NW Natural ISS Field Pilot Study Implementation
Gasco Sediments Site – September/October 2023
Field Change Request Form

Project Name: Gasco Sediments Site **Contractor:** Sevenson Environmental Services, Inc.

Field Activity: ISS Field Pilot Implementation **Request Number:** 1

To: Hunter Young, U.S. Environmental Protection Agency **Date:** September 28, 2023

Field Change Request Title: Repositioned ISS Pilot Study Footprint and Post-Construction Sand Placement

Description

This Field Change Request Form #1 is associated with two issues the NW Natural Design Team has encountered during ongoing performance of construction activities in accordance with the U.S. Environmental Protection Agency (EPA)-approved *Final Revised In Situ Stabilization and Solidification Field Pilot Study Work Plan* (Work Plan).

Issue 1

As discussed in Section 3.1 of the Work Plan, the Design Team performed a detailed, multiple lines of evidence evaluation to identify a proposed in situ stabilization and solidification (ISS) field pilot study (FPS) area that is a representative and conservative (i.e., highest potential for increased permeability and leachability) scenario for the Gasco Sediments Site Project Area (Project Area) sediment conditions. This selection was based on evaluation of the following primary and secondary lines of evidence:

- **Primary lines of evidence:** Presence of principal threat waste nonaqueous phase liquid (PTW-NAPL) and grain size distribution
- **Secondary lines of evidence:** Bulk sediment chemical concentrations for naphthalene, benzene, and metals; visual observations of substantial product that do not achieve the Project Area-specific definition of PTW-NAPL; mudline bathymetry and water depths; and the presence of nearby marine structures

Regarding the primary line of evidence, it was deemed critical that the FPS footprint be located in an area containing deposits of PTW-NAPL in fine-grained sediments because sediment with high fines content have the potential to present a greater challenge for stabilization treatment. Regarding the secondary lines of evidence, it was deemed critical that the FPS area be located in an area containing:

- Portland Harbor Superfund Site Record of Decision (ROD) Table 21 naphthalene PTW-not reliably contained threshold exceedances, elevated benzene concentrations, and metals concentrations that are representative of the central tendency of the data in the Project Area
- Visual observations of substantial product that do not achieve the Project Area-specific definition of PTW-NAPL
- Representative sloping bathymetry elevations at water depths that will allow sufficient draft for marine equipment to perform the work from the waterside
- Marine structures in relatively close proximity to facilitate a demonstration the work can be performed adjacent to structures

Lastly, as discussed in Section 3.3.3 of the Work Plan, the FPS footprint was also selected to directly account for the documented presence of debris based on the results of pre-design investigation multibeam, side-scan sonar sub-bottom profile, and diver reconnaissance surveys performed throughout the FPS area. The Work Plan included the removal of identified debris prior to ISS auguring and included a process for managing encountered debris during auguring that included halting auguring operations, attempting to remove the debris, and re-initiating auguring in the same ISS column to attempt to achieve the target depth of contamination (DOC) below mudline.

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Based on the results of the multiple lines of evidence evaluation, the FPS footprint was proposed directly adjacent to the ISS bench scale treatability testing location ISSTS-003 and in close proximity to the Siltronic outfall, as shown in Work Plan Figure 3-2 (Attachment A). This proximity allows for the following: 1) direct comparison of the FPS strength and permeability results (see Work Plan Section 3.3.8.3) to the bench scale testing results for the *Additional Revised In Situ Stabilization and Solidification Bench Scale Treatability Study Work Plan*; and 2) demonstration that the work can be successfully performed without impacting adjacent structures.

Upon mobilization of the in-water construction equipment to the FPS area in mid-September 2023, the river elevations were significantly lower than what was anticipated based on historically measured elevations in September. These elevations are too shallow for the marine construction equipment to access the shoreward portions of the ISS area without grounding, which is prohibited in the Work Plan. Based on current river elevations, the equipment is unable to access ISS rows 4 and 5 shown in Figure 1. The river elevations are increasing slightly as time progresses, but it is considered unlikely that elevations will increase sufficiently to facilitate access to the shoreward portions of the ISS area.

In addition, following 2 days of targeted removal of surface and subsurface debris within the FPS area prior to initiation of ISS auguring, additional previously unidentified subsurface debris were encountered at variable depths below mudline in several columns completed to date in row 1 of the FPS area (Figure 1). This debris comprised timber pilings and large cobbles. In four of the column locations (1-4, 1-5, 1-8, and 1-9), the presence of this debris prevented achievement of ISS treatment to the full target 30-foot DOC.

Issue 2
As discussed in Section 3.4.1.1.1 of the Work Plan, ISS swell materials that are generated as part of the ISS activities may lead to increased post-construction mudline elevations. To ensure no flood rise impacts, these increases must be removed as necessary to ensure there is no net fill when calculated across the FPS area. Post-ISS treatment surveying has shown that the mudline elevations surrounding the ISS-treated columns to date are less than the pre-construction mudline elevations. Management of post-construction mudline elevations that are less than the pre-construction elevations is not included in the Work Plan.

Recommended Change

Issue 1
NW Natural requests the flexibility to reconfigure the FPS area to allow ISS column placements within the approximate extents shown in Figure 1. The total number of columns that will be advanced cannot be determined at this time, but the goal is to advance the minimum number (29) identified in the Work Plan. Figure 2 shows a profile view of this potential full expansion in the channelward direction. As discussed with EPA, the Design Team will determine whether and to what extent expansion is necessary based on river elevations encountered, the results of additional ISS auguring, and associated debris removal within the EPA-approved FPS area in the next few weeks. Now that NW Natural has successfully completed multiple days of ISS auguring with associated field and chemistry water quality monitoring data showing no exceedances of the applicable criteria, the Design Team will focus on performing additional debris removal either within the current or expanded FPS area and testing additional means and methods to clear areas with obstructions to ISS auguring. Consistent with Appendix D of the Work Plan, water quality monitoring will be performed in accordance with changes in construction activities.

The Design Team reevaluated the multiple lines of evidence presented above and confirmed the potential expansion maintains achievement of the FPS area objectives. Specifically:

- **Primary lines of evidence:**
    - PTW-NAPL has been observed inside the expanded FPS area (see Work Plan Figure 3-1a in Attachment A).
    - The grain size distribution is expected to be comparable to what was observed in the original FPS area because the expanded FPS area is directly adjacent.
- **Secondary lines of evidence:**
    - Bulk sediment chemical concentrations are expected to be comparable to what was observed in the original FPS area (which contained no subsurface sediment core data) because the expanded FPS area is directly adjacent.
    - Visual observations of substantial product that do not achieve the Project Area-specific definition of PTW-NAPL were made at ISSTS-003, and the expanded FPS area is either within or adjacent to that sampling location.
    - Mudline elevations and slopes are generally the same as shown in Figures 1 and 2. The water depth does increase somewhat, and the Design Team confirmed that there is sufficient ISS drill shaft to accommodate the increased depths.
    - The expanded area remains within close proximity to the Siltronic outfall (see Figure 1).

In addition, the expanded FPS area:

- Remains directly adjacent to ISS bench scale treatability location ISSTS-003 (see Work Plan Figure 3-2 in Attachment A).
- Remains sufficiently offset from the navigation channel such that no work will occur in the 10-foot offset (Figure 2).
- Relocates the ISS footprint closer to subsurface sediment core location PDI-198 where the DOC is 17 feet below mudline (see attached Work Plan Figure 3-3 in Attachment A). To maintain the same level of conservatism identified in Section 3.1 of the Work Plan, NW Natural will maintain the originally proposed DOC of 30 feet below mudline in any expanded FPS area column location.

Issue 2
As discussed with EPA, if the post-construction mudline elevations are lower than the pre-construction mudline elevations, NW Natural agrees to import and place the same sand material approved for cover of the dolphin piling removal area to approximately return the mudline elevations to the pre-construction elevations, and the placement schedule will be determined in coordination with EPA. Consistent with Section 3.4.1.1.1 of the Work Plan, the clean sand placement performance criteria will include the following:

- Multibeam bathymetry data will be collected with a horizontal and vertical accuracy of 0.5 foot.
- Multibeam XYZ files will be provided electronically with the computer mean value a maximum grid spacing of 0.5 foot.
- The required minimum placement elevation will be achieved in at least 90% of the FPS area. In addition, no sounding in any of the remaining 10% of the FPS area will be greater than 6 inches below the required elevation.

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Respondent Lead:

Ryan Barth		September 28, 2023
Respondent Project Lead	**Signature**	**Date**

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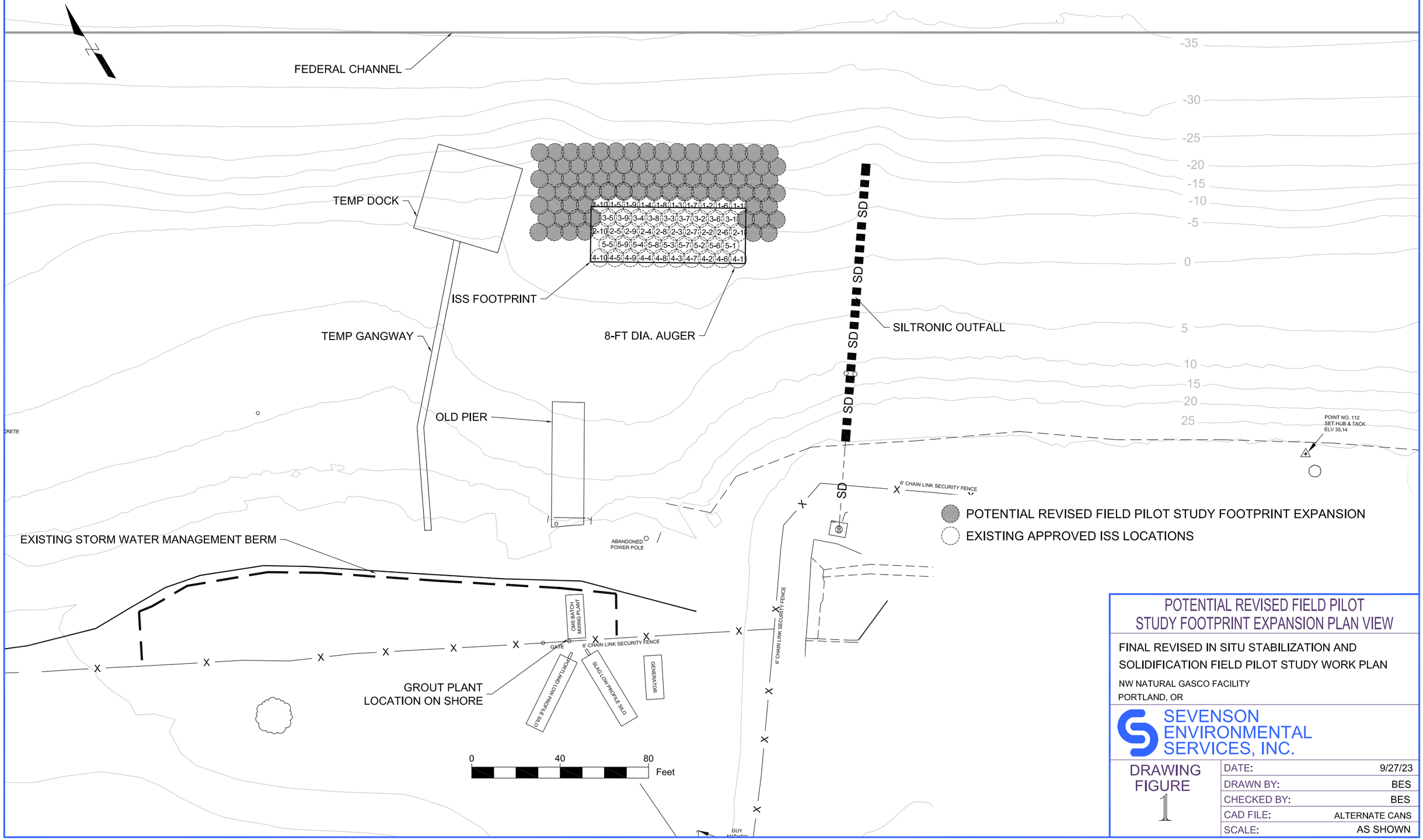
Figures



POTENTIAL REVISED FIELD PILOT STUDY FOOTPRINT EXPANSION PLAN VIEW

FINAL REVISED IN SITU STABILIZATION AND SOLIDIFICATION FIELD PILOT STUDY WORK PLAN

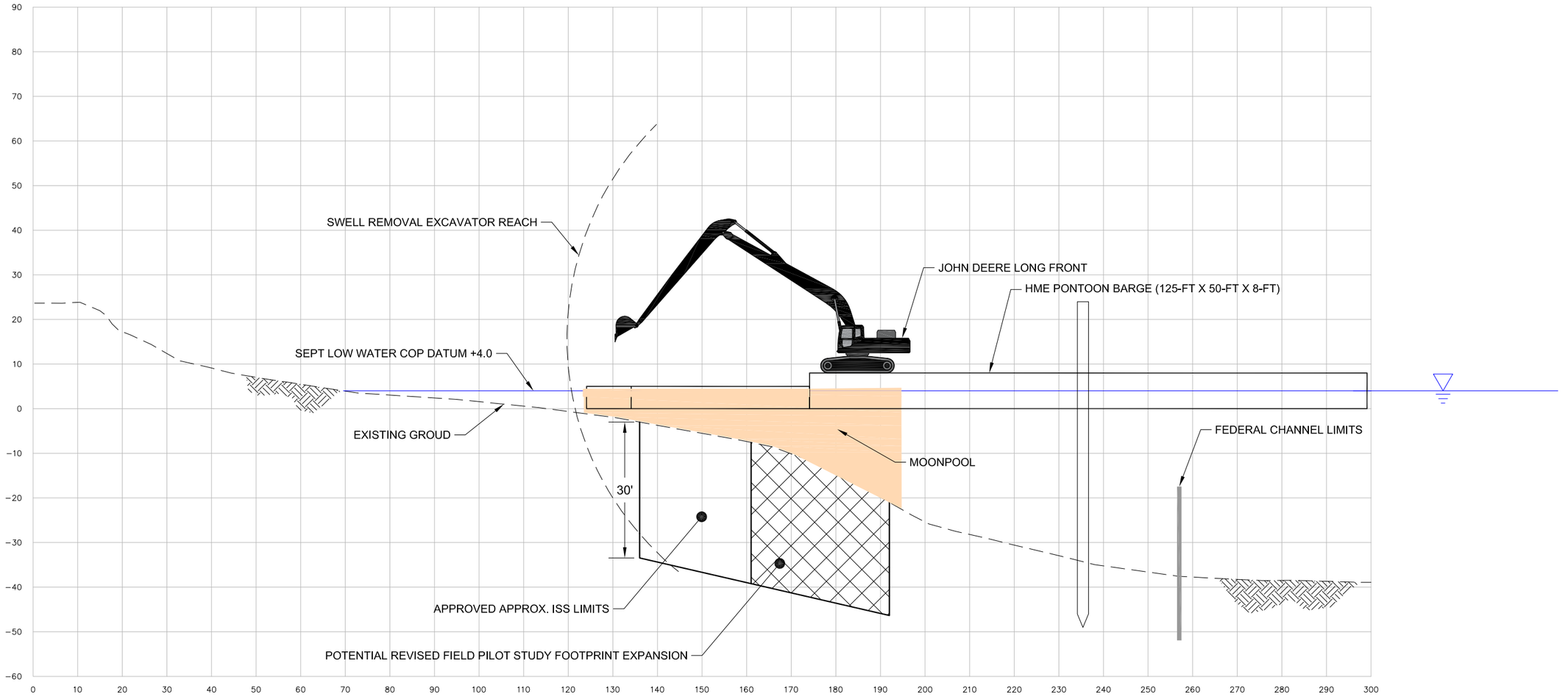
NW NATURAL GASCO FACILITY
PORTLAND, OR

SEVENSON ENVIRONMENTAL SERVICES, INC.

DRAWING FIGURE 1

DATE:	9/27/23
DRAWN BY:	BES
CHECKED BY:	BES
CAD FILE:	ALTERNATE CANS
SCALE:	AS SHOWN

GASCO0054076



POTENTIAL REVISED FIELD PILOT STUDY FOOTPRINT EXPANSION PROFILE VIEW

FINAL REVISED IN SITU STABILIZATION AND SEDIMENT FIELD PILOT STUDY WORK PLAN

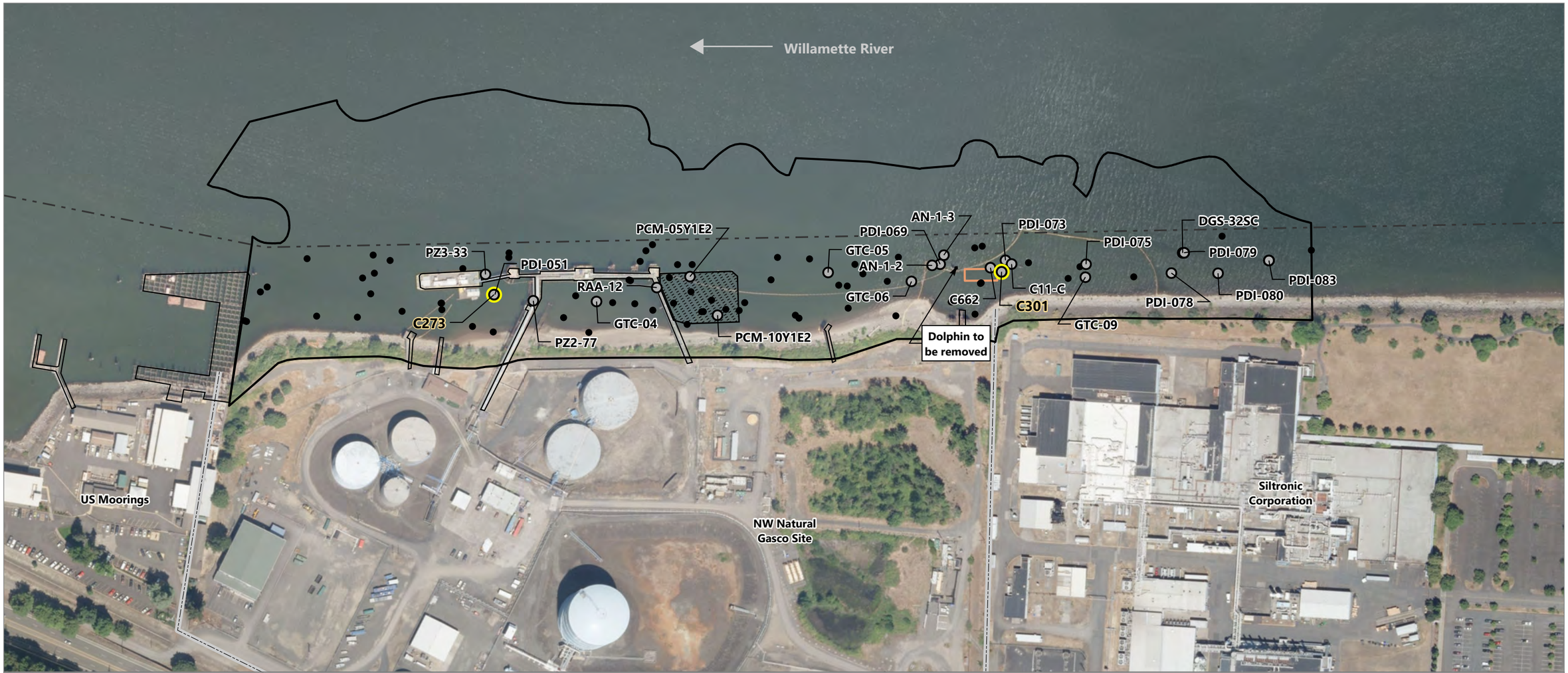
NW NATURAL GASCO FACILITY
PORTLAND, OR

SEVENSON ENVIRONMENTAL SERVICES, INC.

FIGURE 2

DATE:	9/23/23
DRAWN BY:	TMD
CHECKED BY:	TMD
CAD FILE:	GASCO ISS AND DREDGE
SCALE:	AS SHOWN

Attachment A



LEGEND:

- ISS Bench Scale Treatability Study Sample Location and Depth Interval
- PTW-NAPL Observation
- Historical Subsurface Sediment Sample Location
- Gasco Sediments Project Area
- Field Pilot Study Footprint
- Gasco Early Action Removal Action Pilot Cap
- Structures
- Navigation Channel
- Property Line

NOTES:

1. Arrow indicates direction of flow of river.
2. Horizontal datum is NAD83 (HARN 91) Oregon State Plane North, International Feet.
3. Vertical datum is City of Portland (COP), Feet.
4. Aerial imagery from City of Portland 2018.

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Feet

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ANCHOR QEA

Figure 3-1a
PTW-NAPL Observations: 0 to 4 Feet
Final Revised in Situ Stabilization and Solidification Field Pilot Study Work Plan
Gasco Sediments Project Area
GASCO0054079

LEGEND:

- ISS Bench Scale Treatability Study Sample Location and Depth Interval
- PTW-NAPL Observation
- Historical Subsurface Sediment Sample Location
- Field Pilot Study Footprint
- Gasco Sediments Project Area
- Gasco Early Action Removal Action Pilot Cap
- Structures
- Navigation Channel
- Property Line

NOTES:

1. Arrow indicates direction of flow of river.
2. Horizontal datum is NAD83 (HARN 91) Oregon State Plane North, International Feet.
3. Vertical datum is City of Portland (COP), Feet.
4. Aerial imagery from City of Portland 2018.

0 230
Feet

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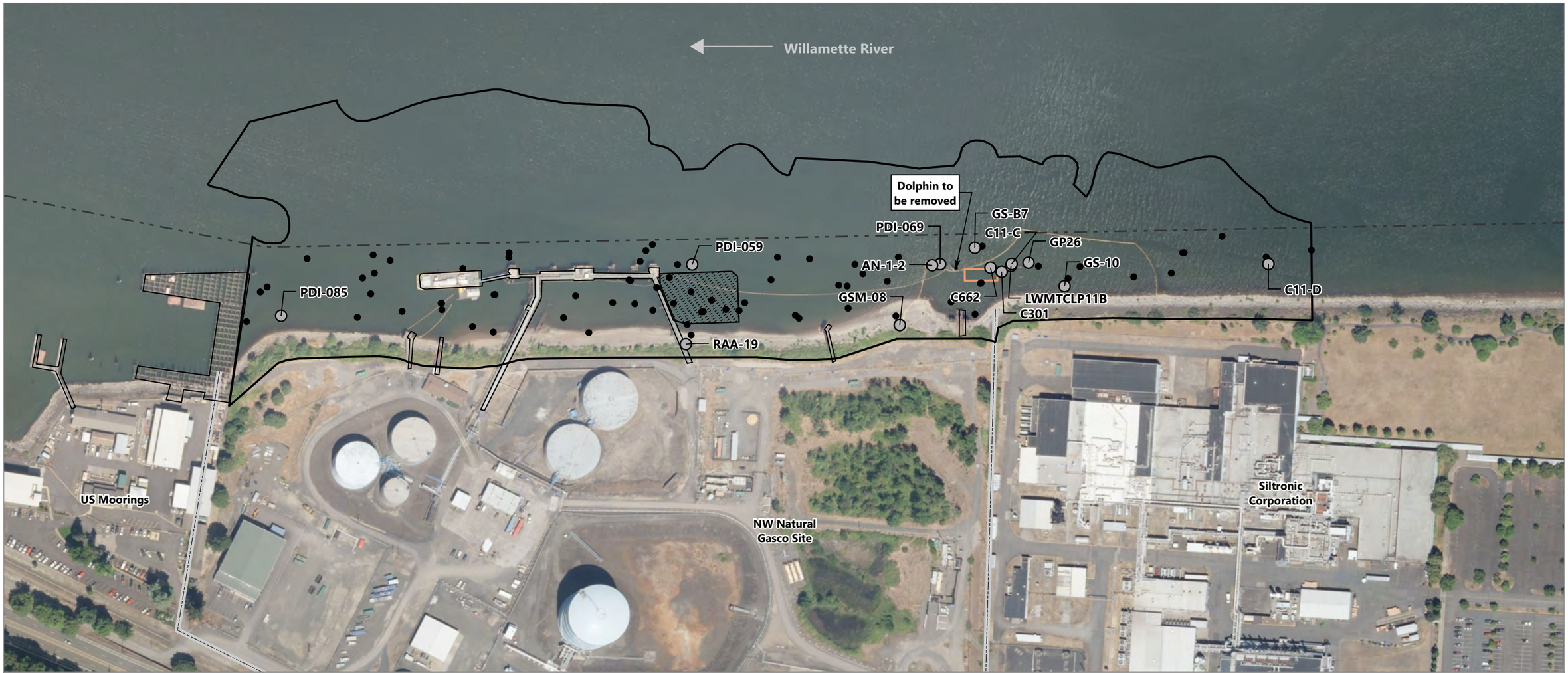
Figure 3-1b
PTW-NAPL Observations: 4 to 8 Feet
Final Revised in Situ Stabilization and Solidification Field Pilot Study Work Plan
Gasco Sediments Project Area
GASCO0054080



LEGEND:

- PTW-NAPL Observation
- Gasco Sediments Project Area
- Field Pilot Study Footprint
- Gasco Early Action Removal Action Pilot Cap
- Structures
- Navigation Channel
- Property Line

NOTES:

1. Arrow indicates direction of flow of river.
2. Horizontal datum is NAD83 (HARN 91) Oregon State Plane North, International Feet.
3. Vertical datum is City of Portland (COP), Feet.
4. Aerial imagery from City of Portland 2018.

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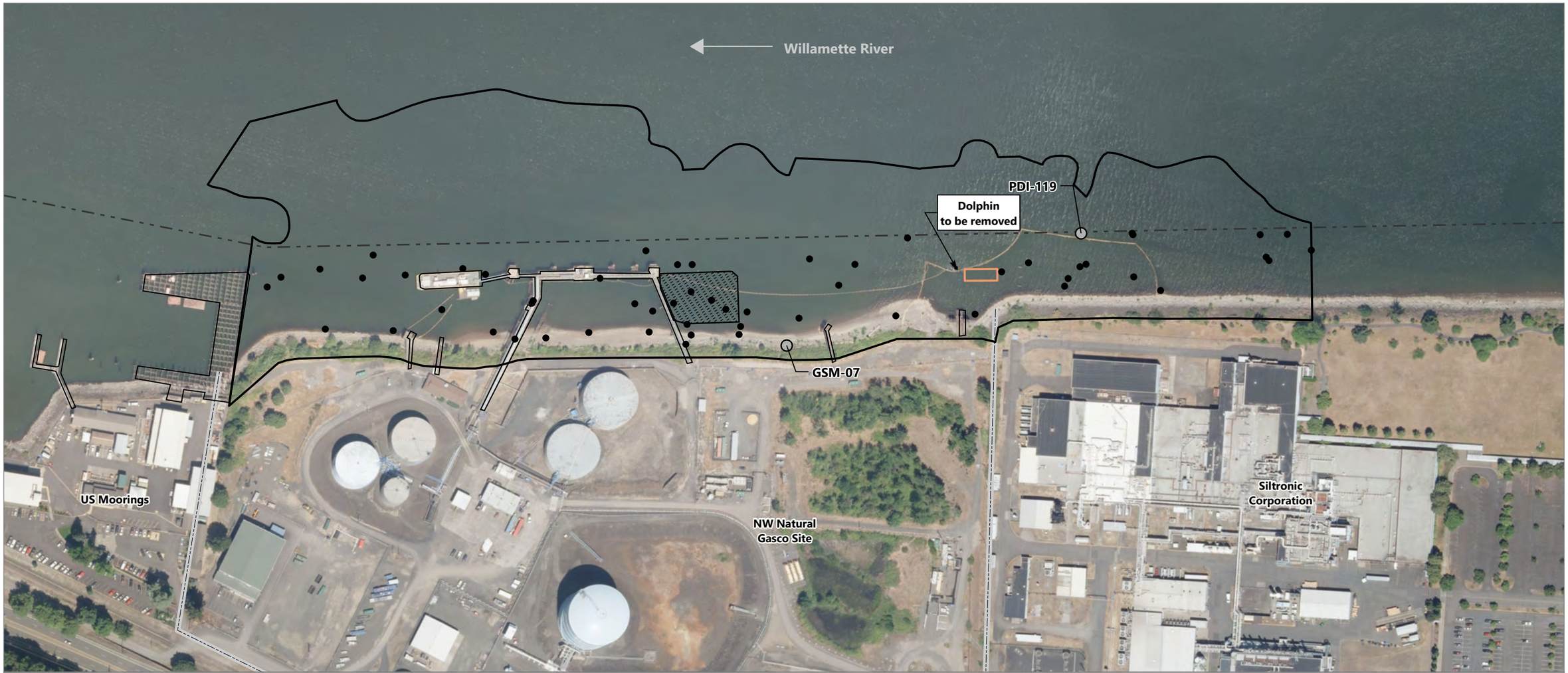
Figure 3-1c
PTW-NAPL Observations: 8 to 16 Feet
Final Revised in Situ Stabilization and Solidification Field Pilot Study Work Plan
Gasco Sediments Project Area
GASCO0054081



LEGEND:

- PTW-NAPL Observation
- Historical Subsurface Sediment Sample Location
- Gasco Sediments Project Area
- Field Pilot Study Footprint
- Gasco Early Action Removal Action Pilot Cap
- Structures
- Navigation Channel
- Property Line

NOTES:

1. Arrow indicates direction of flow of river.
2. Horizontal datum is NAD83 (HARN 91) Oregon State Plane North, International Feet.
3. Vertical datum is City of Portland (COP), Feet.
4. Aerial imagery from City of Portland 2018.

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Feet

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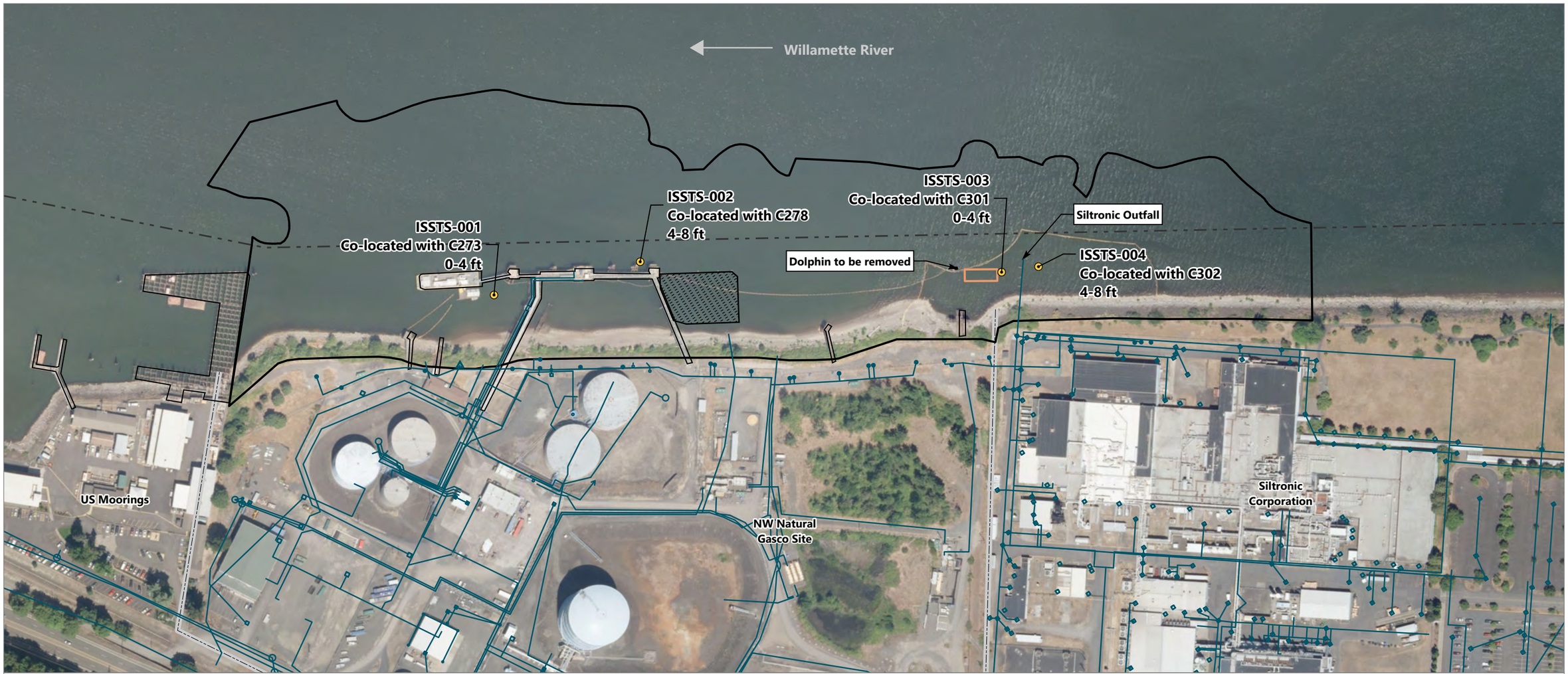
Figure 3-1d
PTW-NAPL Observations: Deeper Than 16 Feet
Final Revised in Situ Stabilization and Solidification Field Pilot Study Work Plan
Gasco Sediments Project Area
GASCO0054082



LEGEND:

- Proposed In-water Sediment Sample Locations
- Property Line
- Stormwater Feature
- Field Pilot Study Footprint
- Gasco Early Action Removal Action Pilot Cap
- Structures
- Navigation Channel
- Gasco Sediments Project Area

NOTES:

1. Arrow indicates direction of flow of river.
2. Horizontal datum is NAD83 (HARN 91) Oregon State Plane North, International Feet.
3. Vertical datum is City of Portland (COP), Feet.
4. Aerial imagery from City of Portland 2018.

DOC: Depth of Contamination
ISS: In Situ Stabilization and Solidification

0 220
Feet

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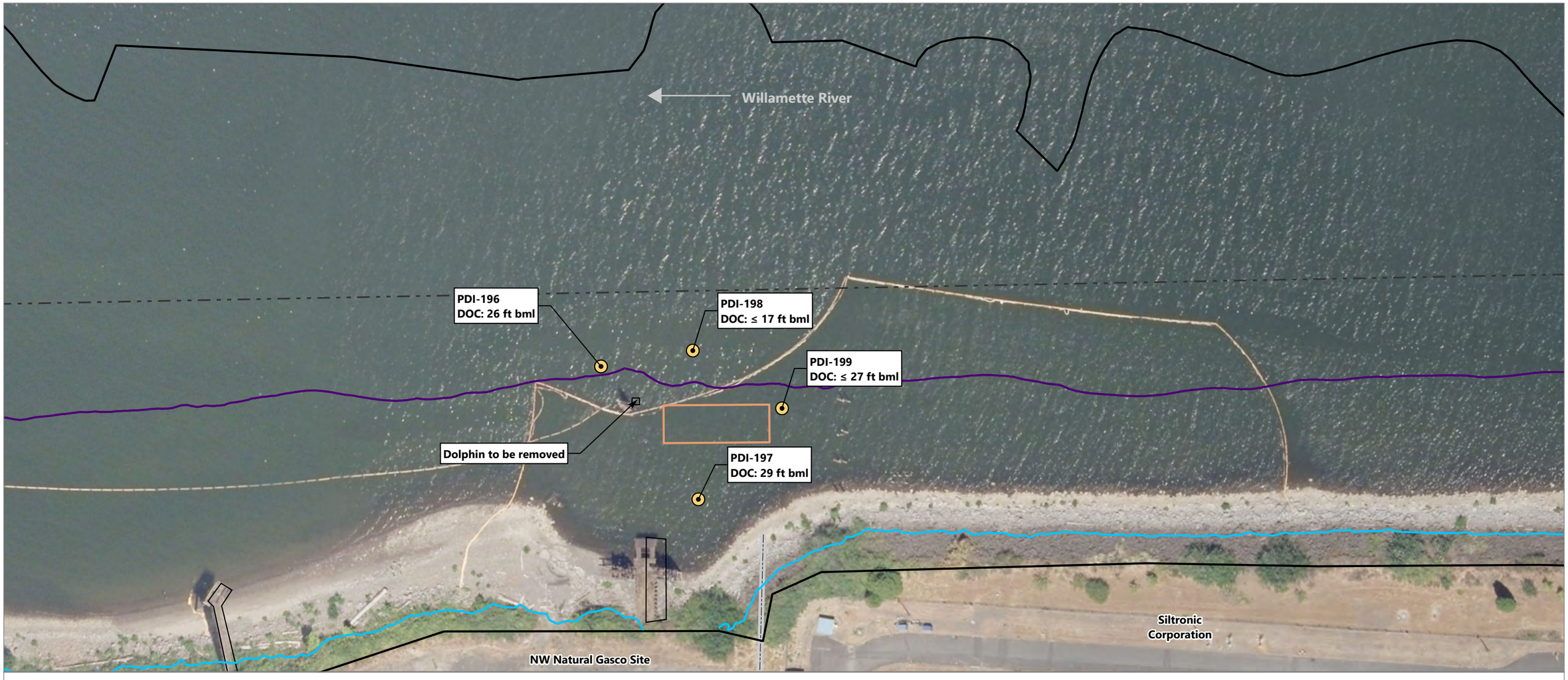
Figure 3-2
Proposed ISS Field Pilot Study Location
Final Revised in Situ Stabilization and Solidification Field Pilot Study Work Plan
Gasco Sediments Project Area
GASCO0054083



LEGEND:

- Gasco Early Action Removal Action Pilot Cap
- Structures
- Navigation Channel
- Field Pilot Study Footprint
- Gasco Sediments Project Area
- Property Line
- Ordinary High Water (+18 ft COP)
- Ordinary Low Water (+4.8 ft COP)
- -12 ft COP
- Sonic Borings (2023)

NOTES:

1. Arrow indicates direction of flow of river.
2. Horizontal datum is NAD83 (HARN 91) Oregon State Plane North, International Feet.
3. Vertical datum is City of Portland (COP), Feet.
4. Aerial imagery from City of Portland 2018.
5. Depth of contamination based on non-validated analytical data.

bml: below mudline
DOC: Depth of Contamination
ISS: In Situ Stabilization and Solidification

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Feet

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Figure 3-3
Proposed ISS Field Pilot Study Location
Final Revised in Situ Stabilization and Solidification Field Pilot Study Work Plan
Gasco Sediments Project Area
GASCO0054084