
USGS, MassGIS

Legend

- PCB Characterization and Confirmatory Sample Location
- PCB Characterization Sample Location
- Proposed Limits of Excavation
- MHHW (1.99 ft)
- MLLW (-1.97 ft)
- Parcel Boundary

0 70 140 Feet

N

Basemap Data Source:
MassGIS, ESRI

March 2019

Intertidal West Zone 1
Parcels 116-132 and 116-86
Sampling Locations with Excavation Footprint
(0-1 ft Depth Interval)

New Bedford Harbor Superfund Site

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Figure 2-3a

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Legend

- PCB Characterization and Confirmatory Sample Location
- PCB Characterization Sample Location
- Proposed Limits of Excavation
- MHHW (1.99 ft)
- MLLW (-1.97 ft)
- Parcel Boundary

0 40 80 Feet

Basemap Data Source:
MassGIS, ESRI

March 2019

Intertidal West Zone 1
Parcel 116-100
Sampling Locations with Excavation Footprint
(0-1 ft Depth Interval)

New Bedford Harbor Superfund Site

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Figure 2-3b

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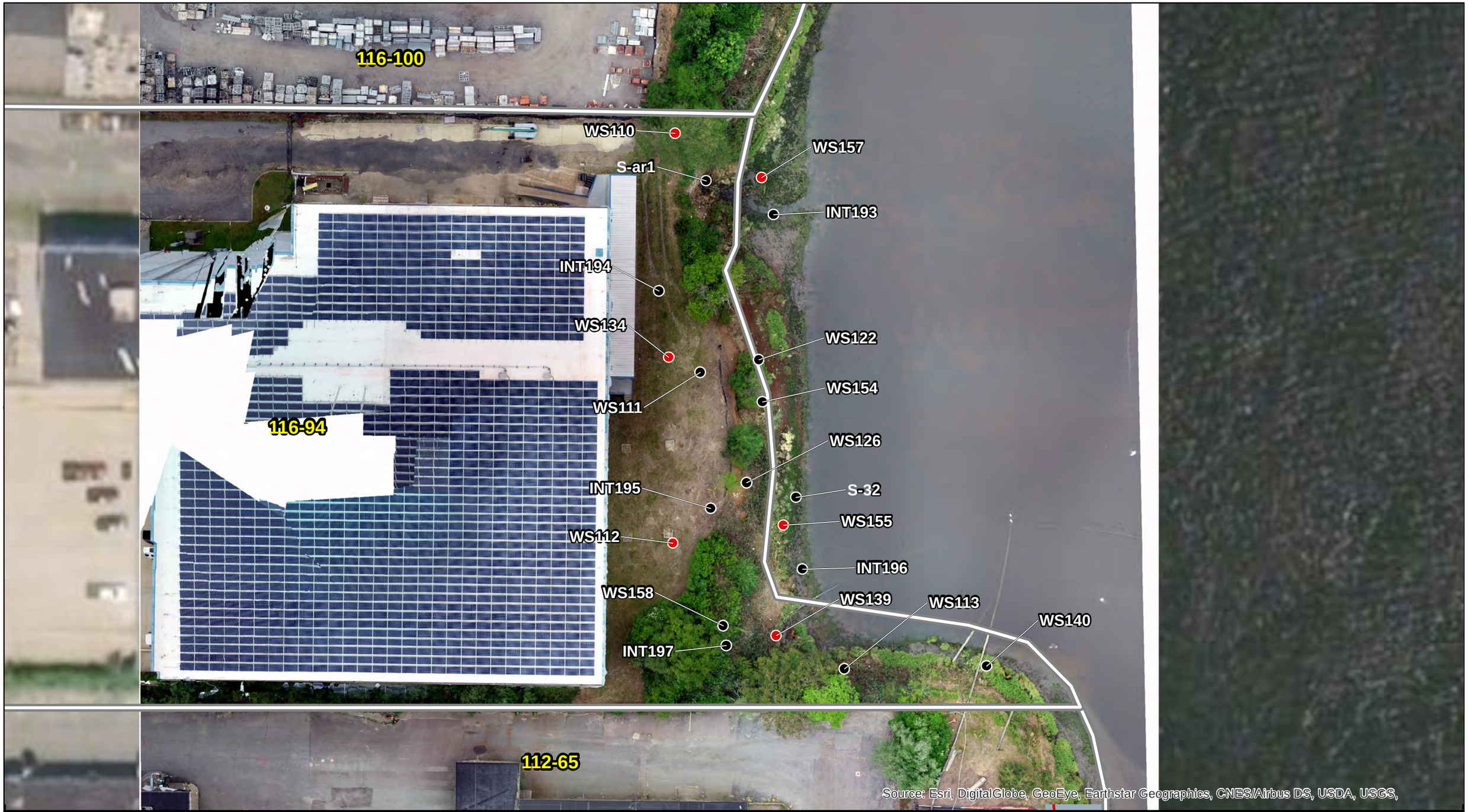

Legend

- PCB Characterization and Confirmatory Sample Location
- PCB Characterization Sample Location
- Proposed Limits of Excavation
- MHHW (1.99 ft)
- MLLW (-1.97 ft)
- Parcel Boundary

0 40 80 Feet

Basemap Data Source: MassGIS, ESRI

March 2019

Intertidal West Zone 1
Parcel 116-94
Sampling Locations with Excavation Footprint
(0-1 ft Depth Interval)

New Bedford Harbor Superfund Site

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Figure 2-3c

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Legend

- PCB Characterization and Confirmatory Sample Location
- PCB Characterization Sample Location
- Proposed Limits of Excavation
- MHHW (1.99 ft)
- MLLW (-1.97 ft)
- Parcel Boundary
- Aerovox Interim Cap Zone 1
- Aerovox Interim Cap Zone 3

0 40 80 Feet

Basemap Data Source:
MassGIS, ESRI

March 2019

Intertidal West Zone 1
Parcel 112-65
Sampling Locations with Excavation Footprint
(0-1 ft Depth Interval)

New Bedford Harbor Superfund Site

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Figure 2-3d

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Legend

- Existing Access
- Temporary Gravel Access Road
- Approximate Location of Electrical Conduit
- Proposed Limits of Excavation
- MHHW (1.99 ft)
- MLLW (-1.97 ft)
- Parcel Boundary
- Aerovox Interim Cap Zone 1
- Aerovox Interim Cap Zone 3

MHHW and MLLW Elevations NAVD88 FT - Green Seal (2018)

N

Site Aerial Photography Green Seal (2018)

0 50 100 Feet

1:1,200

JACOBS

Intertidal West Zone 1 Construction Site Plan

New Bedford Harbor Superfund Site

March 2019 | Figure 3-1

Path: C:\Users\scottna\Documents\NBH\35BG1001\20180901_Intertidal\WZ1\ArcGIS\WP_Figures\Fig 3-1 WZ1_WP_Construction_Site_Plan_20190326.mxd

Legend

- Inland Reach of Dredge
- Approximate Location of Electrical Conduit
- MHHW (1.99 ft)
- MLLW (-1.97 ft)
- Parcel Boundary

Feet of Sediment To Remove

- 6
- 5
- 4
- 3
- 2
- 1

2.1 Pre-Excavation Elevations NAVD88 ft. (Green Seal, June, 2018)

0 40 80 Feet

Pre-Excavation MHHW and MLLW Elevations NAVD88 ft. (Green Seal, June, 2018)

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Intertidal West Zone 1
Parcels 116-132 and 116-86
Excavation Plan
Showing Cut Depths and Pre-Excavation Elevations

New Bedford Harbor Superfund Site

September 2019 **Figure 3-2a**

Path: C:\Users\scottgat\Documents\NBH\35BG1001\20180901_IntertidalNWZ1\ArcGIS\WP_Figures\Fig 3-2a WZ1_WP_Parcels_116_132_and_116_86_Excavation_Plan_20190920.mxd

116-86

116-100

116-94

Legend

- Inland Reach of Dredge
- MHHW (1.99 ft)
- MLLW (-1.97 ft)
- Parcel Boundary

Feet of Sediment To Remove

- 4
- 3
- 2
- 1

2.1 Pre-Excavation Elevations NAVD88 ft. (Green Seal, June, 2018)

Pre-Excavation MHHW and MLLW Elevations NAVD88 ft. (Green Seal, June, 2018)

0 20 40 Feet

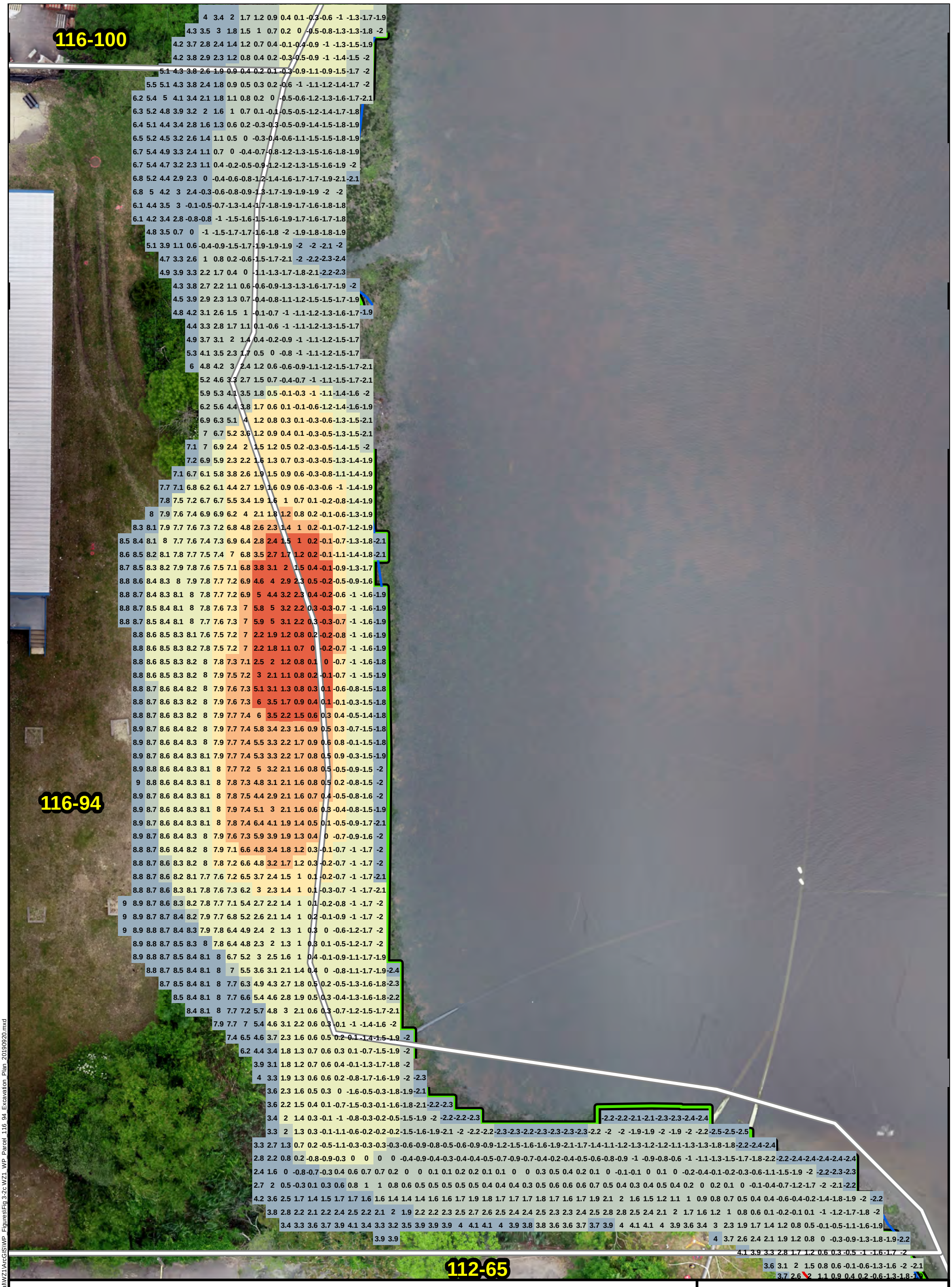
JACOBS™

Intertidal West Zone 1
Parcel 116-100
Excavation Plan
Showing Cut Depths and Pre-Excavation Elevations

New Bedford Harbor Superfund Site

September 2019 **Figure 3-2b**

Path: C:\Users\scottga\Documents\NBH35BG\00120180901_Intertidal\WZ1\ArcGIS\WP_Figures\Fig 3-2b WZ1_WP_Parcel_116_100_Excavation_Plan_20190920.mxd



Legend

- Inland Reach of Dredge
- MHHW (1.99 ft)
- MLLW (-1.97 ft)
- Parcel Boundary

Feet of Sediment To Remove

- 6
- 5
- 4
- 3
- 2
- 1

2.1 Pre-Excavation Elevations NAVD88 ft. (Green Seal, June, 2018)

0 20 40 Feet

Pre-Excavation MHHW and MLLW Elevations NAVD88 ft. (Green Seal, June, 2018)

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Intertidal West Zone 1
Parcel 116-94
Excavation Plan
Showing Cut Depths and Pre-Excavation Elevations

New Bedford Harbor Superfund Site

September 2019 **Figure 3-2c**

Path: C:\Users\scottga\Documents\NBH\35BG1001\20180901_IntertidalWZ1\ArcGIS\WP_Figures\Fig 3-2c WZ1_WP_Parcel_116_94_Excavation_Plan_20190920.mxd

Legend

- Inland Reach of Dredge
- Aerovox Interim Cap Zone 1
- Aerovox Interim Cap Zone 3
- MHHW (1.99 ft)
- MLLW (-1.97 ft)
- Parcel Boundary

Feet of Sediment To Remove

- 2
- 1

2.1 Pre-Excavation Elevations NAVD88 ft. (Green Seal, June, 2018)

0 20 40 Feet

Pre-Excavation MHHW and MLLW Elevations NAVD88 ft. (Green Seal, June, 2018)

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Intertidal West Zone 1
Parcel 112-65
Excavation Plan
Showing Cut Depths and
Pre-Excavation Elevations

New Bedford Harbor Superfund Site

September 2019 **Figure 3-2d**

Path: C:\Users\scottga\Documents\NBH35BG1001\20180901_Intertidal\WZ1\ArcGIS\WP_Figures\Fig 3-2d WZ1_WP_Parcel_112_65_Excavation_Plan_20190920.mxd

S-18
WS158
WS102
WS165
116-132
WS159
WS147
WS166
WS118
WS160
S-20
WS167
INT185
WS119
WS106
WS168
WS135
WS123
WS130
WS131
WS138
WS169
WS161
116-86
116-100

Legend

- Compliance Survey Location
- Proposed Limits of Excavation
- MHHW (1.99 ft)
- MLLW (-1.97 ft)
- Parcel Boundary

MHHW and MLLW Elevations NAVD88.
(Green Seal, 2018)

0 70 140 Feet

Basemap Data Source:
Green Seal (2018); MassGIS (2014)

May 2019

Intertidal West Zone 1
Parcels 116-132 and 116-86
Compliance Survey Locations with Excavation Footprint
(0-1 ft Depth Interval)

New Bedford Harbor Superfund Site

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Figure 3-3a

Path: C:\Users\scottga\Documents\NBH\35BG10012018090l_IntertidalWZ1\ArcGIS\WP_Figures\Fg 3-3a WZ1_WP_Parcels_116_32_and_116_86_Compliance_Sampling_Locations_with_Excavation_Footprint_20190529.mxd

Legend

- Compliance Survey Location
- Proposed Limits of Excavation
- MHHW (1.99 ft)
- MLLW (-1.97 ft)
- Parcel Boundary

MHHW and MLLW Elevations NAVD88.
(Green Seal, 2018)

0 40 80 Feet

Basemap Data Source:
Green Seal (2018); MassGIS (2014)

May 2019

Intertidal West Zone 1
Parcel 116-100
Compliance Survey Locations with Excavation Footprint
(0-1 ft Depth Interval)

New Bedford Harbor Superfund Site

JACOBS

Figure 3-3b

Path: C:\Users\scottga\Documents\NBH\35BG1001\20180901_IntertidalWZ1\ArcGIS\WP_Figures\Fig 3-3b WZ1_WP_Parcels_116_100_Compliance_Sampling_Locations_with_Excavation_Footprint_20190529.mxd

Legend

- Compliance Survey Location
- Proposed Limits of Excavation
- MHHW (1.99 ft)
- MLLW (-1.97 ft)
- Parcel Boundary

MHHW and MLLW Elevations NAVD88.
(Green Seal, 2018)

0 40 80 Feet

N

Basemap Data Source:
Green Seal (2018); MassGIS (2014)

May 2019

Intertidal West Zone 1
Parcel 116-94
Compliance Survey Locations with Excavation Footprint
(0-1 ft Depth Interval)

New Bedford Harbor Superfund Site

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Figure 3-3c

Path: C:\Users\scottgal\Documents\NBH\35BG10010\20180901_IntertidalWZ1\ArcGIS\WP_Figures\Fig 3-3c WZ1_WP_Parcels_116_94_Compliance_Sampling_Locations_with_Excavation_Footprint_20190529.mxd

116-94

112-65

112-88

WS175

WS163

WS141

WS164

WS176

WS143

Legend

- Compliance Survey Location
- Proposed Limits of Excavation
- MHHW (1.99 ft)
- MLLW (-1.97 ft)
- Parcel Boundary
- Aerovox Interim Cap Zone 1
- Aerovox Interim Cap Zone 3

MHHW and MLLW Elevations NAVD88.
(Green Seal, 2018)

0 40 80 Feet

Basemap Data Source:
Green Seal (2018); MassGIS (2014)

May 2019

Intertidal West Zone 1
Parcel 112-65
Compliance Survey Locations with Excavation Footprint
(0-1 ft Depth Interval)

New Bedford Harbor Superfund Site

JACOBS

Figure 3-3d

Path: C:\Users\scotta\Documents\NBH\35BG10012018090l_IntertidalWZ1\ArcGIS\WP_Figures\Fig 3-3d WZ1_WP_Parcels_112_65_Compliance_Sampling_Locations_with_Excavation_Footprint_20190529.mxd

Restoration Area Plantings

Area 1:
Iva frutescens (shrub), planted seaward edge of area, 1-gallon containers, 36" on-center spacing requirements.

Area 2:
Rosa virginiana (shrub), planted within upland area, 1-gallon containers, 36" on-center spacing requirements.

Area 3:
Juniperus virginiana (tree) planted within upland area, 1-gallon containers, 48" on-center spacing requirements.
Clethra alnifolia (shrub), mixed with Juniperus and within upland, 1-gallon containers, 48" on-center spacing requirements.

Area 4:
Clethra alnifolia (shrub) planted landward edge of area, 1-gallon containers, 48" on-center spacing requirements.
Myrica pensylvanica (shrub) planted landward edge of area, 1-gallon containers, 48" on-center spacing requirements.

Notes:

Proposed High Marsh plantings to include 50/50 mix of Spartina patens and Distichlis spicata, plugs, 12" on-center spacing requirements.

Proposed Low Marsh plantings to include Spartina alterniflora, plugs, 12" on-center spacing requirements.

Any native trees removed as part of access road construction or excavation will be replaced in-kind (1-gallon containers). Any invasive trees removed will be replaced on a one-to-one basis with native tree species constituting similar growth form, habit, and size (1-gallon containers).

Areas of proposed restoration surface shall be uniformly graded with a smooth finished surface and will transition back to match existing grades upon completion of construction. Slight differences between depicted and constructed surfaces may occur due to microtopographic variations across the site.

MHHW and MLLW lines are approximate.

Upland areas will be seeded with conservation seed mix as specified in the Generic Intertidal Work Plan.

Legend

- Proposed Coir Log
- 0-1' Excavation Depth
- 1-2' Excavation Depth
- 2-3' Excavation Depth
- 3-4' Excavation Depth
- 4-5' Excavation Depth
- 5-6' Excavation Depth
- Mean Lower Low Water
- Mean Higher High Water
- Parcel Boundary
- 1-foot Contour
- Proposed Shrub Restoration Area 1
- Proposed Shrub Restoration Area 2
- Proposed Shrub Restoration Area 3
- Proposed Shrub Restoration Area 4
- Mudflat / Subtidal (Minimal Backfill as Needed for Drainage or Slope Stability)
- High Marsh
- Low Marsh
- Unvegetated Fill
- Upland

0 50 100 Feet

January 2019

Basemap Data Source: MassGIS

Vertical Datum: NAVD88

Intertidal West Zone 1
Parcels 116-132/116-86
Proposed Wetland Cover Types
New Bedford Harbor Superfund Site

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Figure 7-1a

Restoration Area Plantings
Area 1:
Clethra alnifolia (shrub), within upland, 1-gallon containers, 48" on-center spacing requirements.

Notes:

Proposed High Marsh plantings to include 50/50 mix of Spartina patens and Distichlis spicata, plugs, 12" on-center spacing requirements.

Proposed Low Marsh plantings to include Spartina alterniflora, plugs, 12" on-center spacing requirements.

Any native trees removed as part of access road construction or excavation will be replaced in-kind (1-gallon containers). Any invasive trees removed will be replaced on a one-to-one basis with native tree species constituting similar growth form, habit, and size (1-gallon containers).

Areas of proposed restoration surface shall be uniformly graded with a smooth finished surface and will transition back to match existing grades upon completion of construction. Slight differences between depicted and constructed surfaces may occur due to microtopographic variations across the site.

MHHW and MLLW lines are approximate.

Upland areas will be seeded with conservation seed mix as specified in the Generic Intertidal Work Plan.

Legend

- Proposed Coir Log
- 0-1' Excavation Depth
- 1-2' Excavation Depth
- 2-3' Excavation Depth
- 3-4' Excavation Depth
- Mean Lower Low Water
- Mean Higher High Water
- Parcel Boundary
- 1-foot Contour
- Shrub Restoration Area
- Mudflat / Subtidal (Minimal Backfill as Needed for Drainage or Slope Stability)
- Proposed High Marsh
- Proposed Low Marsh
- Proposed Upland

0 50 100 Feet

January 2019

Basemap Data Source: MassGIS

Vertical Datum: NAVD88

Intertidal West Zone 1
Parcel 116-100
Proposed Wetland Cover Types
New Bedford Harbor Superfund Site

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Figure 7-1b

Restoration Area Plantings
Area 1:
Clethra alnifolia (shrub), planted along seaward edge, 1-gallon containers, 48" on-center spacing requirements.
Rosa virginiana (shrub), mixed with Clethra within upland, 1-gallon containers, 36" on-center spacing requirements.

Area 2:
Clethra alnifolia (shrub), planted along seaward edge, 1-gallon containers, 48" on-center spacing requirements.
Acer rubrum (tree), planted along landward edge, 1-gallon containers, 120" on-center spacing requirements.

Area 3:
Clethra alnifolia (shrub), planted along seaward edge, 1-gallon containers, 48" on-center spacing requirements.
Acer rubrum (tree), planted along landward edge, 1-gallon containers, 120" on-center spacing requirements.

Area 4:
Iva frutescens (shrub), planted seaward edge of area, 1- gallon containers, 36" on-center spacing requirements.

Notes:

- Proposed High Marsh plantings to include 50/50 mix of Spartina patens and Distichlis spicata, plugs, 12" on-center spacing requirements.
- Proposed Low Marsh plantings to include Spartina alterniflora, plugs, 12" on-center spacing requirements.
- Any native trees removed as part of access road construction or excavation will be replaced in-kind (1-gallon containers). Any invasive trees removed will be replaced on a one-to-one basis with native tree species constituting similar growth form, habit, and size (1-gallon containers).
- Areas of proposed restoration surface shall be uniformly graded with a smooth finished surface and will transition back to match existing grades upon completion of construction. Slight differences between depicted and constructed surfaces may occur due to microtopographic variations across the site.
- MHHW and MLLW lines are approximate.
- Upland areas will be seeded with conservation seed mix as specified in the Generic Intertidal Work Plan.

Legend

- 0-1' Excavation Depth
- 1-2' Excavation Depth
- 2-3' Excavation Depth
- 3-4' Excavation Depth
- 4-5' Excavation Depth
- 5-6' Excavation Depth
- Mean Lower Low Water
- Mean Higher High Water
- Parcel Boundary
- 1-foot Contour
- Proposed Coir Log
- Proposed Shrub Restoration Area 1
- Proposed Shrub Restoration Area 2
- Proposed Shrub Restoration Area 3
- Proposed Shrub Restoration Area 4
- Mudflat / Subtidal (Minimal Backfill as Needed for Drainage or Slope Stability)
- Proposed High Marsh
- Proposed Low Marsh
- Unvegetated Fill
- Proposed Upland/Lawn
- Proposed Upland

0 50 100 Feet

January 2019

Basemap Data Source: MassGIS

Vertical Datum: NAVD88

Intertidal West Zone 1
Parcel 116-94
Proposed Wetland Cover Types
New Bedford Harbor Superfund Site

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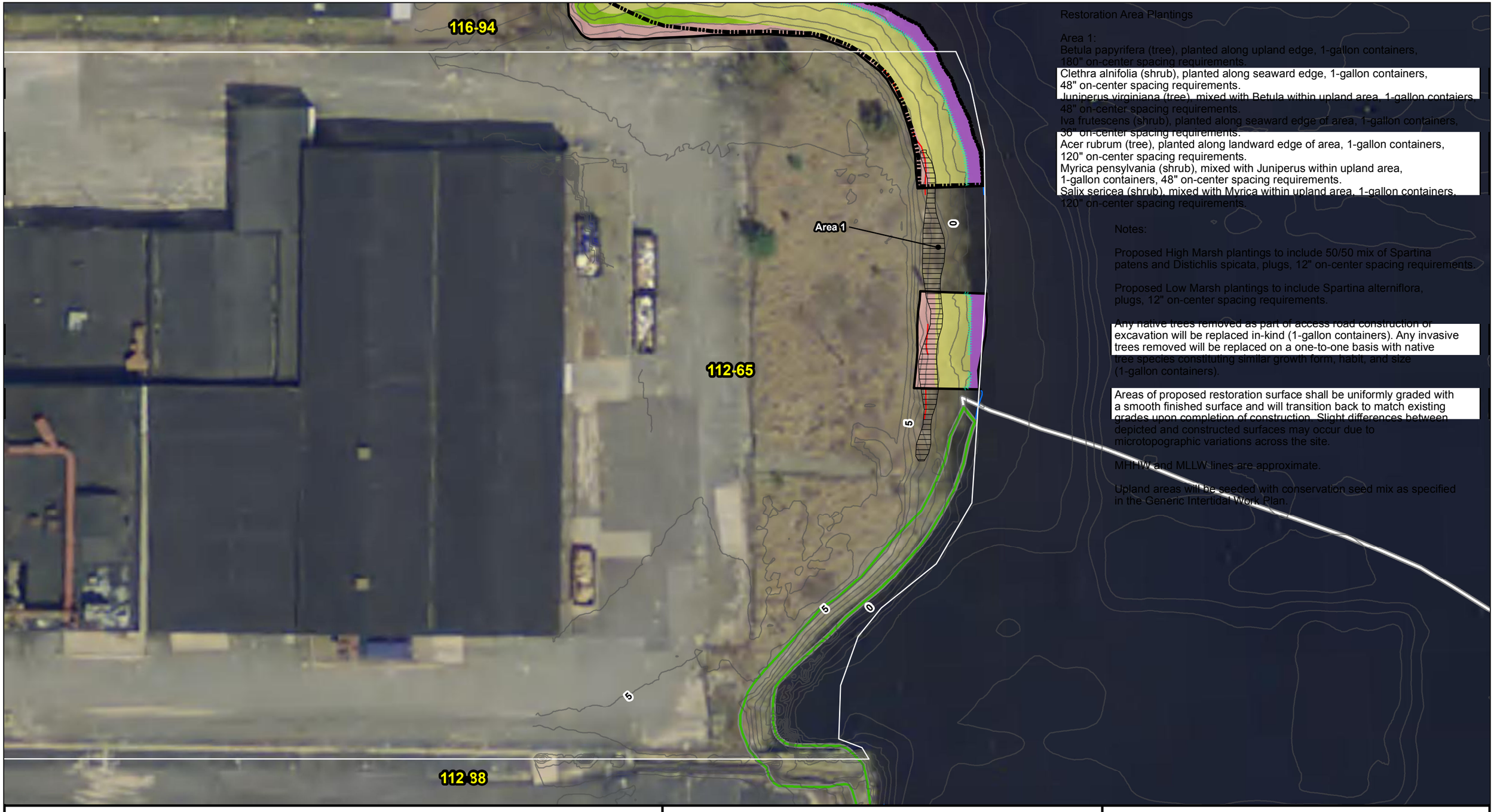
Figure 7-1c



Restoration Area Plantings

Area 1:
Betula papyrifera (tree), planted along upland edge, 1-gallon containers, 180" on-center spacing requirements.
Clethra alnifolia (shrub), planted along seaward edge, 1-gallon containers, 48" on-center spacing requirements.
Juniperus virginiana (tree), mixed with Betula within upland area, 1-gallon containers, 48" on-center spacing requirements.
Iva frutescens (shrub), planted along seaward edge of area, 1-gallon containers, 36" on-center spacing requirements.
Acer rubrum (tree), planted along landward edge of area, 1-gallon containers, 120" on-center spacing requirements.
Myrica pensylvania (shrub), mixed with Juniperus within upland area, 1-gallon containers, 48" on-center spacing requirements.
Salix sericea (shrub), mixed with Myrica within upland area, 1-gallon containers, 120" on-center spacing requirements.

Notes:

Proposed High Marsh plantings to include 50/50 mix of Spartina patens and Distichlis spicata, plugs, 12" on-center spacing requirements.

Proposed Low Marsh plantings to include Spartina alterniflora, plugs, 12" on-center spacing requirements.

Any native trees removed as part of access road construction or excavation will be replaced in-kind (1-gallon containers). Any invasive trees removed will be replaced on a one-to-one basis with native tree species constituting similar growth form, habit, and size (1-gallon containers).

Areas of proposed restoration surface shall be uniformly graded with a smooth finished surface and will transition back to match existing grades upon completion of construction. Slight differences between depicted and constructed surfaces may occur due to microtopographic variations across the site.

MHHW and MLLW lines are approximate.

Upland areas will be seeded with conservation seed mix as specified in the Generic Intertidal Work Plan.

Legend

- Proposed Coir Log
- 0-1' Excavation Depth
- 1-2' Excavation Depth
- Mean Higher High Water
- Mean Lower Low Water
- Parcel Boundary
- 1-foot Contour
- Shrub Restoration Area 1
- Aerovox Cap Zone 1
- Aerovox Cap Zone 3
- Mudflat / Subtidal (Minimal Backfill as Needed for Drainage or Slope Stability)
- Proposed High Marsh
- Proposed Low Marsh
- Proposed Upland

0 50 100 Feet

January 2019

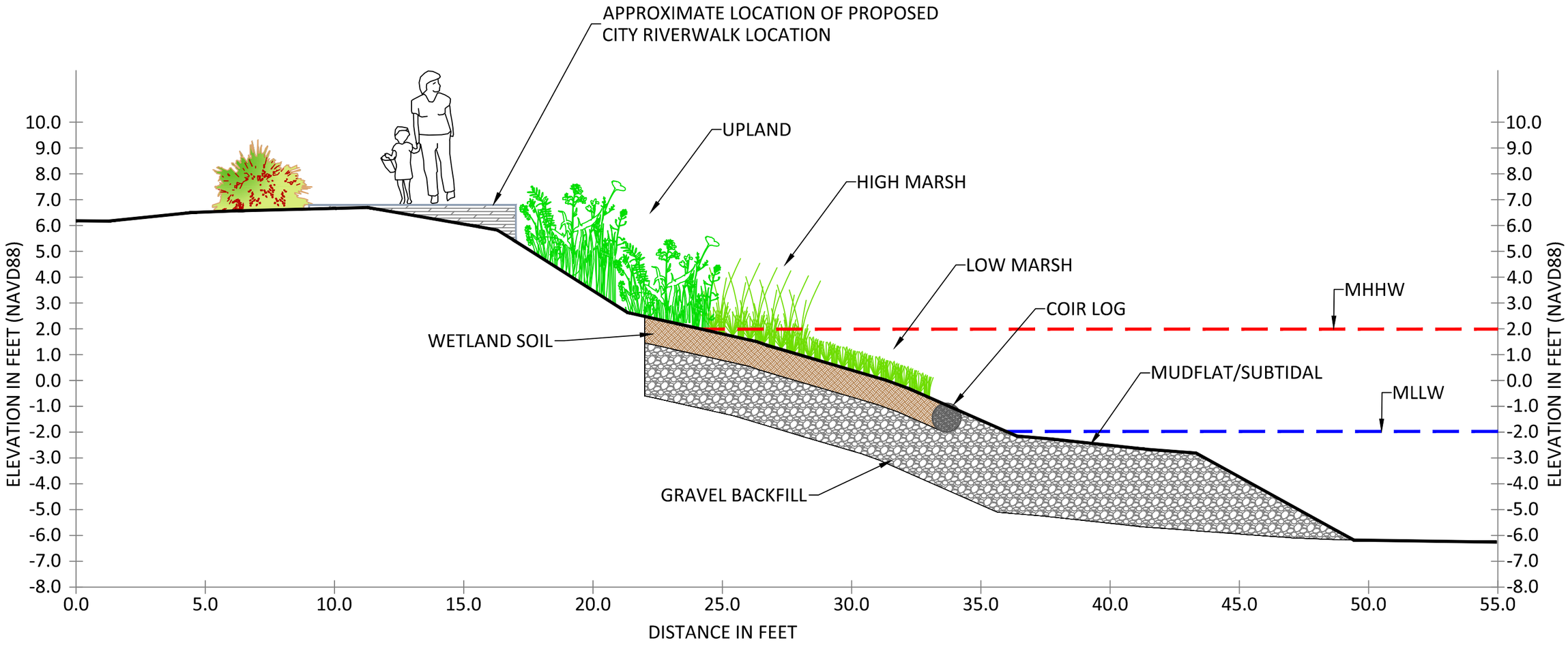
Basemap Data Source: MassGIS

Vertical Datum: NAVD88

Intertidal West Zone 1
Parcel 112-65
Proposed Wetland Cover Types
New Bedford Harbor Superfund Site

JACOBS

Figure 7-1d



0 4 feet

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West Zone 1
Conceptual Cross Section

New Bedford Harbor Superfund Site

May 2019 | Figure 7-2

Tables

Table 2-1a
West Zone 1 Pre-Excavation PCB Characterization Sample Results for Parcels 116-132 and 116-86

Parcel	Type	Sample ID	Station ID	Sample Depth Top (ft)	Sample Depth Bottom (ft)	Sample Date	Description	Total PCB (mg/kg)	Final Qualifier
116-132	Low Marsh	S-0018-1	S-18	0.0	1.0	9/7/1999	Total PCB Congeners (sum CONG x factor)	1.2	
116-132	Low Marsh	S-0018-2	S-18	1.0	2.0	9/7/1999	Total PCB Congeners (sum CONG x factor)	45.0	
116-132	Low Marsh	S-3632-.5-1.0	S-3632	0.5	1.0	8/21/2001	Total 18 NOAA PCB cong (excl non-detects)	2.2	
116-132	Low Marsh	S-3632-1.0-1.5	S-3632	1.0	1.5	8/21/2001	Total 18 NOAA PCB cong (excl non-detects)	13.5	
116-132	Low Marsh	S-3632-1.5-2.0	S-3632	1.5	2.0	8/21/2001	Total 18 NOAA PCB cong (excl non-detects)	7.0	
116-132	Low Marsh	S-3632-2.0-2.5	S-3632	2.0	2.5	8/21/2001	Total 18 NOAA PCB cong (excl non-detects)	1.8	
116-132	Upland	S-4038-0.0-1.0	S-4038	0.0	1.0	7/9/2002	Total 18 NOAA PCB cong (excl non-detects)	2.4	
116-132	Upland	S-4038-0.0-1.0REP	S-4038	0.0	1.0	7/9/2002	Total 18 NOAA PCB cong (excl non-detects)	1.8	
116-132	Upland	S-4038-1.0-2.0	S-4038	1.0	2.0	7/9/2002	Total 18 NOAA PCB cong (excl non-detects)	1.4	
116-132	Upland	S-4038-2.0-2.5	S-4038	2.0	2.5	7/9/2002	Total 18 NOAA PCB cong (excl non-detects)	1.1	
116-132	Upland	S-WS101-18FSP10-00-10	WS101	0.0	1.0	5/9/2018	Total 209 PCB cong (excl non-detects)	12.1	
116-132	Upland	S-WS101-18FSP10-10-20	WS101	1.0	2.0	5/9/2018	Aroclor 1254 - Immunoassay	6.9	J
116-132	Upland	S-WS102-18FSP10-00-10	WS102	0.0	1.0	5/9/2018	Total 209 PCB cong (excl non-detects)	35.9	
116-132	Upland	S-WS102-18FSP10-10-20	WS102	1.0	2.0	5/9/2018	Aroclor 1254 - Immunoassay	77.0	JD
116-132	Upland	S-WS102-18FSP10-20-30	WS102	2.0	3.0	8/8/2018	Total 209 PCB cong (excl non-detects)	8.2	
116-132	Low Marsh	S-WS128-18FSP10-00-10	WS128	0.0	1.0	8/24/2018	Total 209 PCB cong (excl non-detects)	608	
116-132	Low Marsh	S-WS128-18FSP10-10-20	WS128	1.0	2.0	8/24/2018	Aroclor 1254 - Immunoassay	90.0	JD
116-86	Upland	S-15L-INT184-00-10	INT184	0.0	1.0	7/7/2015	Aroclor 1254 - Immunoassay	534	D
116-86	Upland	S-15L-INT184-10-20	INT184	1.0	2.0	7/7/2015	Aroclor 1254 - Immunoassay	44.3	D
116-86	Upland	S-15L-INT184-20-24	INT184	2.0	2.4	7/7/2015	Aroclor 1254 - Immunoassay	8.2	
116-86	Upland	S-15L-INT185-00-10	INT185	0.0	1.0	7/7/2015	Total 139 PCB cong (excl non-detects)	5.6	
116-86	Upland	S-15L-INT185-10-17	INT185	1.0	1.8	7/7/2015	Aroclor 1254 - Immunoassay	9.1	
116-86	Upland	S-15L-INT186-00-10	INT186	0.0	1.0	7/7/2015	Aroclor 1254 - Immunoassay	118	D
116-86	Upland	S-15L-INT186-10-20	INT186	1.0	2.0	7/7/2015	Total 139 PCB cong (excl non-detects)	13.0	
116-86	Upland	S-15L-INT186-20-30	INT186	2.0	3.0	7/7/2015	Aroclor 1254 - Immunoassay	692	D
116-86	Low Marsh	S-15L-INT187-00-10	INT187	0.0	1.0	7/7/2015	Aroclor 1254 - Immunoassay	0.90	
116-86	Low Marsh	S-15L-INT187-10-20	INT187	1.0	2.0	7/7/2015	Aroclor 1254 - Immunoassay	120	D
116-86	Low Marsh	S-15L-INT187-20-30	INT187	2.0	3.0	7/7/2015	Total 139 PCB cong (excl non-detects)	56.0	
116-86	Upland	S-15L-INT188-00-10	INT188	0.0	1.0	7/7/2015	Aroclor 1254 - Immunoassay	0.60	
116-86	Upland	S-15L-INT188-10-20	INT188	1.0	2.0	7/7/2015	Aroclor 1254 - Immunoassay	1.1	
116-86	Upland	S-15L-INT189-00-10	INT189	0.0	1.0	7/7/2015	Aroclor 1254 - Immunoassay	2.2	
116-86	Upland	S-15L-INT189-10-20	INT189	1.0	2.0	7/7/2015	Aroclor 1254 - Immunoassay	4.7	
116-86	Low Marsh	S-10O-C039-0-0.5	MA4	0.0	0.5	10/21/2010	Total 18 NOAA PCB cong (excl non-detects)	36.4	
116-86	Low Marsh	S-10O-C043-0-0.5	MA9	0.0	0.5	10/21/2010	Total 18 NOAA PCB cong (excl non-detects)	572	
116-86	Low Marsh	S-0020-1	S-20	0.0	1.0	9/7/1999	Total PCB Congeners (sum CONG x factor)	1700	
116-86	Low Marsh	S-0020-2	S-20	1.0	2.0	9/7/1999	Total PCB Congeners (sum CONG x factor)	4.0	
116-86	Low Marsh	S-0020-3	S-20	2.0	3.0	9/7/1999	Total PCB Congeners (sum CONG x factor)	12.0	
116-86	Low Marsh	S-0022-1	S-22	0.0	1.0	9/8/1999	Total PCB Congeners (sum CONG x factor)	300	
116-86	Low Marsh	S-0022-2	S-22	1.0	2.0	9/8/1999	Total PCB Congeners (sum CONG x factor)	6.0	
116-86	Low Marsh	S-3633-.3-.8	S-3633	0.3	0.8	8/22/2001	Total 18 NOAA PCB cong (excl non-detects)	133	

Table 2-1a
West Zone 1 Pre-Excavation PCB Characterization Sample Results for Parcels 116-132 and 116-86

Parcel	Type	Sample ID	Station ID	Sample Depth Top (ft)	Sample Depth Bottom (ft)	Sample Date	Description	Total PCB (mg/kg)	Final Qualifier
116-86	Low Marsh	S-3633-.8-1.3	S-3633	0.8	1.3	8/21/2001	Total 18 NOAA PCB cong (excl non-detects)	187	
116-86	Upland	S-WS104-18FSP10-00-09	WS104	0.0	0.9	5/9/2018	Total 209 PCB cong (excl non-detects)	0.73	
116-86	Upland	S-WS105-18FSP10-00-10	WS105	0.0	1.0	5/4/2018	Total 209 PCB cong (excl non-detects)	0.94	
116-86	Upland	S-WS105-18FSP10-10-20	WS105	1.0	2.0	5/4/2018	Aroclor 1254 - Immunoassay	6.2	J
116-86	Upland	S-WS106-18FSP10-00-10	WS106	0.0	1.0	4/30/2018	Total 209 PCB cong (excl non-detects)	0.66	
116-86	Upland	S-WS106-18FSP10-10-20	WS106	1.0	2.0	4/30/2018	Aroclor 1254 - Immunoassay	3.7	J
116-86	Upland	S-WS107-18FSP10-00-10	WS107	0.0	1.0	4/30/2018	Total 209 PCB cong (excl non-detects)	2.7	
116-86	Upland	S-WS107-18FSP10-10-20	WS107	1.0	2.0	4/30/2018	Aroclor 1254 - Immunoassay	3400	JD
116-86	Upland	S-WS107-18FSP10-20-30	WS107	2.0	3.0	4/30/2018	Total 209 PCB cong (excl non-detects)	133	
116-86	Mudflat	S-WS117-18FSP10-00-10	WS117	0.0	1.0	5/4/2018	Aroclor 1254 - Immunoassay	2.0	JB
116-86	Mudflat	S-WS117-18FSP10-10-20	WS117	1.0	2.0	5/4/2018	Aroclor 1254 - Immunoassay	140	JD
116-86	Mudflat	S-WS117-18FSP10-20-29	WS117	2.0	2.9	5/4/2018	Aroclor 1254 - Immunoassay	120	J
116-86	Low Marsh	S-WS118-18FSP10-00-10	WS118	0.0	1.0	5/4/2018	Aroclor 1254 - Immunoassay	56.0	JD
116-86	Low Marsh	S-WS118-18FSP10-10-20	WS118	1.0	2.0	5/4/2018	Aroclor 1254 - Immunoassay	260	JD
116-86	Low Marsh	S-WS118-18FSP10-20-30	WS118	2.0	3.0	5/4/2018	Total 209 PCB cong (excl non-detects)	22.2	
116-86	Low Marsh	S-WS119-18FSP10-00-10	WS119	0.0	1.0	5/4/2018	Aroclor 1254 - Immunoassay	5.2	JD
116-86	Low Marsh	S-WS119-18FSP10-10-20	WS119	1.0	2.0	5/4/2018	Aroclor 1254 - Immunoassay	240	JD
116-86	Low Marsh	S-WS119-18FSP10-20-30	WS119	2.0	3.0	5/4/2018	Aroclor 1254 - Immunoassay	19.0	JD
116-86	Low Marsh	S-WS119-18FSP10-30-40	WS119	3.0	4.0	5/4/2018	Aroclor 1254 - Immunoassay	320	JD
116-86	Low Marsh	S-WS119-18FSP10-40-50	WS119	4.0	5.0	9/18/2018	Aroclor 1254 - Immunoassay	99.0	JD
116-86	Low Marsh	S-WS119-18FSP10-50-58	WS119	5.0	5.8	9/18/2018	Total 209 PCB cong (excl non-detects)	62.3	
116-86	Upland	S-WS123-18FSP10-00-10	WS123	0.0	1.0	4/30/2018	Aroclor 1254 - Immunoassay	56.0	JD
116-86	Upland	S-WS123-18FSP10-10-20	WS123	1.0	2.0	4/30/2018	Aroclor 1254 - Immunoassay	17.0	JD
116-86	Upland	S-WS123-18FSP10-20-30	WS123	2.0	3.0	4/30/2018	Aroclor 1254 - Immunoassay	23.0	JD
116-86	Upland	S-WS123-18FSP10-30-40	WS123	3.0	4.0	4/30/2018	Aroclor 1254 - Immunoassay	17.0	JD
116-86	Upland	S-WS123-18FSP10-40-50	WS123	4.0	5.0	4/30/2018	Aroclor 1254 - Immunoassay	4.1	J
116-86	Upland	S-WS129-18FSP10-00-10	WS129	0.0	1.0	8/1/2018	Total 209 PCB cong (excl non-detects)	1.6	
116-86	Upland	S-WS129-18FSP10-10-12	WS129	1.0	1.2	8/1/2018	Aroclor 1254 - Immunoassay	1.8	JD
116-86	Upland	S-WS130-18FSP10-00-10	WS130	0.0	1.0	7/31/2018	Total 209 PCB cong (excl non-detects)	0.15	
116-86	Upland	S-WS130-18FSP10-10-20	WS130	1.0	2.0	7/31/2018	Aroclor 1254 - Immunoassay	8.8	J
116-86	Upland	S-WS130-18FSP10-20-23	WS130	2.0	2.3	7/31/2018	Aroclor 1254 - Immunoassay	13.0	JD
116-86	Upland	S-WS130B-18FSP10-00-10	WS130	0.0	1.0	8/3/2018	Total 209 PCB cong (excl non-detects)	0.42	
116-86	Upland	S-WS130B-18FSP10-10-20	WS130	1.0	2.0	8/3/2018	Aroclor 1254 - Immunoassay	7.0	J
116-86	Upland	S-WS130B-18FSP10-20-25	WS130	2.0	2.5	8/3/2018	Aroclor 1254 - Immunoassay	6.0	JD
116-86	Upland	S-WS131-18FSP10-00-10	WS131	0.0	1.0	8/15/2018	Total 209 PCB cong (excl non-detects)	3.7	
116-86	Upland	S-WS131-18FSP10-10-13	WS131	1.0	1.3	8/15/2018	Aroclor 1254 - Immunoassay	15.0	JD
116-86	Upland	S-WS132-18FSP10-00-10	WS132	0.0	1.0	8/8/2018	Total 209 PCB cong (excl non-detects)	2.5	
116-86	Upland	S-WS132-18FSP10-10-19	WS132	1.0	1.9	8/8/2018	Aroclor 1254 - Immunoassay	9.1	J
116-86	Upland	S-WS135-18FSP10-00-10	WS135	0.0	1.0	8/3/2018	Total 209 PCB cong (excl non-detects)	2.1	
116-86	Upland	S-WS135-18FSP10-10-20	WS135	1.0	2.0	8/3/2018	Aroclor 1254 - Immunoassay	8.1	J

Table 2-1a
West Zone 1 Pre-Excavation PCB Characterization Sample Results for Parcels 116-132 and 116-86

Parcel	Type	Sample ID	Station ID	Sample Depth Top (ft)	Sample Depth Bottom (ft)	Sample Date	Description	Total PCB (mg/kg)	Final Qualifier
116-86	Upland	S-WS136-18FSP10-00-10	WS136	0.0	1.0	8/1/2018	Total 209 PCB cong (excl non-detects)	7.1	
116-86	Upland	S-WS136-18FSP10-10-20	WS136	1.0	2.0	8/1/2018	Aroclor 1254 - Immunoassay	4.0	JD
116-86	Upland	S-WS136-18FSP10-20-29	WS136	2.0	2.9	8/1/2018	Aroclor 1254 - Immunoassay	100	JD
116-86	Low Marsh	S-WS137-18FSP10-10-20	WS137	1.0	2.0	8/6/2018	Aroclor 1254 - Immunoassay	2.4	JD
116-86	Low Marsh	S-WS137-18FSP10-20-24	WS137	2.0	2.4	8/6/2018	Aroclor 1254 - Immunoassay	2.4	J
116-86	Low Marsh	S-WS138-18FSP10-10-20	WS138	1.0	2.0	8/6/2018	Total 209 PCB cong (excl non-detects)	125	
116-86	Low Marsh	S-WS138-18FSP10-20-30	WS138	2.0	3.0	8/6/2018	Total 209 PCB cong (excl non-detects)	85.5	
116-86	Low Marsh	S-WS138-18FSP10-30-40	WS138	3.0	4.0	8/6/2018	Total 209 PCB cong (excl non-detects)	35.9	
116-86	Low Marsh	S-WS147-18FSP10-30-40	WS147	3.0	4.0	8/8/2018	Total 209 PCB cong (excl non-detects)	71.4	
116-86	Low Marsh	S-WS147-18FSP10-40-49	WS147	4.0	4.9	8/8/2018	Total 209 PCB cong (excl non-detects)	15.5	
116-86	Low Marsh	S-WS149-18FSP10-30-40	WS149	3.0	4.0	8/8/2018	Aroclor 1254 - Immunoassay	17.0	JD
116-86	Low Marsh	S-WS149-18FSP10-40-50	WS149	4.0	5.0	8/8/2018	Aroclor 1254 - Immunoassay	8.7	J
116-86	Low Marsh	S-WS151-18FSP10-30-40	WS151	3.0	4.0	9/4/2018	Total 209 PCB cong (excl non-detects)	68.4	
116-86	Low Marsh	S-WS151-18FSP10-40-50	WS151	4.0	5.0	9/4/2018	Total 209 PCB cong (excl non-detects)	555	

Notes:
Pre-excavation confirmatory congener samples are shaded green.
D - reported value is from a dilution; U - not detected; J - estimated value.
Total 18 NOAA PCB congeners multiplied by a factor of 2.6.

Table 2-1b
West Zone 1 Pre-Excavation PCB Characterization Sample Results for Parcel 116-100

Parcel	Type	Sample ID	Station ID	Sample Depth Top (ft)	Sample Depth Bottom (ft)	Sample Date	Description	Total PCB (mg/kg)	Final Qualifier
116-100	Upland	S-15L-INT190-00-10-REP	INT190	0.0	1.0	7/7/2015	Aroclor 1254 - Immunoassay	2.0	
116-100	Upland	S-15L-INT190-00-10	INT190	0.0	1.0	7/7/2015	Aroclor 1254 - Immunoassay	1.2	
116-100	Upland	S-15L-INT190-10-20	INT190	1.0	2.0	7/7/2015	Aroclor 1254 - Immunoassay	2.3	
116-100	Upland	S-15L-INT190-10-20-REP	INT190	1.0	2.0	7/7/2015	Aroclor 1254 - Immunoassay	1.6	
116-100	Low Marsh	S-15L-INT191-00-10	INT191	0.0	1.0	7/7/2015	Aroclor 1254 - Immunoassay	691	D
116-100	Low Marsh	S-15L-INT191-10-20	INT191	1.0	2.0	7/7/2015	Aroclor 1254 - Immunoassay	1499	D
116-100	Low Marsh	S-15L-INT191-20-30	INT191	2.0	3.0	7/7/2015	Aroclor 1254 - Immunoassay	192	D
116-100	Low Marsh	S-15L-INT191-30-38	INT191	3.0	3.8	7/7/2015	Total 139 PCB cong (excl non-detects)	63.0	
116-100	Mudflat	S-15G-INT192-00-10	INT192	0.0	1.0	8/4/2015	Aroclor 1254 - Immunoassay	298	D
116-100	Mudflat	S-15G-INT192-10-20	INT192	1.0	2.0	8/4/2015	Aroclor 1254 - Immunoassay	0.50	U
116-100	Upland	S-WS108-18FSP10-00-10	WS108	0.0	1.0	5/9/2018	Total 209 PCB cong (excl non-detects)	1.9	
116-100	Upland	S-WS108-18FSP10-10-20	WS108	1.0	2.0	5/9/2018	Aroclor 1254 - Immunoassay	6.1	J
116-100	Upland	S-WS109-18FSP10-00-10	WS109	0.0	1.0	5/4/2018	Total 209 PCB cong (excl non-detects)	1.3	
116-100	Upland	S-WS109-18FSP10-10-20	WS109	1.0	2.0	5/4/2018	Aroclor 1254 - Immunoassay	4.3	J
116-100	Low Marsh	S-WS120-18FSP10-00-10	WS120	0.0	1.0	4/30/2018	Aroclor 1254 - Immunoassay	19.0	JD
116-100	Low Marsh	S-WS120-18FSP10-10-20	WS120	1.0	2.0	4/30/2018	Aroclor 1254 - Immunoassay	33.0	JD
116-100	Low Marsh	S-WS120-18FSP10-20-30	WS120	2.0	3.0	4/30/2018	Aroclor 1254 - Immunoassay	140	J
116-100	Low Marsh	S-WS121R-18FSP10-00-10-REP	WS121	0.0	1.0	5/9/2018	Aroclor 1254 - Immunoassay	410	JD
116-100	Low Marsh	S-WS121-18FSP10-00-10	WS121	0.0	1.0	5/9/2018	Aroclor 1254 - Immunoassay	350	JD
116-100	Low Marsh	S-WS121-18FSP10-10-20	WS121	1.0	2.0	5/9/2018	Aroclor 1254 - Immunoassay	93.0	JD
116-100	Low Marsh	S-WS121R-18FSP10-10-20-REP	WS121	1.0	2.0	5/9/2018	Aroclor 1254 - Immunoassay	93.0	JD
116-100	Low Marsh	S-WS121-18FSP10-20-30	WS121	2.0	3.0	5/9/2018	Total 209 PCB cong (excl non-detects)	102	
116-100	Low Marsh	S-WS121-18FSP10-30-40	WS121	3.0	4.0	9/18/2018	Total 209 PCB cong (excl non-detects)	4.82	
116-100	Low Marsh	S-WS124-18FSP10-00-10	WS124	0.0	1.0	5/4/2018	Aroclor 1254 - Immunoassay	8.2	J
116-100	Low Marsh	S-WS124-18FSP10-10-20	WS124	1.0	2.0	5/4/2018	Aroclor 1254 - Immunoassay	49.0	JD
116-100	Low Marsh	S-WS124-18FSP10-20-30	WS124	2.0	3.0	5/4/2018	Aroclor 1254 - Immunoassay	270	JD
116-100	Low Marsh	S-WS124-18FSP10-30-40	WS124	3.0	4.0	5/4/2018	Total 209 PCB cong (excl non-detects)	93.4	
116-100	Upland	S-WS125-18FSP10-00-10	WS125	0.0	1.0	5/9/2018	Aroclor 1254 - Immunoassay	270	JD
116-100	Upland	S-WS125-18FSP10-10-20	WS125	1.0	2.0	5/9/2018	Total 209 PCB cong (excl non-detects)	366	
116-100	Upland	S-WS125-18FSP10-20-30	WS125	2.0	3.0	5/9/2018	Total 209 PCB cong (excl non-detects)	158	
116-100	Upland	S-WS125-18FSP10-30-40	WS125	3.0	4.0	5/9/2018	Aroclor 1254 - Immunoassay	15.0	JD
116-100	Upland	S-WS127-18FSP10-00-10	WS127	0.0	1.0	5/9/2018	Aroclor 1254 - Immunoassay	8.4	J
116-100	Upland	S-WS127-18FSP10-10-20	WS127	1.0	2.0	5/9/2018	Aroclor 1254 - Immunoassay	4.7	J
116-100	Upland	S-WS127-18FSP10-20-30	WS127	2.0	3.0	5/9/2018	Aroclor 1254 - Immunoassay	2.3	J
116-100	Upland	S-WS127-18FSP10-30-38	WS127	3.0	3.8	5/9/2018	Aroclor 1254 - Immunoassay	2.6	J
116-100	Upland	S-WS133-18FSP10-00-10	WS133	0.0	1.0	8/14/2018	Total 209 PCB cong (excl non-detects)	3.5	
116-100	Upland	S-WS133-18FSP10-10-20	WS133	1.0	2.0	8/14/2018	Aroclor 1254 - Immunoassay	17.0	JD
116-100	Low Marsh	S-WS152-18FSP10-30-40	WS152	3.0	4.0	8/9/2018	Total 209 PCB cong (excl non-detects)	172	
116-100	Low Marsh	S-WS152-18FSP10-40-50	WS152	4.0	5.0	8/9/2018	Total 209 PCB cong (excl non-detects)	12.8	
116-100	Upland	S-WS153-18FSP10-40-50	WS153	4.0	5.0	8/14/2018	Total 209 PCB cong (excl non-detects)	17.7	

Table 2-1b
West Zone 1 Pre-Excavation PCB Characterization Sample Results for Parcel 116-100

Parcel	Type	Sample ID	Station ID	Sample Depth Top (ft)	Sample Depth Bottom (ft)	Sample Date	Description	Total PCB (mg/kg)	Final Qualifier
116-100	Upland	S-WS156-18FSP10-00-10	WS156	0.0	1.0	8/14/2018	Total 209 PCB cong (excl non-detects)	3.8	
116-100	Upland	S-WS156-18FSP10-10-20	WS156	1.0	2.0	8/14/2018	Total 209 PCB cong (excl non-detects)	26.8	
116-100	Upland	S-WS156-18FSP10-20-30	WS156	2.0	3.0	8/14/2018	Aroclor 1254 - Immunoassay	6.0	J

Notes:
Pre-excavation confirmatory congener samples are shaded green.
D - reported value is from a dilution; U - not detected; J - estimated value.
Total 18 NOAA PCB congeners multiplied by a factor of 2.6.

Table 2-1c
West Zone 1 Pre-Excavation PCB Characterization Sample Results for Parcel 116-94

Parcel	Type	Sample ID	Station ID	Sample Depth Top (ft)	Sample Depth Bottom (ft)	Sample Date	Description	Total PCB (mg/kg)	Final Qualifier
116-94	Mudflat	S-15G-INT193-00-10	INT193	0.0	1.0	8/4/2015	Total 139 PCB cong (excl non-detects)	2300	
116-94	Mudflat	S-15G-INT193-10-12	INT193	1.0	1.2	8/4/2015	Aroclor 1254 - Immunoassay	1426	D
116-94	Mudflat	S-15G-INT193-12-22	INT193	1.2	2.2	8/4/2015	Aroclor 1254 - Immunoassay	1.3	
116-94	Upland	S-15L-INT194-00-10	INT194	0.0	1.0	7/15/2015	Aroclor 1254 - Immunoassay	1.4	
116-94	Upland	S-15L-INT194-10-21	INT194	1.0	2.1	7/15/2015	Aroclor 1254 - Immunoassay	4.9	
116-94	Upland	S-15L-INT195-00-10	INT195	0.0	1.0	7/15/2015	Aroclor 1254 - Immunoassay	662	D
116-94	Upland	S-15L-INT195-10-20	INT195	1.0	2.0	7/15/2015	Aroclor 1254 - Immunoassay	1637	D
116-94	Upland	S-15L-INT195-20-30	INT195	2.0	3.0	7/15/2015	Aroclor 1254 - Immunoassay	1174	D
116-94	Mudflat	S-15G-INT196-00-10	INT196	0.0	1.0	8/4/2015	Aroclor 1254 - Immunoassay	65.2	D
116-94	Mudflat	S-15G-INT196-10-20	INT196	1.0	2.0	8/4/2015	Aroclor 1254 - Immunoassay	1.0	
116-94	Upland	S-15G-INT197-00-10	INT197	0.0	1.0	8/5/2015	Aroclor 1254 - Immunoassay	5.3	D
116-94	Upland	S-15G-INT197-10-20	INT197	1.0	2.0	8/5/2015	Aroclor 1254 - Immunoassay	2.0	
116-94	Mudflat	S-0032-1	S-32	0.0	1.0	9/9/1999	Total PCB Congeners (sum CONG x factor)	720	
116-94	Mudflat	S-0032-2	S-32	1.0	2.0	9/9/1999	Total PCB Congeners (sum CONG x factor)	650	
116-94	Low Marsh	S-ar1	S-ar1	0.0	1.0	pre-ROD	Total PCB Congeners (sum CONG x factor)[1]	200	
116-94	Upland	S-WS110-18FSP10-00-10	WS110	0.0	1.0	5/4/2018	Total 209 PCB cong (excl non-detects)	0.54	
116-94	Upland	S-WS110-18FSP10-10-20	WS110	1.0	2.0	5/4/2018	Aroclor 1254 - Immunoassay	2.1	B
116-94	Upland	S-WS111-18FSP10-00-10	WS111	0.0	1.0	5/9/2018	Total 209 PCB cong (excl non-detects)	9.2	
116-94	Upland	S-WS111-18FSP10-10-20	WS111	1.0	2.0	5/9/2018	Total 209 PCB cong (excl non-detects)	179	
116-94	Upland	S-WS111-18FSP10-20-30	WS111	2.0	3.0	5/9/2018	Total 209 PCB cong (excl non-detects)	134	
116-94	Upland	S-WS112-18FSP10-00-10	WS112	0.0	1.0	5/9/2018	Total 209 PCB cong (excl non-detects)	0.56	
116-94	Low Marsh	S-WS113-18FSP10-00-10	WS113	0.0	1.0	5/9/2018	Aroclor 1254 - Immunoassay	140	JD
116-94	Low Marsh	S-WS113R-18FSP10-00-10-REP	WS113	0.0	1.0	5/9/2018	Aroclor 1254 - Immunoassay	68.0	JD
116-94	Low Marsh	S-WS113R-18FSP10-10-20-REP	WS113	1.0	2.0	5/9/2018	Total 209 PCB cong (excl non-detects)	215	
116-94	Low Marsh	S-WS113-18FSP10-10-20	WS113	1.0	2.0	5/9/2018	Aroclor 1254 - Immunoassay	8.6	J
116-94	Low Marsh	S-WS113R-18FSP10-20-30-REP	WS113	2.0	3.0	5/9/2018	Aroclor 1254 - Immunoassay	21.0	JD
116-94	Low Marsh	S-WS113-18FSP10-20-30	WS113	2.0	3.0	5/9/2018	Aroclor 1254 - Immunoassay	8.6	J
116-94	Low Marsh	S-WS113R-18FSP10-30-40-REP	WS113	3.0	4.0	5/9/2018	Aroclor 1254 - Immunoassay	18.0	JD
116-94	Low Marsh	S-WS113-18FSP10-30-40	WS113	3.0	4.0	5/9/2018	Aroclor 1254 - Immunoassay	8.6	J
116-94	Low Marsh	S-WS122-18FSP10-00-10	WS122	0.0	1.0	5/9/2018	Aroclor 1254 - Immunoassay	74.0	JD
116-94	Low Marsh	S-WS122-18FSP10-10-20	WS122	1.0	2.0	5/9/2018	Total 209 PCB cong (excl non-detects)	292	
116-94	Low Marsh	S-WS122-18FSP10-20-30	WS122	2.0	3.0	5/9/2018	Aroclor 1254 - Immunoassay	7.4	J
116-94	Low Marsh	S-WS122-18FSP10-30-40	WS122	3.0	4.0	5/9/2018	Total 209 PCB cong (excl non-detects)	295	
116-94	Upland	S-WS126-18FSP10-00-10	WS126	0.0	1.0	5/9/2018	Aroclor 1254 - Immunoassay	36.0	JD
116-94	Upland	S-WS126-18FSP10-10-20	WS126	1.0	2.0	5/9/2018	Aroclor 1254 - Immunoassay	180	JD
116-94	Upland	S-WS126-18FSP10-20-30	WS126	2.0	3.0	5/9/2018	Aroclor 1254 - Immunoassay	98.0	JD
116-94	Upland	S-WS126-18FSP10-30-40	WS126	3.0	4.0	5/9/2018	Aroclor 1254 - Immunoassay	140	JD
116-94	Upland	S-WS126-18FSP10-40-50	WS126	4.0	5.0	5/9/2018	Aroclor 1254 - Immunoassay	150	JD
116-94	Upland	S-WS134-18FSP10-00-10	WS134	0.0	1.0	8/3/2018	Total 209 PCB cong (excl non-detects)	6.0	
116-94	Upland	S-WS134-18FSP10-10-16	WS134	1.0	1.6	8/3/2018	Aroclor 1254 - Immunoassay	10.0	JD

Table 2-1c
West Zone 1 Pre-Excavation PCB Characterization Sample Results for Parcel 116-94

Parcel	Type	Sample ID	Station ID	Sample Depth Top (ft)	Sample Depth Bottom (ft)	Sample Date	Description	Total PCB (mg/kg)	Final Qualifier
116-94	Low Marsh	S-WS139-18FSP10-10-20	WS139	1.0	2.0	8/1/2018	Aroclor 1254 - Immunoassay	19.0	JD
116-94	Low Marsh	S-WS139-18FSP10-20-30	WS139	2.0	3.0	8/1/2018	Total 209 PCB cong (excl non-detects)	87.1	
116-94	Low Marsh	S-WS139-18FSP10-30-40	WS139	3.0	4.0	8/1/2018	Total 209 PCB cong (excl non-detects)	13.7	
116-94	Low Marsh	S-WS140-18FSP10-00-10	WS140	0.0	1.0	8/6/2018	Aroclor 1254 - Immunoassay	76.0	JD
116-94	Low Marsh	S-WS140-18FSP10-10-20	WS140	1.0	2.0	8/6/2018	Total 209 PCB cong (excl non-detects)	62.3	
116-94	Low Marsh	S-WS140-18FSP10-20-30	WS140	2.0	3.0	8/6/2018	Aroclor 1254 - Immunoassay	10.0	J
116-94	Low Marsh	S-WS140-18FSP10-30-40	WS140	3.0	4.0	8/6/2018	Aroclor 1254 - Immunoassay	9.6	JD
116-94	Upland	S-WS154-18FSP10-40-50	WS154	4.0	5.0	8/9/2018	Aroclor 1254 - Immunoassay	100	JD
116-94	Upland	S-WS154-18FSP10-50-60	WS154	5.0	6.0	8/9/2018	Total 209 PCB cong (excl non-detects)	110	
116-94	Mudflat	S-WS155-18FSP10-30-40	WS155	3.0	4.0	8/9/2018	Total 209 PCB cong (excl non-detects)	41.5	
116-94	Mudflat	S-WS155-18FSP10-40-50	WS155	4.0	5.0	8/9/2018	Aroclor 1254 - Immunoassay	21.0	JD
116-94	Mudflat	S-WS157-18FSP10-20-30	WS157	2.0	3.0	7/31/2018	Total 209 PCB cong (excl non-detects)	0.20	
116-94	Mudflat	S-WS157-18FSP10-30-40	WS157	3.0	4.0	7/31/2018	Aroclor 1254 - Immunoassay	7.1	JD
116-94	Upland	S-WS158-18FSP10-10-20	WS158	1.0	2.0	8/6/2018	Aroclor 1254 - Immunoassay	2.2	JD
116-94	Upland	S-WS158-18FSP10-20-30	WS158	2.0	3.0	8/6/2018	Aroclor 1254 - Immunoassay	3.4	JD
116-94	Upland	S-WS158-18FSP10-30-40	WS158	3.0	4.0	8/6/2018	Aroclor 1254 - Immunoassay	3.6	JD

Notes:
Pre-excavation confirmatory congener samples are shaded green.
D - reported value is from a dilution; U - not detected; J - estimated value.
Total 18 NOAA PCB congeners multiplied by a factor of 2.6.
1. Pre-ROD sample result is most likely a total Aroclor value although it is reported in the project database as Sum 18 NOAA PCB congeners X factor.

Table 2-1d
West Zone 1 Pre-Excavation PCB Characterization Sample Results for Parcel 112-65

Parcel	Type	Sample ID	Station ID	Sample Depth Top (ft)	Sample Depth Bottom (ft)	Sample Date	Description	Total PCB (mg/kg)	Final Qualifier
112-65	Upland	S-15L-INT198-00-10	INT198	0.0	1.0	7/8/2015	Total 139 PCB cong (excl non-detects)	8.7	
112-65	Upland	S-15L-INT198-10-20	INT198	1.0	2.0	7/8/2015	Aroclor 1254 - Immunoassay	5.4	
112-65	Upland	S-15L-INT198-20-24	INT198	2.0	2.4	7/8/2015	Aroclor 1254 - Immunoassay	4.9	
112-65	Upland	S-15L-INT199-00-10	INT199	0.0	1.0	7/8/2015	Aroclor 1254 - Immunoassay	0.50	U
112-65	Upland	S-15L-INT199-10-20	INT199	1.0	2.0	7/8/2015	Aroclor 1254 - Immunoassay	0.50	U
112-65	Upland	S-15L-INT200-00-10	INT200	0.0	1.0	7/8/2015	Aroclor 1254 - Immunoassay	1.3	
112-65	Upland	S-15L-INT200-10-20	INT200	1.0	2.0	7/8/2015	Aroclor 1254 - Immunoassay	0.50	U
112-65	Low Marsh	S-15L-INT202-00-10	INT202	0.0	1.0	7/8/2015	Aroclor 1254 - Immunoassay	64.5	D
112-65	Low Marsh	S-15L-INT202-10-20	INT202	1.0	2.0	7/8/2015	Aroclor 1254 - Immunoassay	9.9	
112-65	Low Marsh	S-15L-INT202-20-30	INT202	2.0	3.0	7/8/2015	Aroclor 1254 - Immunoassay	2.9	
112-65	Upland	S-WS114-18FSP10-00-10	WS114	0.0	1.0	4/30/2018	Total 209 PCB cong (excl non-detects)	0.98	
112-65	Upland	S-WS114-18FSP10-10-20	WS114	1.0	2.0	4/30/2018	Aroclor 1254 - Immunoassay	3.1	JB
112-65	Upland	S-WS115-18FSP10-00-10	WS115	0.0	1.0	4/30/2018	Total 209 PCB cong (excl non-detects)	7.4	
112-65	Upland	S-WS115-18FSP10-10-20	WS115	1.0	2.0	4/30/2018	Aroclor 1254 - Immunoassay	4.0	J
112-65	Upland	S-WS116-18FSP10-00-10	WS116	0.0	1.0	4/30/2018	Total 209 PCB cong (excl non-detects)	2.9	
112-65	Upland	S-WS116-18FSP10-10-20	WS116	1.0	2.0	4/30/2018	Aroclor 1254 - Immunoassay	170	JD
112-65	Upland	S-WS116-18FSP10-20-30	WS116	2.0	3.0	4/30/2018	Aroclor 1254 - Immunoassay	210	J
112-65	Upland	S-WS141-18FSP10-00-10	WS141	0.0	1.0	8/3/2018	Aroclor 1254 - Immunoassay	160	JD
112-65	Upland	S-WS141-18FSP10-10-20	WS141	1.0	2.0	8/3/2018	Total 209 PCB cong (excl non-detects)	158	
112-65	Upland	S-WS141-18FSP10-20-30	WS141	2.0	3.0	8/3/2018	Total 209 PCB cong (excl non-detects)	34.1	
112-65	Upland	S-WS141-18FSP10-30-40	WS141	3.0	4.0	8/3/2018	Aroclor 1254 - Immunoassay	13.0	JD
112-65	Mudflat	S-WS142-18FSP10-00-10	WS142	0.0	1.0	7/31/2018	Aroclor 1254 - Immunoassay	1.8	JD
112-65	Mudflat	S-WS142-18FSP10-10-20	WS142	1.0	2.0	7/31/2018	Aroclor 1254 - Immunoassay	10.0	J
112-65	Mudflat	S-WS142-18FSP10-20-30	WS142	2.0	3.0	7/31/2018	Aroclor 1254 - Immunoassay	3.5	JD
112-65	Mudflat	S-WS142-18FSP10-30-40	WS142	3.0	4.0	7/31/2018	Aroclor 1254 - Immunoassay	5.6	JD
112-65	Low Marsh	S-WS143-18FSP10-00-10	WS143	0.0	1.0	8/3/2018	Aroclor 1254 - Immunoassay	240	JD
112-65	Low Marsh	S-WS143-18FSP10-10-20	WS143	1.0	2.0	8/3/2018	Aroclor 1254 - Immunoassay	71.0	JD
112-65	Low Marsh	S-WS143-18FSP10-20-30	WS143	2.0	3.0	8/3/2018	Aroclor 1254 - Immunoassay	55.0	JD
112-65	Low Marsh	S-WS143-18FSP10-30-40	WS143	3.0	4.0	8/3/2018	Aroclor 1254 - Immunoassay	79.0	JD
112-65	Low Marsh	S-WS143-18FSP10-40-50	WS143	4.0	5.0	8/3/2018	Aroclor 1254 - Immunoassay	88.0	JD
112-65	Mudflat	S-WS145-18FSP10-00-10	WS145	0.0	1.0	8/30/2018	Aroclor 1254 - Immunoassay	95.0	JD
112-65	Mudflat	S-WS145-18FSP10-10-20	WS145	1.0	2.0	8/30/2018	Aroclor 1254 - Immunoassay	95.0	JD
112-65	Mudflat	S-WS145-18FSP10-20-29	WS145	2.0	2.9	8/30/2018	Total 209 PCB cong (excl non-detects)	25.1	
112-65	Mudflat	S-WS146-18FSP10-00-10	WS146	0.0	1.0	8/16/2018	Aroclor 1254 - Immunoassay	95.0	JD
112-65	Mudflat	S-WS146-18FSP10-10-14	WS146	1.0	1.4	8/16/2018	Aroclor 1254 - Immunoassay	96.0	JD
112-65	Upland	S-WS146B-18FSP10-00-10	WS146B	0.0	1.0	8/28/2018	Aroclor 1254 - Immunoassay	94.0	JD
112-65	Upland	S-WS146B-18FSP10-10-20	WS146B	1.0	2.0	8/28/2018	Aroclor 1254 - Immunoassay	94.0	JD
112-65	Upland	S-WS146B-18FSP10-20-30	WS146B	2.0	3.0	8/28/2018	Aroclor 1254 - Immunoassay	10.0	JD
112-65	Upland	S-WS146B-18FSP10-30-31	WS146B	3.0	3.1	8/28/2018	Aroclor 1254 - Immunoassay	19.0	JD

Notes:
Pre-excavation confirmatory congener samples are shaded green.
D - reported value is from a dilution; U - not detected; J - estimated value.
Total 18 NOAA PCB congeners multiplied by a factor of 2.6.

Table 3-1
Compliance Survey Control Table for West Zone 1

Parcel	Station ID	Location	Easting	Northing	Design Elevation	Post-Excavation Elevation	Δ (ft)
			MA State Plane ft, NAD83		NAVD88 ft		
116-132	S-18	Sidewall	815432.0	2708218.0	-2.8	TBD	TBD
116-132	WS158	Sidewall	815439.1	2708194.2	3.1	TBD	TBD
116-132	WS165	Sidewall	815481.2	2708165.4	-4.0	TBD	TBD
116-132	WS102	Floor	815460.8	2708176.2	-0.4	TBD	TBD
116-86	WS159	Sidewall	815486.1	2708114.1	1.2	TBD	TBD
116-86	WS160	Sidewall	815480.2	2708014.2	2.1	TBD	TBD
116-86	INT185	Sidewall	815480.0	2707959.0	2.2	TBD	TBD
116-86	WS106	Sidewall	815482.4	2707915.8	2.7	TBD	TBD
116-86	WS130	Sidewall	815423.5	2707847.9	4.3	TBD	TBD
116-86	WS131	Sidewall	815480.5	2707807.9	5.4	TBD	TBD
116-86	WS135	Sidewall	815458.0	2707866.7	3.0	TBD	TBD
116-86	WS161	Sidewall	815500.1	2707744.1	4.0	TBD	TBD
116-86	WS166	Sidewall	815509.1	2708075.6	-4.1	TBD	TBD
116-86	WS167	Sidewall	815494.1	2707977.3	-2.9	TBD	TBD
116-86	WS168	Sidewall	815509.2	2707878.4	-6.9	TBD	TBD
116-86	WS169	Sidewall	815526.9	2707768.3	-4.0	TBD	TBD
116-86	S-20	Floor	815495.0	2708000.0	-1.9	TBD	TBD
116-86	WS118	Floor	815496.7	2708058.5	-1.5	TBD	TBD
116-86	WS119	Floor	815502.2	2707923.9	-5.7	TBD	TBD
116-86	WS123	Floor	815486.6	2707855.8	3.0	TBD	TBD
116-86	WS138	Floor	815509.6	2707782.3	-1.7	TBD	TBD
116-86	WS147	Floor	815494.8	2708099.4	-0.7	TBD	TBD
116-100	WS133	Sidewall	815509.7	2707703.8	3.8	TBD	TBD
116-100	WS156	Sidewall	815504.9	2707614.4	3.4	TBD	TBD
116-100	WS170	Sidewall	815546.9	2707672.5	-3.1	TBD	TBD
116-100	WS171	Sidewall	815530.3	2707581.4	-3.9	TBD	TBD
116-100	WS121	Floor	815518.2	2707593.3	-2.6	TBD	TBD
116-100	WS152	Floor	815525.7	2707720.0	-2.5	TBD	TBD
116-100	WS153	Floor	815523.5	2707674.9	-1.1	TBD	TBD
116-94	WS110	Sidewall	815474.2	2707560.2	5.3	TBD	TBD
116-94	WS112	Sidewall	815473.2	2707377.6	8.0	TBD	TBD
116-94	WS134	Sidewall	815471.4	2707460.4	7.6	TBD	TBD
116-94	WS162	Sidewall	815530.8	2707309.2	2.3	TBD	TBD
116-94	WS172	Sidewall	815526.2	2707501.6	-3.1	TBD	TBD
116-94	WS173	Sidewall	815530.1	2707405.2	-2.9	TBD	TBD
116-94	WS174	Sidewall	815557.4	2707329.5	-3.2	TBD	TBD
116-94	WS111	Floor	815485.4	2707453.7	5.0	TBD	TBD
116-94	WS139	Floor	815519.2	2707336.3	-3.7	TBD	TBD
116-94	WS140	Floor	815613.0	2707322.7	-2.6	TBD	TBD
116-94	WS155	Floor	815522.4	2707385.5	-4.0	TBD	TBD
116-94	WS157	Floor	815512.7	2707540.5	-3.9	TBD	TBD
112-65	WS163	Sidewall	815623.6	2707297.2	0.6	TBD	TBD
112-65	WS164	Sidewall	815639.4	2707195.8	2.1	TBD	TBD
112-65	WS175	Sidewall	815651.0	2707297.1	-3.8	TBD	TBD
112-65	WS176	Sidewall	815666.4	2707193.2	-2.9	TBD	TBD
112-65	WS141	Floor	815647.8	2707275.9	-1.7	TBD	TBD
112-65	WS143	Floor	815650.3	2707176.2	-0.2	TBD	TBD

Notes:
Elevation measurements at sidewall locations will be taken at the base of the sidewall (bottom of the excavation).
Locations WS158 through WS176 are compliance survey locations only (no associated PCB sample data).
MA - Massachusetts; NAD83 - North American Datum 1983; NAVD88 - North American Vertical Datum 1988; ft - feet; TBD - to be determined.
Δ - difference between post-excavation elevation and design elevation.

Table 7-1a
Proposed Restoration Acreages by Cover Type for Parcels 116-132 and 116-86

Habitat Type within Excavation Boundary	Existing Pre-Construction Area [acres]	Proposed Area of Restoration [acres]
Mudflat/Subtidal	0.063	0.063
Low Marsh	0.112	0.121
High Marsh	0.000	0.001
Upland	0.108	0.108
Unvegetated Fill	0.022	0.022
Phragmites	0.011	0.000
TOTAL	**0.316**	**0.316**

Notes:
Actual restored mudflat acreage will depend on final as-built conditions.

Table 7-1b
Proposed Restoration Acreages by Cover Type for Parcel 116-100

Habitat Type within Excavation Boundary	Existing Pre-Construction Area [acres]	Proposed Area of Restoration [acres]
Low Marsh	0.046	0.046
Mudflat/Subtidal	0.026	0.026
Phragmites	0.029	0.000
High Marsh	0.000	0.029
Upland	0.039	0.039
TOTAL	**0.140**	**0.140**

Notes:
Actual restored mudflat acreage will depend on final as-built conditions.

Table 7-1c
Proposed Restoration Acreages by Cover Type for Parcel 116-94

Habitat Type within Excavation Boundary	Existing Pre-Construction Area [acres]	Proposed Area of Restoration [acres]
Low Marsh	0.083	0.084
High Marsh	0.000	0.029
Mudflat/Subtidal	0.088	0.088
Phragmites	0.040	0.000
Unvegetated Fill	0.001	0.001
Upland	0.049	0.059
Upland/Lawn	0.059	0.059
TOTAL	**0.319**	**0.320**

Notes:
Actual restored mudflat acreage will depend on final as-built conditions.

Table 7-1d
Proposed Restoration Acreages by Cover Type for Parcel 112-65

Habitat Type within Excavation Boundary	Existing Pre-Construction Area [acres]	Proposed Area of Restoration [acres]
Low Marsh	0.033	0.033
Mudflat/Subtidal	0.012	0.012
Upland	0.009	0.009
TOTAL	**0.054**	**0.054**

Notes:
Actual restored mudflat acreage will depend on final as-built conditions.

Table 7-2a
Shrub Restoration Summary for Parcels 116-32 and 116-86

Scientific Name	Common Name	On-Center Spacing Requirements (inches)	Number of Proposed Plants	Shrub Restoration Area
Iva frutescens	hightide bush	36"	47	Area 1
Rosa virginiana	Virginia rose	36"	190	Area 2
Juniperus virginiana	eastern red cedar	48"	28	Area 3
Clethra alnifolia	sweet pepperbush	48"	28	Area 3
Clethra alnifolia	sweet pepperbush	48"	21	Area 4
Myrica pensylvanica	northern bayberry	48"	21	Area 4
Total Proposed Trees/Shrubs for Parcels 116-132 and 116-86			**335**	

Table 7-2b
Shrub Restoration Summary for Parcel 116-100

Scientific Name	Common Name	On-Center Spacing Requirements (inches)	Number of Proposed Plants	Shrub Restoration Area
Clethra alnifolia	sweet pepperbush	48"	7	Area 1
Total Proposed Trees/Shrubs for Parcel 116-100			**7**	

Table 7-2c
Shrub Restoration Summary for Parcel 116-94

Scientific Name	Common Name	On-Center Spacing Requirements (inches)	Number of Proposed Plants	Shrub Restoration Area
Clethra alnifolia	sweet pepperbush	48"	34	Area 1
Rosa virginiana	Virginia rose	36"	61	Area 1
Clethra alnifolia	sweet pepperbush	48"	6	Area 2
Acer rubrum	red maple	120"	1	Area 2
Clethra alnifolia	sweet pepperbush	48"	8	Area 3
Acer rubrum	red maple	120"	1	Area 3
Iva frutescens	hightide bush	36"	32	Area 4
Total Proposed Trees/Shrubs for Parcel 116-94			**143**	

Table 7-2d
Shrub Restoration Summary for Parcel 112-65

Scientific Name	Common Name	On-Center Spacing Requirements (inches)	Number of Proposed Plants	Shrub Restoration Area
Betula papyrifera	paper birch	180"	1	Area 1
Clethra alnifolia	sweet pepperbush	48"	7	Area 1
Juniperus virginiana	eastern red cedar	48"	7	Area 1
Iva frutescens	hightide bush	36"	13	Area 1
Acer rubrum	red maple	120"	2	Area 1
Myrica pensylvanica	northern bayberry	48"	7	Area 1
Salix sericea	silky willow	120"	2	Area 1
Total Proposed Trees/Shrubs for Parcel 112-65			**39**	

Appendix A

West Zone 1 Pre-Excavation Tree and Shrub Inventories

Appendix A

Parcels 116-132 and 116-86

Memorandum

JACOBS

Subject	Parcels 116-86 and 116-132 Pre-Excavation Tree and Shrub Inventory	**Project Name**	New Bedford Harbor Superfund Site
Attention	Marie Esten USACE	**Project No.**	35BG2000
From	Jessica Rebholz/Kim Degutis	**Document Control No.**	ACE-J23-35BG2000-M1-0119
Date	3 January 2019		

Attachments: Figure 1 Existing Trees and Shrubs, Parcels 116-86/116-132, Tables 3-1 through 3-5 (inventory results)

1.0 Background

Jacobs conducted an inventory of existing trees and shrubs on Parcels 116-86 and 116-132 in the intertidal remediation area (Figure 1) on 9 May 2018. The purpose of the inventory was to identify existing trees and shrubs that would be removed in association with site remediation activities, including areas of excavation associated with contaminated sediment and soil removal. The information collected from this inventory is intended to be used to inform selection of proposed native woody species for future restoration plantings.

2.0 Methods

For the purposes of the inventory, trees were defined as any nonclimbing, woody plant that had at least one erect perennial stem (trunk) with a diameter at breast height (DBH) of 3.0 inches or greater, regardless of height. Jacobs' wetland biologists walked the planned remediation portions of Parcels 116-86 and 116-132 and identified all trees within the proposed excavation area. Tree locations were recorded using a Trimble Geo 7X GPS, capable of sub-meter accuracy.

For the purposes of the inventory, shrubs were defined as any nonclimbing, woody plant with a DBH less than 3.0 inches. Shrubs were inventoried according to dominant shrub types that appeared to constitute similar species diversity and percent areal cover. For purposes of documentation and reference, the results of the tree and shrub inventories are recorded by sub-area in separate tables included in Section 3 below.

3.0 Results

Eastern red cedar (*Juniperus virginiana*) is the dominant tree type within Parcels 116-86 and 116-132. The majority of the trees identified on both parcels are considered non-native and invasive. A list of the trees identified is provided in Table 3-1. For each species, the number of individual trees noted was calculated as an indication of the relative dominance of the species on-site. A total of 17 trees were identified within Parcels 116-86 and 116-132. Of those 17, 11 are non-native and invasive.

High-tide bush (*Iva frutescens*) was the only shrub type observed in Area 1 within Parcel 116-86, and is therefore the dominant shrub type for Area 1. Virginia rose (*Rosa virginia*) was the only shrub type observed in Area 2 within Parcel 116-86, and is therefore the dominant shrub type for Area 2. Morrow's honeysuckle (*Lonicera morrowii*) was the dominant shrub observed in Area 3, and tree of heaven (*Ailanthus altissima*) was the dominant shrub observed in Area 4. No shrubs were identified within the remediation area of Parcel 116-132. The majority of the shrubs identified are considered non-native and invasive (Tables 3-2 – 3-5).

Each area where shrubs were identified and inventoried is identified on Figure 1. Shrubs were classified by genus and species. Tables 3-2 through 3-5 also identify whether the shrub occurred in upland or wetland, as well as any notes regarding specific species.

4.0 Conclusion

The species makeup of Parcel 116-86 and Parcel 116-32 is comprised of mostly non-native, invasive trees and shrubs, with Morrow's honeysuckle (*Lonicera morrowii*) being the dominant shrub and eastern red cedar (*Juniperus* virginiana) being the dominant tree.

Legend

- Red cedar
- Red maple
- White ash
- Black locust
- White poplar
- Tree of heaven
- Siberian crab apple
- Mean Lower Low Water
- Mean Higher High Water
- 0-1' Excavation Depth
- Inventoried Shrub Areas
- Parcel Boundary

0 50 100 Feet

Basemap Data Source: MassGIS

January 2019

Intertidal West Zone 1
Parcels 116-132/116-86
Pre-Excavation Tree and Shrub Inventory

New Bedford Harbor Superfund Site

JACOBS

Figure 1

Table 3-1
Existing Tree Inventory for Parcels 116-86 and 116-132

Scientific Name	Common Name	Tree Count (≥3" DBH)	Invasive	Native/Non-Native
Acer rubrum	red maple	1	no	native, county documented
Juniperus virginiana	eastern red cedar	4	no	native, county documented
Fraxinus americana	white ash	1	no	native, county documented
Malus baccata	Siberian crab apple	3	yes	non-native, state documented
Robinia pseudoacacia	black locust	3	yes	non-native, county documented
Ailanthus altissima	tree of heaven	4	yes	non-native, county documented
Populus alba	white poplar	1	yes	non-native, county documented
	Total	**17**		

Table 3-2
Existing Shrub Cover for Parcel 116-86, Area 1

Scientific Name	Common Name	Percent Areal Cover Area 1	Invasive	Native/Non-Native	Upland/Wetland
Iva frutescens	high-tide bush	35%	no	native, county documented	wetland

Table 3-3
Existing Shrub Cover for Parcel 116-86, Area 2

Scientific Name	Common Name	Percent Areal Cover Area 2	Invasive	Native/Non-Native	Upland/Wetland
Rosa virginiana	Virginia rose	65%	no	native, county documented	upland

Table 3-4
Existing Shrub Cover for Parcel 116-86, Area 3

Scientific Name	Common Name	Percent Areal Cover Area 3	Invasive	Native/Non-Native	Upland/Wetland
Lonicera morrowii	Morrow's honeysuckle	50%	yes	non-native, county documented	upland

Table 3-5
Existing Shrub Cover for Parcel 116-86, Area 4

Scientific Name	Common Name	Percent Areal Cover Area 4	Invasive	Native/Non-Native	Upland/Wetland
Lonicera morrowii	Morrow's honeysuckle	20%	yes	non-native, county documented	upland

Appendix A

Parcel 116-100

Memorandum

JACOBS

Subject	Parcels 116-100 Pre-Excavation Tree and Shrub Inventory	**Project Name**	New Bedford Harbor Superfund Site
Attention	Marie Esten USACE	**Project No.**	35BG2000
From	Jessica Rebholz/Kim Degutis	**Document Control No.**	ACE-J23-35BG2000-M1-0119
Date	10 January 2019		

Attachments: Figure 1 Existing Trees and Shrubs, Parcels 116-100, Tables 3-1 and 3-2 (inventory results)

1.0 Background

Jacobs conducted an inventory of existing trees and shrubs on Parcel 116-100 in the intertidal remediation area (Figure 1) on 9 May 2018. The purpose of the inventory was to identify existing trees and shrubs that would be removed in association with site remediation activities, including areas of excavation associated with contaminated sediment and soil removal. The information collected from this inventory is intended to be used to inform selection of proposed native woody species for future restoration plantings.

2.0 Methods

For the purposes of the inventory, trees were defined as any nonclimbing, woody plant that had at least one erect perennial stem (trunk) with a diameter at breast height (DBH) of 3.0 inches or greater, regardless of height. Jacobs' wetland biologists walked the planned remediation portions of Parcel 116-100 and identified all trees within the proposed excavation area. Tree locations were recorded using a Trimble Geo 7X GPS, capable of sub-meter accuracy.

For the purposes of the inventory, shrubs were defined as any nonclimbing, woody plant with a DBH less than 3.0 inches. Shrubs were inventoried according to dominant shrub types that appeared to constitute similar species diversity and percent areal cover. For purposes of documentation and reference, the results of the tree and shrub inventory is recorded by sub-area in separate tables included in Section 3 below.

3.0 Results

White poplar (*Populus alba*) is the dominant tree type within Parcel 116-100. Of the 6 trees identified on the parcel, 3 are considered non-native and invasive and 3 are considered native and non-invasive. A list of the trees identified is provided in Table 3-1. For each species, the number of individual trees noted was calculated as an indication of the relative dominance of the species on-site.

Red maple (*Acer rubrum*) was the dominant shrub observed in Area 1. The majority of the shrubs identified are considered native and non-invasive (Table 3-2).

Each area where shrubs were identified and inventoried is identified on Figure 1. Shrubs were classified by genus and species. Table 3-2 also identifies whether the shrub occurred in upland or wetland, as well as any notes regarding specific species.

4.0 Conclusion

The species makeup of Parcel 116-100 is comprised of an equal amount of native and non-native trees and a dominant amount of native shrubs. Red maple (*Acer rubrum*) is the dominant shrub and white poplar (*Populus alba*) is the the dominant tree.

Legend

- Black cherry
- Siberian crab apple
- American linden
- White poplar
- Sweetbay magnolia
- MLLW
- MHHW
- 0-1' Excavation Depth
- Inventoried Shrub Areas
- Parcel Boundary

0 50 100 Feet

January 2019

Basemap Data Source:
Green Seal Environmental, Inc.

Intertidal West Zone 1
Parcel 116-100
Pre-Excavation Tree and Shrub Inventory

New Bedford Harbor Superfund Site

JACOBS

Figure 1

Table 3-1
Existing Tree Inventory for Parcel 116-100

Scientific Name	Common Name	Tree Count (≥3" DBH)	Invasive	Native/Non-Native
Prunus serotina	black cherry	1	no	native, county documented
Malus baccata	Siberian crab apple	1	yes	non-native, state documented
Tilia americana	American linden	1	no	native, county documented
Populus alba	white poplar	2	yes	non-native, county documented
Magnolia virginiana	sweetbay magnolia	1	no	native, county documented
	Total	**6**		

Table 3-2
Existing Shrub Cover for Parcel 116-100, Area 1

Scientific Name	Common Name	Percent Areal Cover Area 1	Invasive	Native/Non-Native	Upland/Wetland
Acer rubrum	red maple	55%	no	native, county documented	wetland

Appendix A

Parcel 116-94

Memorandum

JACOBS

Subject	Parcels 116-94 Pre-Excavation Tree and Shrub Inventory	**Project Name**	New Bedford Harbor Superfund Site
Attention	Marie Esten USACE	**Project No.**	35BG2000
From	Jessica Rebholz/Kim Degutis	**Document Control No.**	ACE-J23-35BG2000-M1-0119
Date	17 January 2019		

Attachments: Figure 1 Existing Trees and Shrubs, Parcels 116-94, Tables 3-1 through 3-5 (inventory results)

1.0 Background

Jacobs conducted an inventory of existing trees and shrubs on Parcel 116-94 in the intertidal remediation area (Figure 1) on 9 May 2018. The purpose of the inventory was to identify existing trees and shrubs that would be removed in association with site remediation activities, including areas of excavation associated with contaminated sediment and soil removal. The information collected from this inventory is intended to be used to inform selection of proposed native woody species for future restoration plantings.

2.0 Methods

For the purposes of the inventory, trees were defined as any nonclimbing, woody plant that had at least one erect perennial stem (trunk) with a diameter at breast height (DBH) of 3.0 inches or greater, regardless of height. Jacobs' wetland biologists walked the planned remediation portions of Parcel 116-94 and identified all trees within the proposed excavation area. Tree locations were recorded using a Trimble Geo 7X GPS, capable of sub-meter accuracy.

For the purposes of the inventory, shrubs were defined as any nonclimbing, woody plant with a DBH less than 3.0 inches. Shrubs were inventoried according to dominant shrub types that appeared to constitute similar species diversity and percent areal cover. For purposes of documentation and reference, the results of the tree and shrub inventory is recorded by sub-area in separate tables included in Section 3 below.

3.0 Results

Tree of heaven (*Ailanthus altissima*) is the dominant tree type within Parcel 116-94. Of the 12 trees identified on the parcel, 6 are considered non-native and invasive and 6 are considered native and non-invasive. A list of the trees identified is provided in Table 3-1. For each species, the number of individual trees noted was calculated as an indication of the relative dominance of the species on-site.

Morrow's honeysuckle (*Lonicera morrowii*) was the dominant shrub observed in Area 1 and was the only shrub observed in Areas 2 and 3. The majority of the shrubs identified within the parcel are considered non-native and invasive (Table 3-2). Area 4 contained an approximately 4' wide band of high-tide bush (*Iva frutescens*) between high marsh and low marsh at approximately 10% aerial cover.

Each area where shrubs were identified and inventoried is identified on Figure 1. Shrubs were classified by genus and species. Tables 3-2 through 3-5 also identifies whether the shrub occurred in upland or wetland, as well as any notes regarding specific species.

4.0 Conclusion

The species makeup of Parcel 116-94 is comprised of an equal amount of native and non-native trees and a dominant amount of invasive, non-native shrubs. Morrow's honeysuckle (*Lonicera morrowii*) is the dominant shrub and tree of heaven (*Ailanthus altissima*) is the the dominant tree.

Legend

- Gray birch
- Northern catalpa
- Red cedar
- White poplar
- Silky willow
- Red maple
- MLLW
- MHHW
- Tree of heaven
- Sweetbay magnolia
- Parcel Boundary
- 0-1' Excavation Depth
- Inventoried Shrub Areas

0 50 100 Feet

January 2019

Basemap Data Source:
MassGIS

Intertidal West Zone 1
Parcel 116-94
Pre-Excavation Tree and Shrub Inventory

New Bedford Harbor Superfund Site

JACOBS

Figure 1

Table 3-1
Existing Tree Inventory for Parcels 116-94

Scientific Name	Common Name	Tree Count (≥3" DBH)	Invasive	Native/Non-Native
Betula populifolia	gray birch	1	no	native, county documented
Catalpa speciosa	northern catalpa	1	yes	non-native, state documented
Juniperus virginiana	red cedar	2	no	native, county documented
Acer rubrum	red maple	1	no	native, county documented
Populus alba	white poplar	1	yes	non-native, county documented
Salix sericea	silky willow	1	no	native, county documented
Magnolia virginiana	sweetbay magnolia	1	no	native, county documented
Ailanthus altissima	tree of heaven	4	yes	non-native, county documented
	Total	**12**		

Table 3-2
Existing Shrub Cover for Parcel 116-94, Area 1

Scientific Name	Common Name	Percent Areal Cover Area 1	Invasive	Native/Non-Native	Upland/Wetland
Rosa virginiana	Virginia rose	10%	no	native, county documented	upland

Table 3-3
Existing Shrub Cover for Parcel 116-94, Area 2

Scientific Name	Common Name	Percent Areal Cover Area 2	Invasive	Native/Non-Native	Upland/Wetland
Lonicera morrowii	Morrow's honeysuckle	2%	yes	non-native, county documented	upland

Table 3-4
Existing Shrub Cover for Parcel 116-94 Area 3

Scientific Name	Common Name	Percent Areal Cover Area 3	Invasive	Native/Non-Native	Upland/Wetland
Lonicera morrowii	Morrow's honeysuckle	5%	yes	non-native, county documented	upland

Table 3-5
Existing Shrub Cover for Parcel 116-94, Area 4

Scientific Name	Common Name	Percent Areal Cover Area 4	Invasive	Native/Non-Native	Upland/Wetland
Iva frutescens	high-tide bush	10%	no	native, county documented	wetland

Appendix A

Parcel 112-65

Memorandum

JACOBS

Subject	Parcel 112-65 Pre-Excavation Tree and Shrub Inventory	**Project Name**	New Bedford Harbor Superfund Site
Attention	Marie Esten USACE	**Project No.**	35BG2000
From	Jessica Rebholz/Kim Degutis	**Document Control No.**	ACE-J23-35BG2000-M1-0119
Date	24 January 2019		

Attachments: Figure 1 Existing Trees and Shrubs, Parcel 112-65, Tables 3-1 through 3-5 (inventory results)

1.0 Background

Jacobs conducted an inventory of existing trees and shrubs on Parcel 112-65 in the intertidal remediation area (Figure 1) on 9 May 2018. The purpose of the inventory was to identify existing trees and shrubs that would be removed in association with site remediation activities, including areas of excavation associated with contaminated sediment and soil removal. The information collected from this inventory is intended to be used to inform selection of proposed native woody species for future restoration plantings.

2.0 Methods

For the purposes of the inventory, trees were defined as any nonclimbing, woody plant that had at least one erect perennial stem (trunk) with a diameter at breast height (DBH) of 3.0 inches or greater, regardless of height. Jacobs' wetland biologists walked the planned remediation portions of Parcel 112-65 and identified all trees within the proposed excavation area. Tree locations were recorded using a Trimble Geo 7X GPS, capable of sub-meter accuracy.

For the purposes of the inventory, shrubs were defined as any nonclimbing, woody plant with a DBH less than 3.0 inches. Shrubs were inventoried according to dominant shrub types that appeared to constitute similar species diversity and percent areal cover. For purposes of documentation and reference, the results of the tree and shrub inventory is recorded by sub-area in separate tables included in Section 3 below.

3.0 Results

There are three (3) dominant tree types within Parcel 112-65; northern catalpa (*Catalpa speciosa*), eastern white pine (*Pinus strobus*), and tree of heaven (*Ailanthus altissima*). Of the 14 trees identified on the parcel, 7 are considered non-native and invasive and 7 are considered native and non-invasive. A list of the trees identified is provided in Table 3-1. For each species, the number of individual trees noted was calculated as an indication of the relative dominance of the species on-site.

Pussy willow (*Salix discolor*) was the dominant shrub observed in Area 1, and poison ivy (*Toxicodendron radicans*) was the dominant shrub observed in Area 2. The majority of the shrubs identified within the parcel are considered non-native and invasive (Tables 3-2 – 3-5).

Each area where shrubs were identified and inventoried is identified on Figure 1. Shrubs were classified by genus and species. Tables 3-2 through 3-5 also identify whether the shrub occurred in upland or wetland, as well as any notes regarding specific species.

4.0 Conclusion

The species makeup of Parcel 112-65 is comprised of an equal amount of native and non-native trees and a dominant amount of invasive, non-native shrubs. Tree of heaven (*Ailanthus altissima*) is the dominant shrub and northern catalpa (*Catalpa speciosa*), eastern white pine (*Pinus strobus*), and tree of heaven (*Ailanthus altissima*) are the dominant trees.

Legend

- Northern catalpa
- Red cedar
- Tree of heaven
- Siberian crab apple
- Red maple
- White pine
- Paper birch
- MLLW
- MHHW
- 0-1' Excavation Depth
- Inventoried Shrub Areas
- Parcel Boundary

0 50 100 Feet

January 2019

Basemap Data Source:
MassGIS

Intertidal West Zone 1
Parcel 112-65
Pre-Excavation Tree and Shrub Inventory

New Bedford Harbor Superfund Site

JACOBS

Figure 1

Table 3-1
Existing Tree Inventory for Parcel 112-65

Scientific Name	Common Name	Tree Count (≥3" DBH)	Invasive	Native/Non-Native
Malus baccata	Siberian crab apple	1	yes	non-native, state documented
Catalpa speciosa	northern catalpa	3	yes	non-native, state documented
Juniperus virginiana	eastern red cedar	2	no	native, county documented
Acer rubrum	red maple	1	no	native, county documented
Betula papyrifera	paper birch	1	no	native, county documented
Pinus strobus	eastern white pine	3	no	native, county documented
Ailanthus altissima	tree of heaven	3	yes	non-native, county documented
	Total	**14**		

Table 3-2
Existing Shrub Cover for Parcel 112-65, Area 1

Scientific Name	Common Name	Percent Areal Cover Area 1	Invasive	Native/Non-Native	Upland/Wetland
Betula papyrifera	paper birch	10%	no	native, county documented	upland

Table 3-3
Existing Shrub Cover for Parcel 112-65, Area 2

Scientific Name	Common Name	Percent Areal Cover Area 2	Invasive	Native/Non-Native	Upland/Wetland
Toxicodendron radicans	poison ivy	10%	no	native, county documented	upland

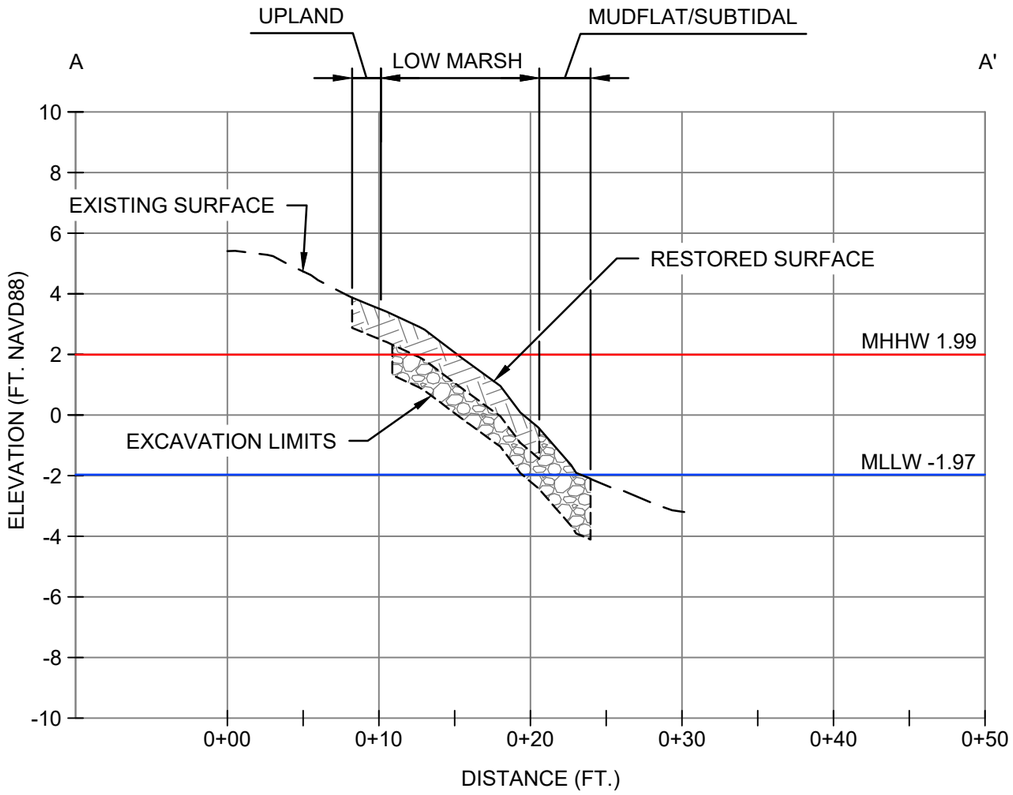
Table 3-4
Existing Shrub Cover for Parcel 112-65, Area 3

Scientific Name	Common Name	Percent Areal Cover Area 3	Invasive	Native/Non-Native	Upland/Wetland
Catalpa speciosa	northern catalpa	4%	yes	non-native, state documented	upland
Acer rubrum	red maple	5%	no	native, county documented	wetland
Ailanthus altissima	tree of heaven	4%	yes	non-native, county documented	upland

Table 3-5
Existing Shrub Cover for Parcel 112-65, Area 4

Scientific Name	Common Name	Percent Areal Cover Area 4	Invasive	Native/Non-Native	Upland/Wetland
Ailanthus altissima	tree of heaven	55%	yes	non-native, county documented	upland

Appendix B
Cross Sections



LEGEND:

- MLLW -1.97
- MHHW 1.99
- GRAVEL BACKFILL
- TOPSOIL BACKFILL

NOTE:

1. MUDFLATS WILL BE BACKFILLED TO PRE-EXCAVATION ELEVATIONS TO APPROXIMATELY 10 FEET SEAWARD OF THE COIR LOGS INSTALLED AT THE LOW MARSH/MUDFLAT BOUNDARY, THEN SLOPED DOWNWARD TO MEET THE EXISTING HARBOR BOTTOM.

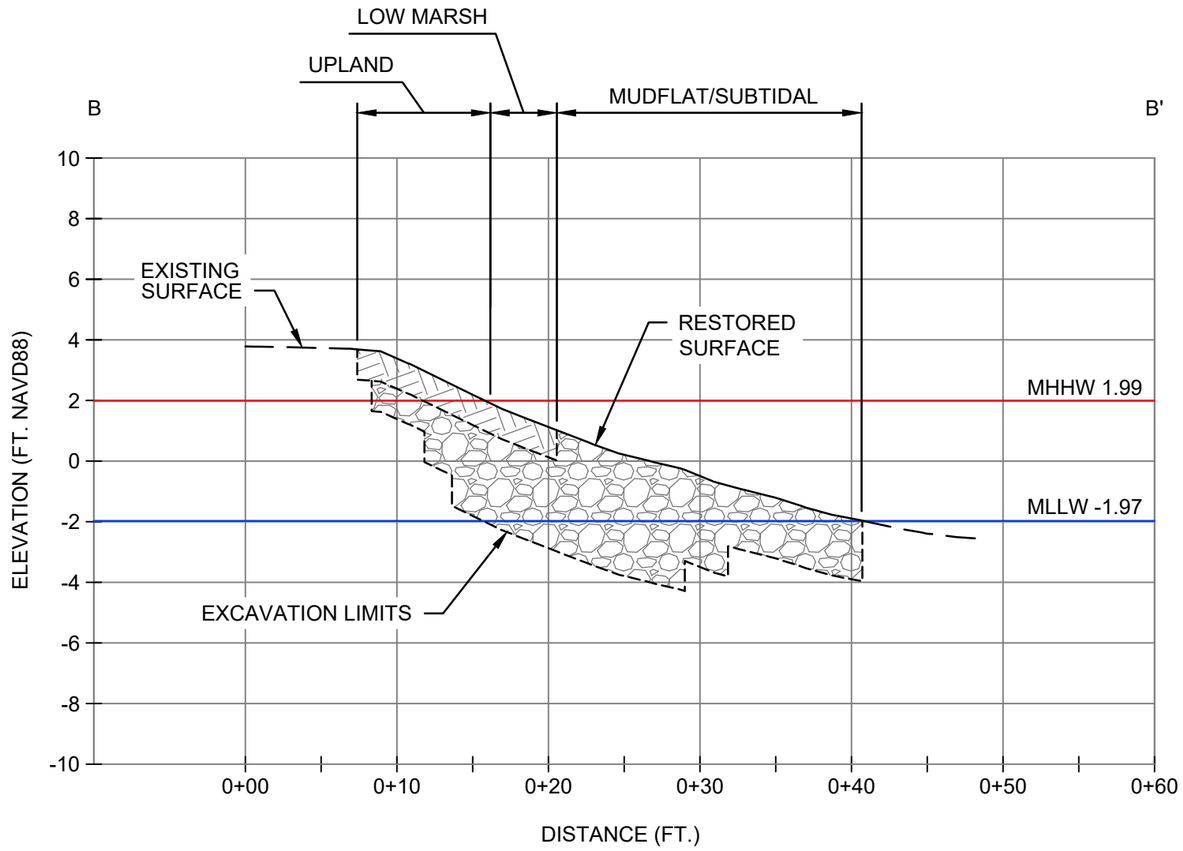
JACOBS®

WEST ZONE 1
SECTION A-A'

NEW BEDFORD HARBOR

DECEMBER 2018 | FIGURE 1

CREATED:12/27/2018 LAST SAVED:3/28/2019 BY:ENGLANLL



LEGEND:

- MLLW -1.97
- MHHW 1.99
- GRAVEL BACKFILL
- TOPSOIL BACKFILL

NOTE:

1. MUDFLATS WILL BE BACKFILLED TO PRE-EXCAVATION ELEVATIONS TO APPROXIMATELY 10 FEET SEAWARD OF THE COIR LOGS INSTALLED AT THE LOW MARSH/MUDFLAT BOUNDARY, THEN SLOPED DOWNWARD TO MEET THE EXISTING HARBOR BOTTOM.

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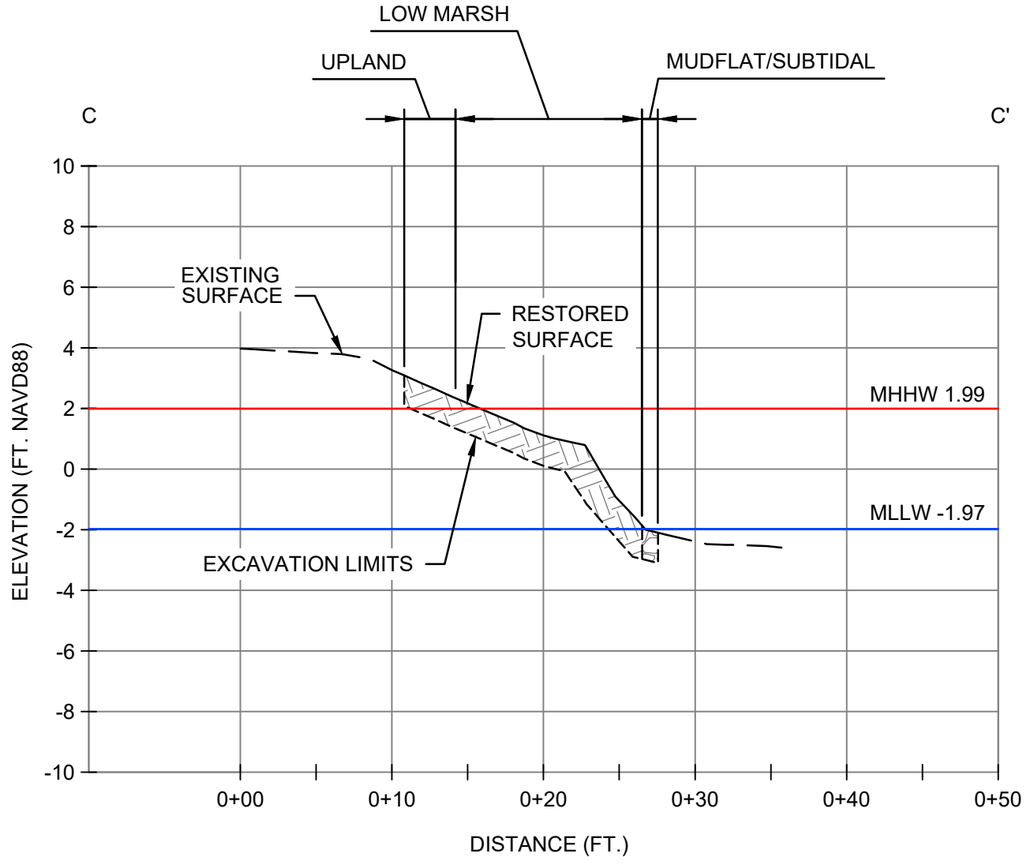
WEST ZONE 1
SECTION B-B'

NEW BEDFORD HARBOR

DECEMBER 2018 | FIGURE 2

CREATED:12/27/2018 LAST SAVED:5/8/2019 BY:ENGLANLL



LEGEND:

- MLLW -1.97
- MHHW 1.99
- GRAVEL BACKFILL
- TOPSOIL BACKFILL

NOTE:

1. MUDFLATS WILL BE BACKFILLED TO PRE-EXCAVATION ELEVATIONS TO APPROXIMATELY 10 FEET SEAWARD OF THE COIR LOGS INSTALLED AT THE LOW MARSH/MUDFLAT BOUNDARY, THEN SLOPED DOWNWARD TO MEET THE EXISTING HARBOR BOTTOM.

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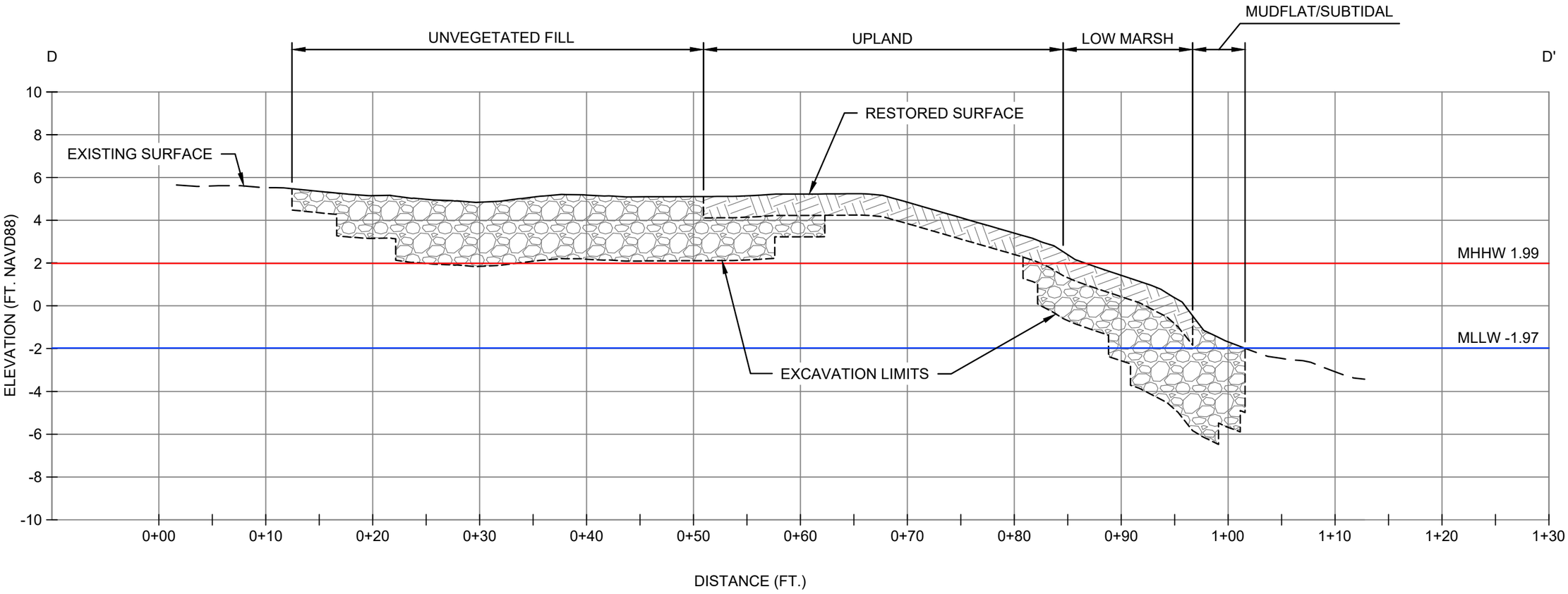
WEST ZONE 1
SECTION C-C'

NEW BEDFORD HARBOR

DECEMBER 2018 | FIGURE 3

CREATED:12/27/2018 LAST SAVED:5/8/2019 BY:ENGLANLL



LEGEND:

- MLLW -1.97
- MHHW 1.99
- GRAVEL BACKFILL
- TOPSOIL BACKFILL

NOTE:

1. MUDFLATS WILL BE BACKFILLED TO PRE-EXCAVATION ELEVATIONS TO APPROXIMATELY 10 FEET SEAWARD OF THE COIR LOGS INSTALLED AT THE LOW MARSH/MUDFLAT BOUNDARY, THEN SLOPED DOWNWARD TO MEET THE EXISTING HARBOR BOTTOM.

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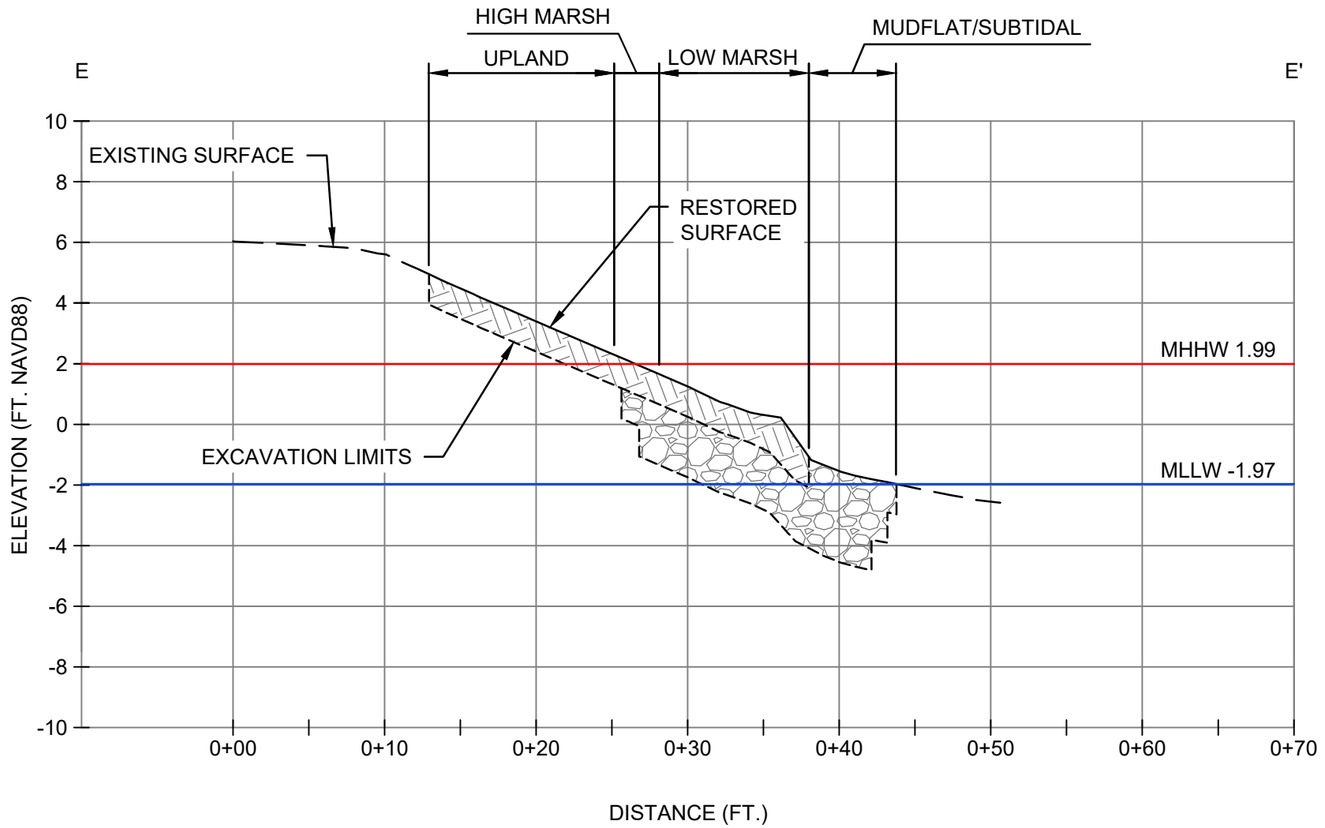
WEST ZONE 1
SECTION D-D'

NEW BEDFORD HARBOR

DECEMBER 2018 | FIGURE 4

CREATED:12/27/2018 LAST SAVED:5/8/2019 BY:ENGLANLL



LEGEND:

- MLLW -1.97
- MHHW 1.99
- GRAVEL BACKFILL
- TOPSOIL BACKFILL

NOTE:

1. MUDFLATS WILL BE BACKFILLED TO PRE-EXCAVATION ELEVATIONS TO APPROXIMATELY 10 FEET SEAWARD OF THE COIR LOGS INSTALLED AT THE LOW MARSH/MUDFLAT BOUNDARY, THEN SLOPED DOWNWARD TO MEET THE EXISTING HARBOR BOTTOM.

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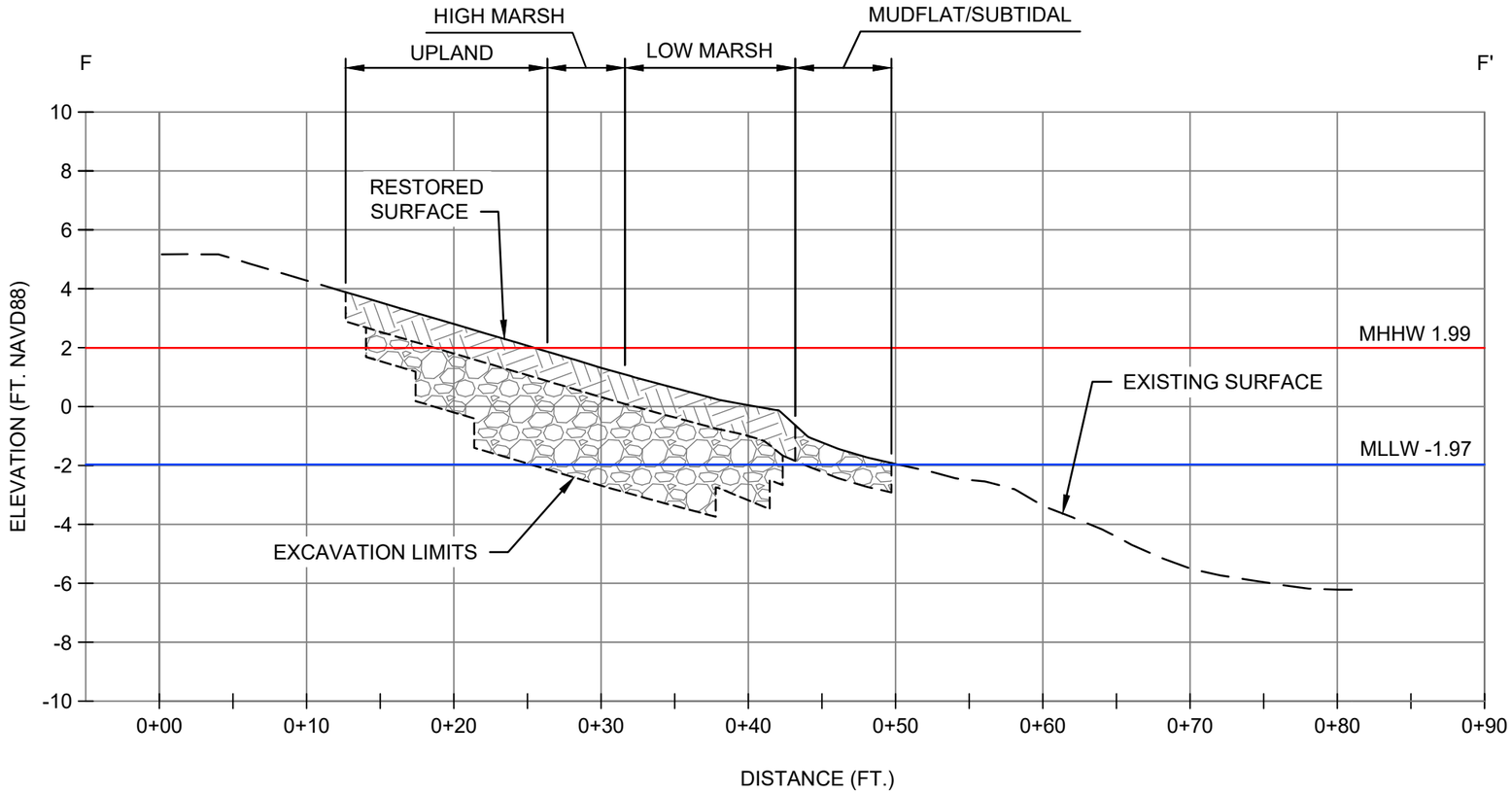
WEST ZONE 1
SECTION E-E'

NEW BEDFORD HARBOR

DECEMBER 2018 | FIGURE 5

CREATED:12/27/2018 LAST SAVED:5/8/2019 BY:ENGLANLL



LEGEND:

- MLLW -1.97
- MHHW 1.99
- GRAVEL BACKFILL
- TOPSOIL BACKFILL

NOTE:

1. MUDFLATS WILL BE BACKFILLED TO PRE-EXCAVATION ELEVATIONS TO APPROXIMATELY 10 FEET SEAWARD OF THE COIR LOGS INSTALLED AT THE LOW MARSH/MUDFLAT BOUNDARY, THEN SLOPED DOWNWARD TO MEET THE EXISTING HARBOR BOTTOM.

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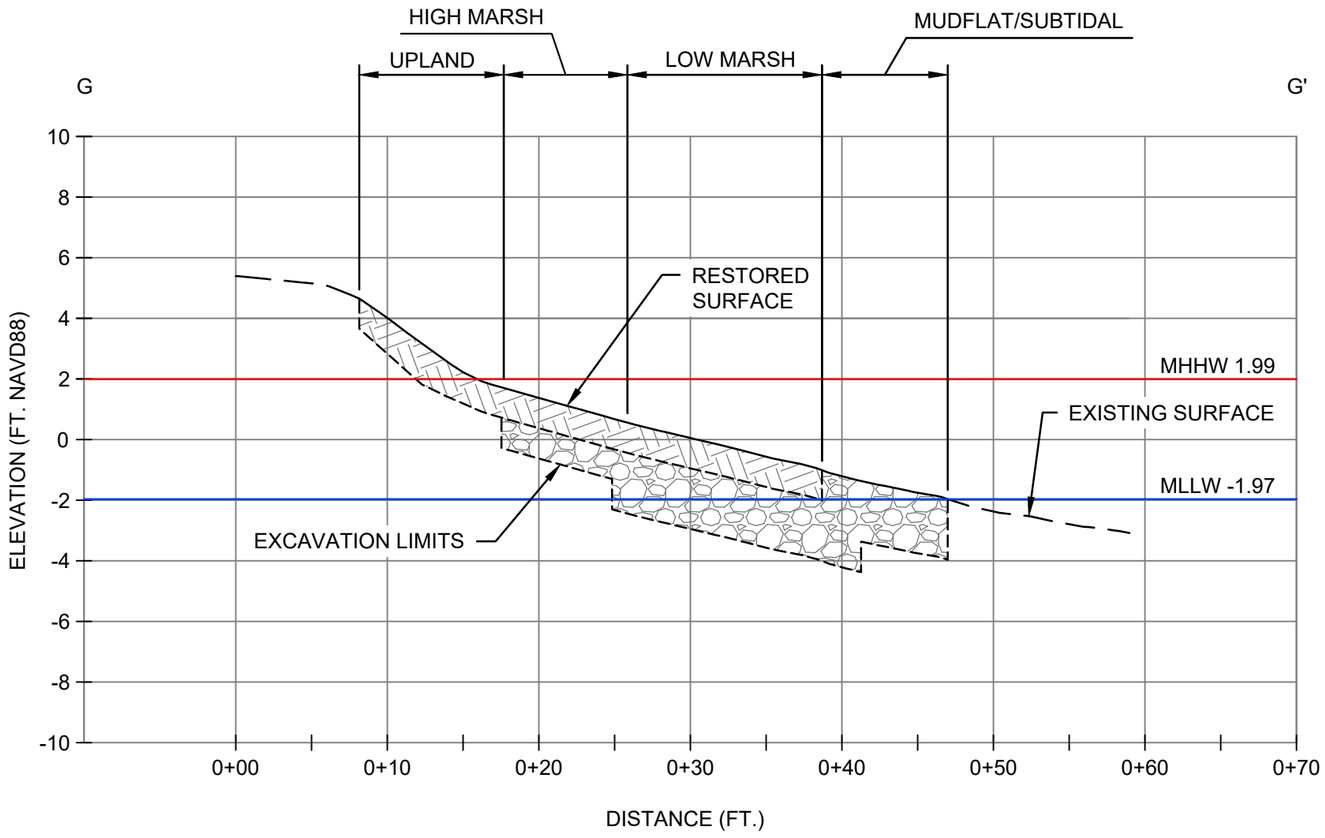
WEST ZONE 1
SECTION F-F'

NEW BEDFORD HARBOR

DECEMBER 2018 | FIGURE 6

CREATED:12/27/2018 LAST SAVED:5/8/2019 BY:ENGLANLL



LEGEND:

- MLLW -1.97
- MHHW 1.99
- GRAVEL BACKFILL
- TOPSOIL BACKFILL

NOTE:

1. MUDFLATS WILL BE BACKFILLED TO PRE-EXCAVATION ELEVATIONS TO APPROXIMATELY 10 FEET SEAWARD OF THE COIR LOGS INSTALLED AT THE LOW MARSH/MUDFLAT BOUNDARY, THEN SLOPED DOWNWARD TO MEET THE EXISTING HARBOR BOTTOM.

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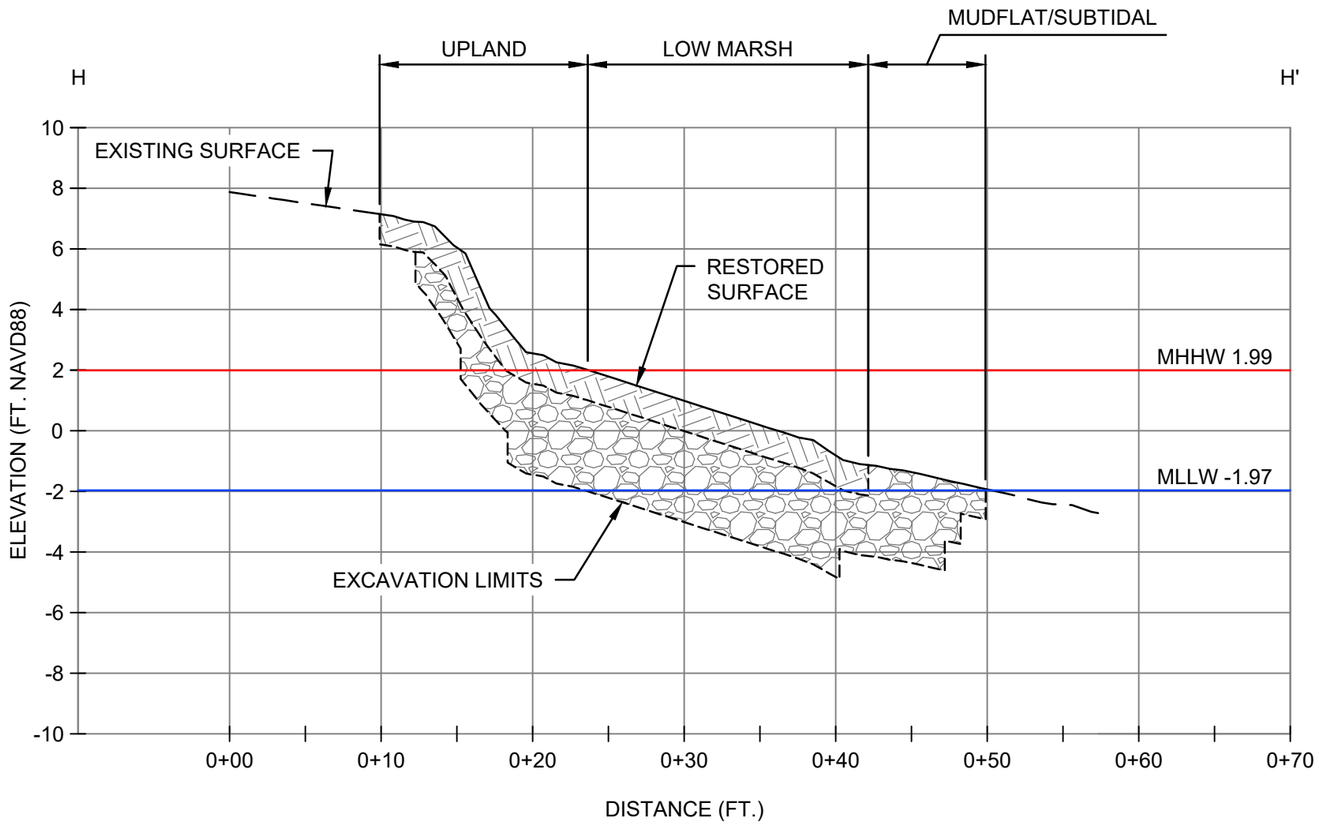
WEST ZONE 1
SECTION G-G'

NEW BEDFORD HARBOR

DECEMBER 2018 | FIGURE 7

CREATED:12/27/2018 LAST SAVED:5/8/2019 BY:ENGLANLL



LEGEND:

- MLLW -1.97
- MHHW 1.99
- GRAVEL BACKFILL
- TOPSOIL BACKFILL

NOTE:

1. MUDFLATS WILL BE BACKFILLED TO PRE-EXCAVATION ELEVATIONS TO APPROXIMATELY 10 FEET SEAWARD OF THE COIR LOGS INSTALLED AT THE LOW MARSH/MUDFLAT BOUNDARY, THEN SLOPED DOWNWARD TO MEET THE EXISTING HARBOR BOTTOM.

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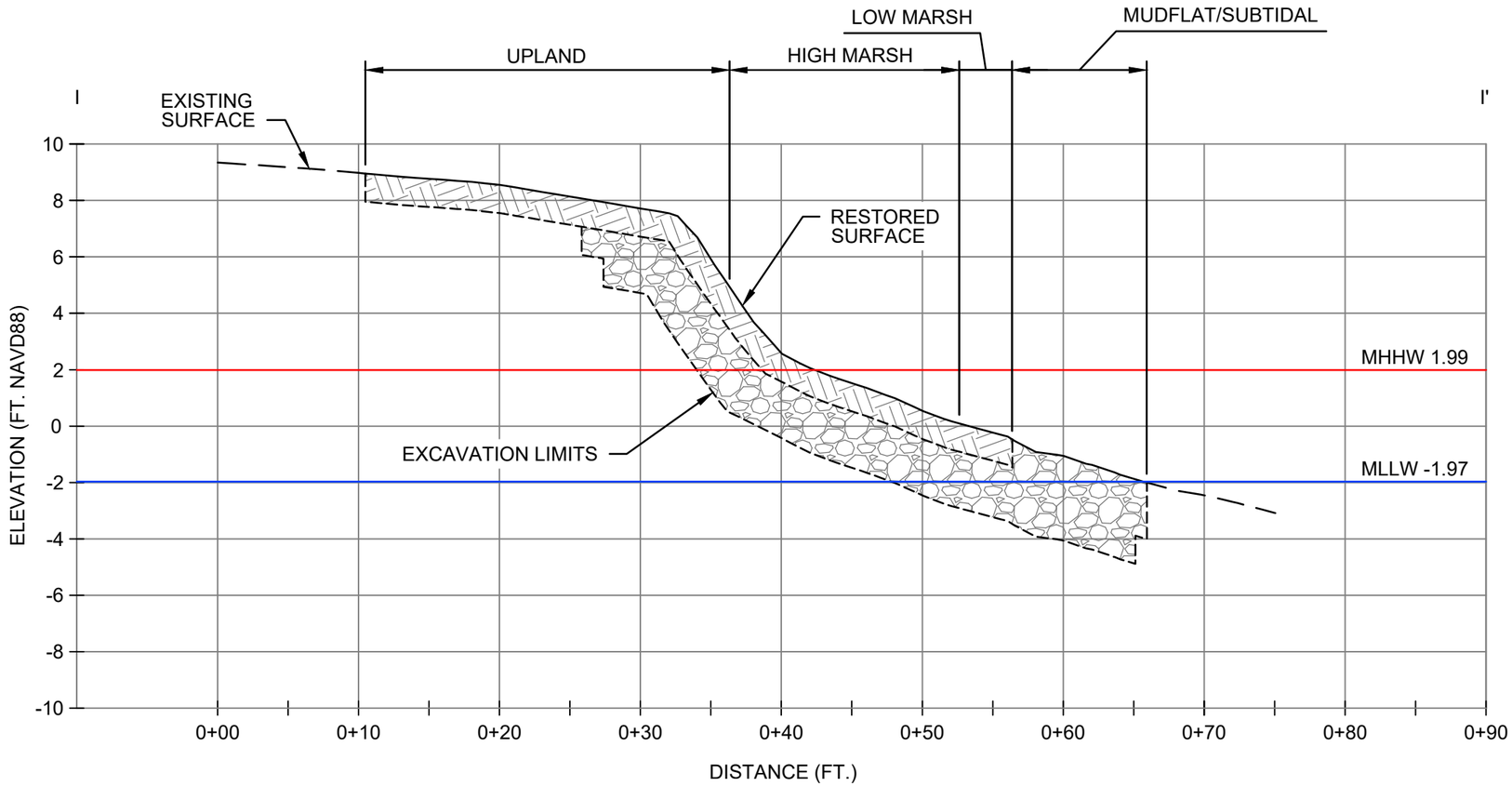
WEST ZONE 1
SECTION H-H'

NEW BEDFORD HARBOR

DECEMBER 2018 | FIGURE 8

CREATED:12/27/2018 LAST SAVED:5/8/2019 BY:ENGLANLL



LEGEND:

- MLLW -1.97
- MHHW 1.99
- GRAVEL BACKFILL
- TOPSOIL BACKFILL

NOTE:

1. MUDFLATS WILL BE BACKFILLED TO PRE-EXCAVATION ELEVATIONS TO APPROXIMATELY 10 FEET SEAWARD OF THE COIR LOGS INSTALLED AT THE LOW MARSH/MUDFLAT BOUNDARY, THEN SLOPED DOWNWARD TO MEET THE EXISTING HARBOR BOTTOM.

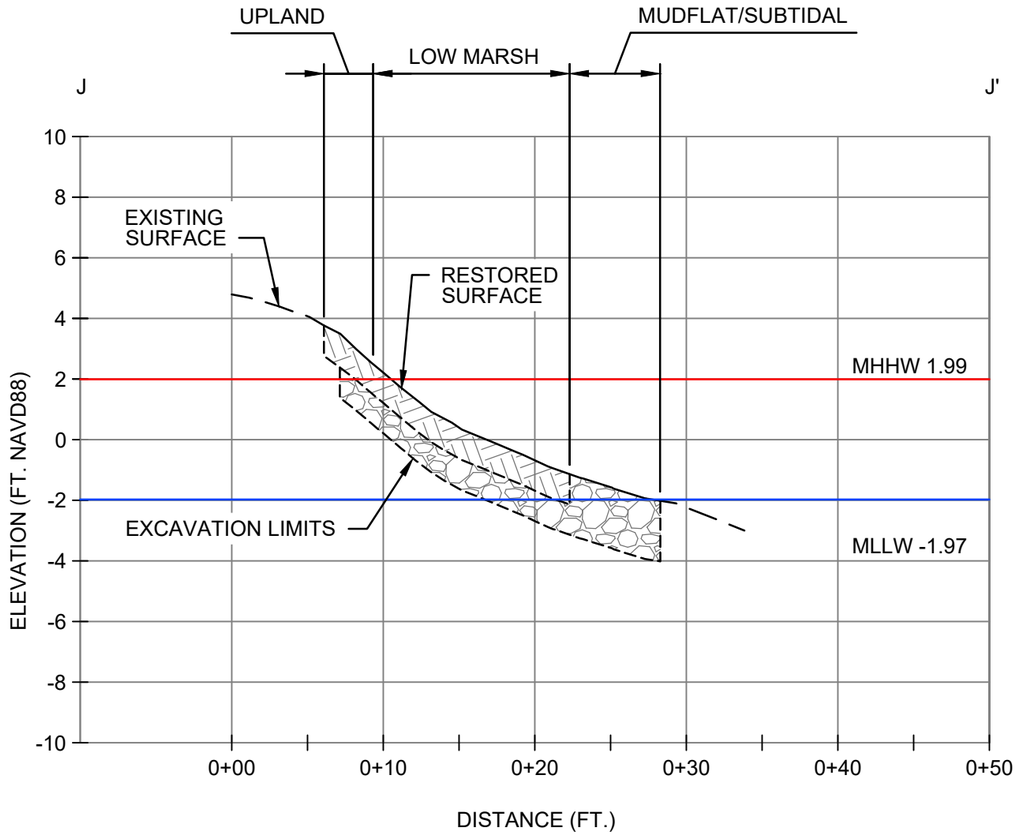
JACOBS®

WEST ZONE 1
SECTION I-I'

NEW BEDFORD HARBOR

DECEMBER 2018 | FIGURE 9

CREATED:12/27/2018 LAST SAVED:5/8/2019 BY:ENGLANLL



LEGEND:

- MLLW -1.97
- MHHW 1.99
- GRAVEL BACKFILL
- TOPSOIL BACKFILL

NOTE:

1. MUDFLATS WILL BE BACKFILLED TO PRE-EXCAVATION ELEVATIONS TO APPROXIMATELY 10 FEET SEAWARD OF THE COIR LOGS INSTALLED AT THE LOW MARSH/MUDFLAT BOUNDARY, THEN SLOPED DOWNWARD TO MEET THE EXISTING HARBOR BOTTOM.

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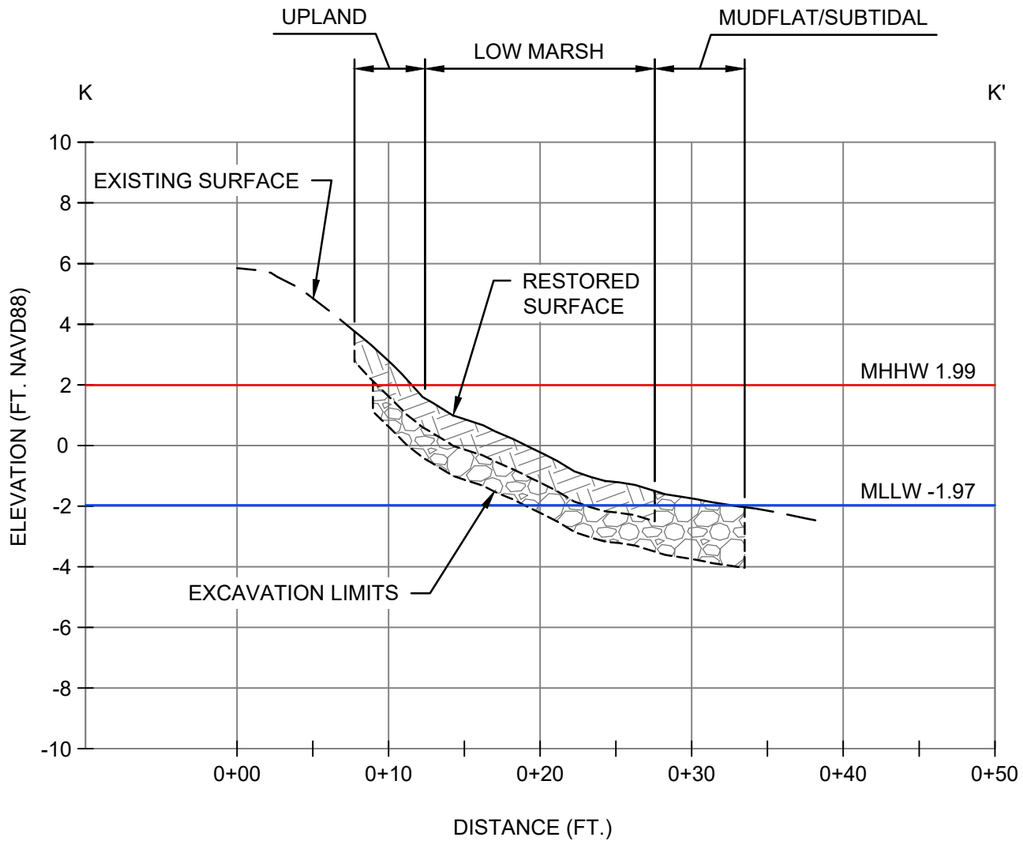
WEST ZONE 1
SECTION J-J'

NEW BEDFORD HARBOR

DECEMBER 2018 | FIGURE 10

CREATED:12/27/2018 LAST SAVED:5/8/2019 BY:ENGLANLL



LEGEND:

- MLLW -1.97
- MHHW 1.99
- GRAVEL BACKFILL
- TOPSOIL BACKFILL

NOTE:

1. MUDFLATS WILL BE BACKFILLED TO PRE-EXCAVATION ELEVATIONS TO APPROXIMATELY 10 FEET SEAWARD OF THE COIR LOGS INSTALLED AT THE LOW MARSH/MUDFLAT BOUNDARY, THEN SLOPED DOWNWARD TO MEET THE EXISTING HARBOR BOTTOM.

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WEST ZONE 1
SECTION K-K'

NEW BEDFORD HARBOR

DECEMBER 2018 | FIGURE 11

CREATED:12/27/2018 LAST SAVED:5/8/2019 BY:ENGLANLL

Legend

- Cross Section Locations
- 0-1' Excavation Depth
- 1-2' Excavation Depth
- 2-3' Excavation Depth
- 3-4' Excavation Depth
- 4-5' Excavation Depth
- 5-6' Excavation Depth
- Mean Lower Low Water
- Mean Higher High Water
- Parcel Boundary
- 1-foot Contour
- Mudflat / Subtidal (Minimal Backfill as Needed for Drainage or Slope Stability)
- Proposed High Marsh
- Proposed Low Marsh
- Proposed Unvegetated Fill
- Proposed Upland

0 50 100 Feet

March 2019

Basemap Data Source: MassGIS

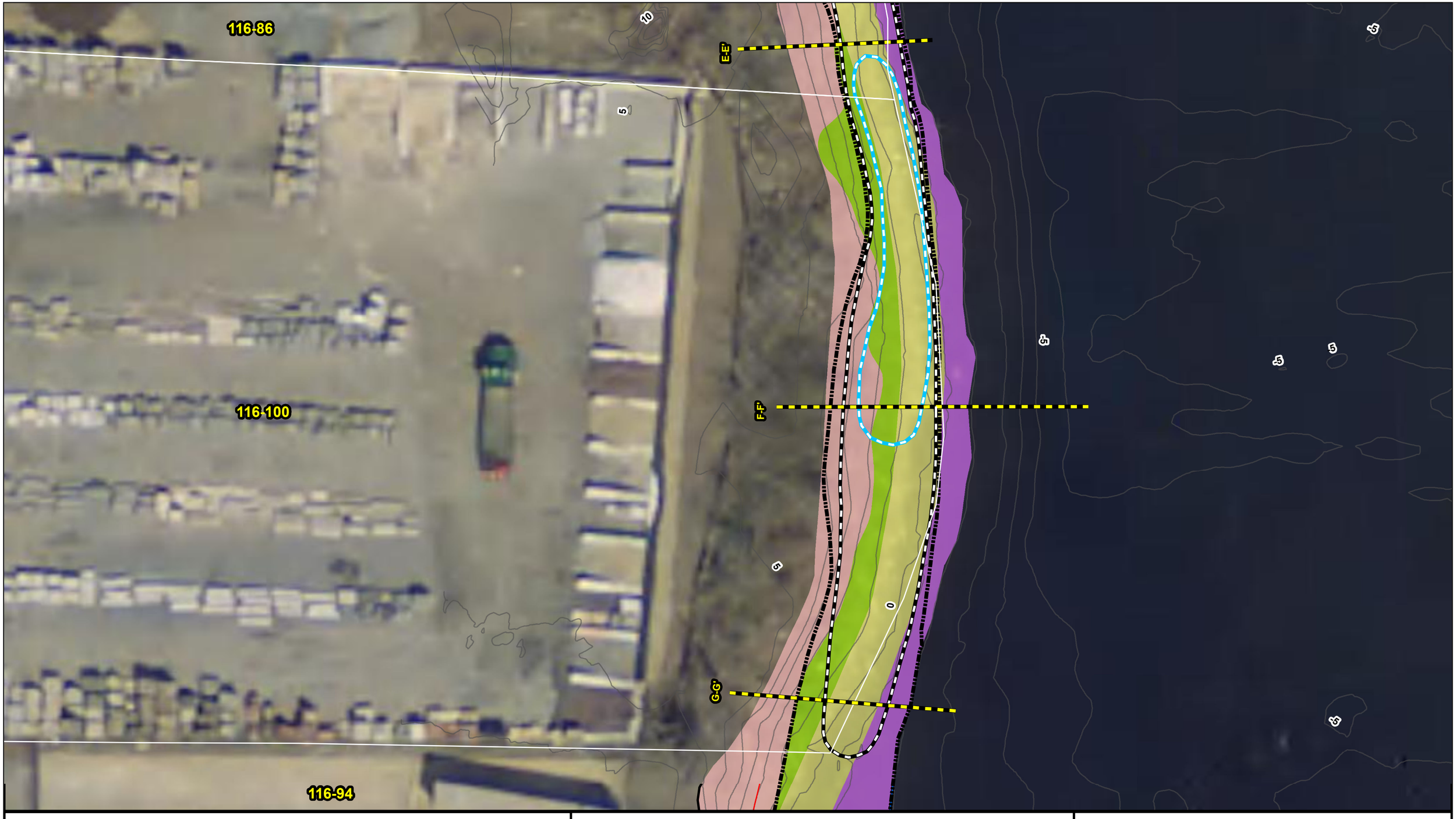
Vertical Datum: NAVD88

Intertidal West Zone 1
Parcels 116-132/116-86
Cross Section Locations

New Bedford Harbor Superfund Site

JACOBS

Figure 12



Legend

- Cross Section Locations
- Mean Lower Low Water
- Mean Higher High Water
- 0-1' Excavation Depth
- 1-2' Excavation Depth
- 2-3' Excavation Depth
- 3-4' Excavation Depth
- Parcel Boundary
- 1-foot Contour
- Mudflat / Subtidal (Minimal Backfill as Needed for Drainage or Slope Stability)
- Proposed High Marsh
- Proposed Low Marsh
- Proposed Upland

0 50 100 Feet

March 2019

Basemap Data Source: MassGIS

Vertical Datum: NAVD88

Intertidal West Zone 1
Parcel 116-100
Cross Section Locations

New Bedford Harbor Superfund Site

JACOBS

Figure 13

Legend

- 0-1' Excavation Depth
- 1-2' Excavation Depth
- 2-3' Excavation Depth
- 3-4' Excavation Depth
- 4-5' Excavation Depth
- 5-6' Excavation Depth
- Mean Lower Low Water
- Mean Higher High Water
- Parcel Boundary
- 1-foot Contour
- Cross Section Locations
- Mudflat / Subtidal (Minimal Backfill as Needed for Drainage or Slope Stability)
- Proposed High Marsh
- Proposed Low Marsh
- Unvegetated Fill
- Proposed Upland/Lawn
- Proposed Upland

0 50 100 Feet

March 2019

Basemap Data Source: MassGIS

Vertical Datum: NAVD88

Intertidal West Zone 1
Parcel 116-94
Cross Section Locations

New Bedford Harbor Superfund Site

JACOBS

Figure 14

Legend

- Cross Section Locations
- 0-1' Excavation Depth
- 1-2' Excavation Depth
- Mean Lower Low Water
- Mean Higher High Water
- Parcel Boundary
- 1-foot Contour
- Aerovox Cap Zone 1
- Aerovox Cap Zone 3
- Mudflat / Subtidal (Minimal Backfill as Needed for Drainage or Slope Stability)
- Proposed High Marsh
- Proposed Low Marsh
- Proposed Upland

0 50 100 Feet

March 2019

Basemap Data Source: MassGIS

Vertical Datum: NAVD88

Intertidal West Zone 1
Parcel 112-65
Cross Section Locations
New Bedford Harbor Superfund Site

JACOBS

Figure 15

Appendix C

Schedule

(to be provided at a later date)