Appendix D
Data Generation and Acquisition for SMA 10

FINAL

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1 Introduction

This appendix describes sediment data gaps associated with finalizing remedial design (RD) of sediment management area (SMA) 10 in the upper reach of the Lower Duwamish Waterway (LDW).

1.1 Background

During RD for the upper reach, the finalization of RD for SMA 10 was deferred based on the results of the U.S. Environmental Protection Agency's (EPA's) source control sufficiency determination for this area. SMA 10 is adjacent to the Boeing Isaacson Thompson (Boeing IT) Site upland cleanup at river mile (RM) 3.75E (Map D-1). The Boeing IT Site upland cleanup is being designed and performed separately by The Boeing Company (Boeing) under agreements with and oversight by the Washington State Department of Ecology (Ecology) under the Model Toxics Control Act (MTCA). The sediment cleanup is being designed and performed by the Lower Duwamish Waterway Group (LDWG) under EPA oversight.

The sediment cleanup footprint and upland cleanup footprint are separated by a dilapidated bulkhead along the shoreline. As described in the cleanup action plan (CAP) for the Boeing IT Site (Ecology 2025), the soil behind the bulkhead will be addressed by the upland site cleanup. Deferment of final RD for SMA 10 will allow for integration of the upland and sediment cleanup actions, such that both efforts are coordinated and connected appropriately.

1.2 Summary of SMA 10 Preliminary (30%) RD

The preliminary (30%) RD for SMA 10, which was completed in 2022 as part of the upper reach RD, included technologies of dredging, partial dredging and engineering capping, and enhanced natural recovery (Anchor QEA and Windward 2022). At that stage in RD, the vertical extent of contamination was unbounded in a portion of the site. However, during the upper reach Phase III Pre-Design Investigation (PDI) (completed in December 2022), additional cores were collected that successfully bounded the vertical extent of contamination. The completion of RD for SMA 10 had already been deferred to the middle reach RD process and was therefore not updated to incorporate the Phase III PDI results. The middle reach intermediate (60%) RD will include SMA 10. The 60% RD for SMA 10 will include the upper reach Phase III data and will present dredging as the remedial technology. It will also incorporate information from the CAP for the Boeing IT Site and other information obtained as part of ongoing coordination with the upland cleanup process.

1.3 Remedial Design and Design Investigation Responsibilities

Because the upland Boeing IT Site cleanup and in-water LDW SMA 10 cleanup actions are adjacent to one another, clarifying roles and responsibilities is important. LDWG is responsible for the design of the sediment remedy, which will occur in the area on the water side of the

bulkhead. Boeing is responsible for the design of the upland remedy, which will occur in the area on the land side of the bulkhead. Boeing has identified upland data gaps to support its design, in coordination with Ecology. LDWG has identified sediment (in-water) data gaps, as described herein.

LDWG understands that the design of an integrated upland/sediment remedy will be supported by data collected by Boeing in the uplands in the event of a future condition wherein a portion of the current upland was to be cut back to an intertidal slope following bulkhead removal. Specific details of this planned restoration are uncertain until RD is complete for the upland property.

The Pre-Remedial Design Investigation (PRDI) for the Boeing IT Site is currently underway. Based on the PRDI Work Plan (DOF 2026), the program includes the collection of an array of soil and groundwater samples to inform design of a permeable reactive barrier (PRB) and support removal of contaminated soil adjacent to the bulkhead. The following upland data gaps have been identified by Boeing in its PRDI:

- Further define the current vertical extent of contamination and evaluate hydrogeologic conditions to inform PRB design.
- Further evaluate the groundwater flow direction and velocity near the shoreline.

Because additional uplands data would also support the design of a future excavated intertidal slope, LDWG shared the following data collection requests for incorporation by Boeing into its PRDI:

- Additional geochemical analyses for planned groundwater samples on the waterward side of the PRB, to indicate arsenic speciation and other geochemical conditions
- Additional vertical characterization of soil on the waterward side of the PRB, including three additional soil borings and archiving additional intervals at four planned soil borings

Boeing has confirmed that these requests have been addressed in the final version of the PRDI Work Plan. LDWG continues to coordinate with Boeing on this topic. Addressing the sediment data gaps described in this attachment will provide sufficient information to finalize an RD for SMA 10 for the technology assignment of dredging, which can be coordinated and connected appropriately with the upland site cleanup action. If it is determined that an engineered cap is needed (e.g., inability to vertically bound arsenic and/or conduct full removal), additional data collection efforts may be required. Based on the long duration of middle reach construction and preference for the upland remedy to precede the in-water remedy, sufficient time is available for

more advanced capping studies if deemed necessary. The upland design schedule assumes the following tentative time frames (pending timing of data):

- Remedial Excavation Engineering Design Report (EDR) by the first quarter of 2027
- PRB EDR by the second quarter of 2028
- Construction 2028 to 2029

For comparison, as discussed in the preliminary (30%) RD, the middle reach construction is anticipated to begin in fall 2028 and continue for 6 to 10 years (Anchor QEA and Windward 2025).

1.4 Data Quality Objectives and Data Gaps

The current design for SMA 10 was progressed through the upper reach Preliminary (30%) RD stage (Anchor QEA and Windward 2022); it was then placed on hold until it could be integrated with the adjacent upland cleanup, which will also address source control sufficiency needs. Following Preliminary (30%) RD, additional sediment data were collected during the upper reach Phase III PDI to fill known data gaps, including vertical extent of contamination. SMA 10 is now being included as part of the middle reach design package; thus, this appendix to the quality assurance project plan (QAPP) addendum for Phase III of middle reach addresses remaining sediment data gaps for SMA 10. As such, data from Phase III of the upper reach PDI (which occurred in December 2022) will be evaluated as part of Intermediate (60%) design. Data from Phase III of the middle reach PDI (which will occur in spring 2026) will be evaluated as part of Pre-Final (90%) design.

LDW PDI data quality objectives (DQOs) (which are the same for the upper and middle reaches) were reviewed to evaluate remaining data gaps (Windward and Anchor QEA 2020, 2022). This evaluation considered the Phase III data collected during the upper reach PDI, as well as information provided by Boeing during coordination of the integrated upland and sediment remedies. Phase I DQOs (i.e., DQOs 1 through 9) have been fully met for sediment. DQOs 10 through 14 were evaluated for in-water RD needs for SMA 10, as described in Table D-1.

Table D-1
Evaluation of Phase II DQOs for SMA 10

Phase II DQO	Activities Conducted to Address DQO in Sediments by LDWG
DQO 10 – Further delineate RAL exceedances, as needed for unbounded areas.	DQO was met through the collection and analysis of sediment samples during the PDI for the upper reach. ***However, one additional 0–60-cm sample is being collected per EPA request to assess PCB concentrations outside of the probability bands in the northwest corner of the SMA 10 area***.
DQO 11 – Assess chemical and physical characteristics of banks (including topographic survey), as needed, depending on remedial technology selected for adjacent sediment and whether bank is erosional.	DQO was met through sampling and surveying of banks during the PDI for the upper reach.
DQO 12 – Delineate vertical elevation of RAL exceedances in dredge (and partial dredge and cap) areas and collect subsurface sediment chemistry data in cap areas where contamination under caps will remain.	DQO was largely met through analysis of vertical extent samples during the PDI for the upper reach. ***Additional sediment chemistry data will be collected in SMA 10 as part of middle reach PDI Phase III to fully meet this DQO (see Section 2 for details).*** ***In addition, because the presence of riprap near the base of the bulkhead wall limits in-water sediment collection, LDWG is coordinating with the Boeing IT Site team regarding the collection of vertical extent information at three locations in the uplands (adjacent to the bulkhead)***. ***This data collection will be performed by Boeing for efficiency.***
DQO 13 – Collect geotechnical data as needed depending on technology proposed and/or physical characteristics of RAL exceedance areas.	DQO was met through the collection and analysis of geotechnical samples during the PDI for the upper reach.
DQO 14 – Collect other engineering-applicable data as needed (e.g., structures inspection, utility location verification, thickness of sediment on top of riprap layers, groundwater velocities).	DQO was largely met during the PDI for the upper reach. ***Sediment geochemistry data (to assess the nature of arsenic in the event that a cap is needed) will be collected, and water quality elutriate testing and sheen testing will be performed for SMA 10 as part of middle reach PDI Phase III to fully meet this DQO (see Section 3 for details).***

Notes:
Boeing: The Boeing Company
Boeing IT Site: Boeing Isaacson Thompson Site
cm: centimeter
DQO: data quality objective
EPA: U.S. Environmental Protection Agency
LDWG: Lower Duwamish Waterway Group
PCB: polychlorinated biphenyl
PDI: pre-design investigation
RAL: remedial action level
SMA: sediment management area

2 Collection of Sediment Analytical Samples

This section presents the design for Phase III sediment sampling and sample collection identification (ID) protocols for SMA 10. All other details regarding sample collection are the same as those presented in the middle reach PDI QAPP and QAPP Addendum No. 1 (for Phase II sampling), as well as the QAPP Addendum No. 3 (for Phase III sampling) to which this document is an appendix.

2.1 Sampling Design

As described in Section 1.3 of this appendix and Table D-1, no additional sediment sampling is needed to address DQO 10 (horizontal extent of contamination). The extent of polychlorinated biphenyl (PCB) and arsenic contamination was reviewed, and it was determined that the horizontal extent of contamination is well bounded around the perimeter of the current RAL exceedance area (i.e., additional data would be unlikely to change the remedial boundary) (Maps D-2 through D-4). A review of the PCB interpolation uncertainty bands (Map D-4) further supports this conclusion. However, per EPA request, one additional 0–60-centimeter (cm) subsurface sample is being collected in the northwest corner of the SMA 10 area to assess PCB concentrations outside of the probability bands.

While the vertical extent of contamination on the waterward side of the bulkhead (DQO 12) appears to be bounded following the completion of PDI sampling in the upper reach, some additional data collection is planned during Phase III to further refine information regarding the depth of contamination. Six locations were identified within SMA 10 where additional vertical extent chemistry information is useful to inform RD. These locations are presented on Map D-2 (all chemistry data with remedial action level [RAL] exceedances), Map D-3 (data for arsenic only), and Map D-4 (data for PCBs only). Based on the existing data for SMA 10, all vertical extent intervals from these vertical extent cores will be analyzed for PCBs and arsenic. Once the vertical extent of contamination has been defined for arsenic and PCBs, intervals without PCB or arsenic concentrations above surface sediment RALs will be analyzed for other contaminants of concern with nearby RAL exceedances (e.g., other metals, polycyclic aromatic hydrocarbons, phthalates) to confirm that concentrations in these intervals are less than surface RALs for these other contaminants of concern. Sample location details are provided in Attachment D-1.

All sample collection, processing, and analytical methods are the same as those described in Section 4 of the middle reach QAPP Addendum No. 3 (for Phase III sampling) or in the middle reach PDI QAPP (Windward and Anchor QEA 2022) and QAPP Addenda for Phase II (Anchor QEA and Windward 2024a, b).

2.2 Sample Identification

The IDs for samples collected in SMA 10 will use the same convention used for previously collected upper and middle reach PDI samples. The two-digit year is assumed to be 26 (i.e., samples will be collected in 2026). Location numbers for SMA 10 samples will start at 850 (i.e., following the numbering scheme from the upper reach).

For example, the first core interval sample (e.g., the 0–45-cm sample) from the intertidal core collected at location 850 will be labeled LDW26-IT850A, the next core interval sample will be labeled LDW26-IT850B, and so on.

3 Collection of Other Engineering Data

This section describes the Phase III activities that will occur to fill engineering data gaps identified for SMA 10, as noted in Section 1.3. Engineering data needs for SMA 10 were primarily met as part of the PDI for the upper reach. As described in Table D-1, to fully meet DQO 14, sediment geochemistry data will be collected to assess the nature of arsenic in the event that a cap is needed (Section 3.1), water quality testing will be performed to assess the need for additional best management practices (Section 3.2), and sheen testing will be conducted to determine if potential sheen-producing material is present (Section 3.3).

3.1 Data for Contingent Cap Design

As part of addressing DQO 14, sediment geochemistry data will be collected to assess the nature of arsenic, to be prepared in the event that a cap is needed. Sediment geochemistry data will be necessary if the integrated sediment/upland RD cannot fully remove elevated concentrations of arsenic.

3.1.1 Field Procedures

Geochemical and arsenic speciation data will be collected for both sediment and porewater at select depth intervals. As described further in Section 5.7 of middle reach PDI QAPP Addendum No. 3 (for Phase III sampling), arsenic is redox sensitive and requires handling without exposure to air to preserve *in situ* conditions. Therefore, the process for geochemistry data collection (visually presented in Figure D-1) will proceed as follows:

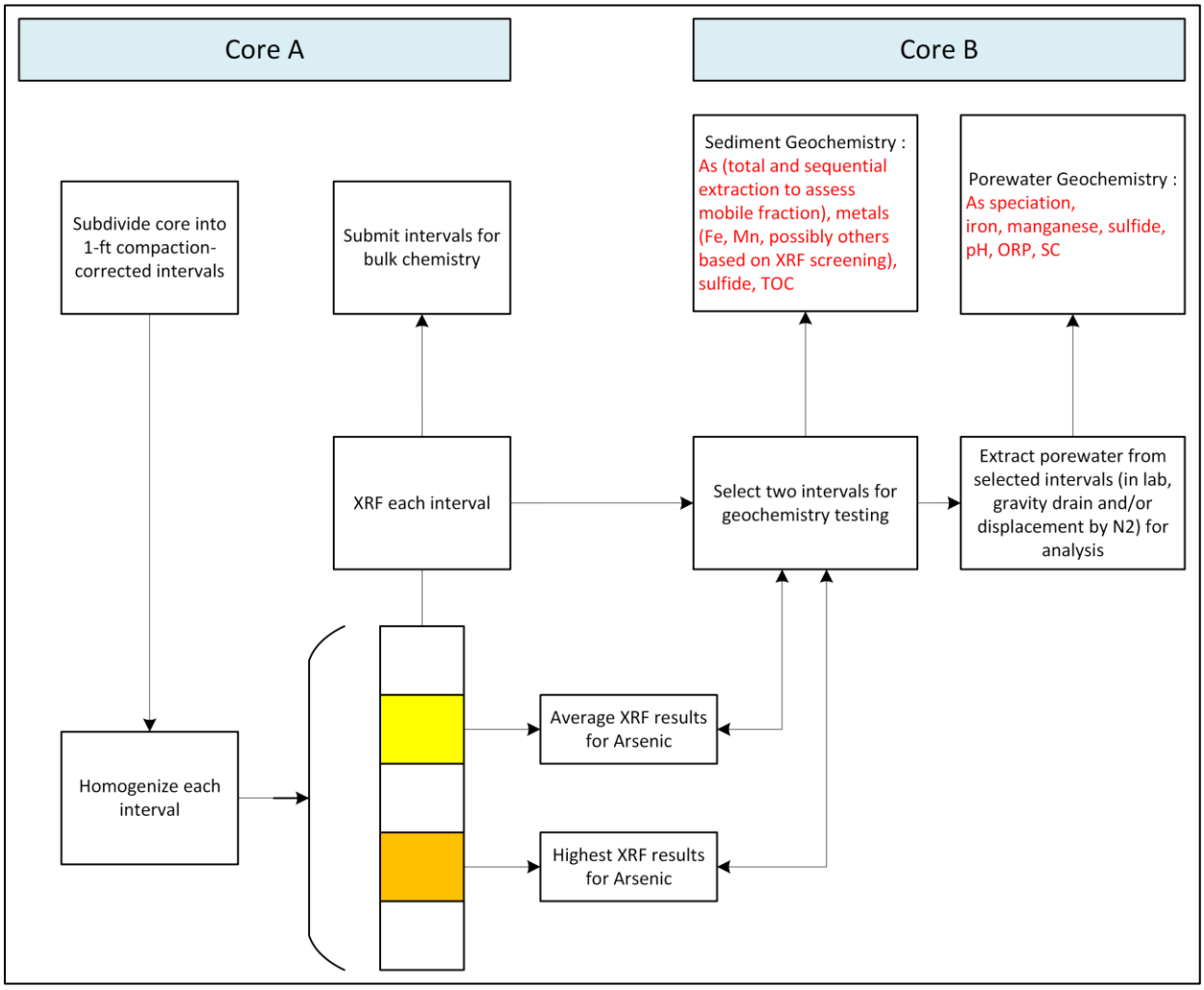
- **Core collection** – At each of the four locations identified for the collection of geochemistry data, two sediment cores will be collected following the procedures outlined in standard operating procedure (SOP) E19 as near to one another as possible (but not closer than approximately 2 feet to reduce potential sediment movement between the two cores). These cores will be referred to as Core A and Core B. When possible, Core B will be the first core collected to minimize disturbance that could impact the required redox-sensitive parameters.

- **Field processing procedures for Core A:**
  - Core A on Figure D-1 will be processed in accordance with the procedure for any typical sediment core described in the QAPP and SOP E19 (i.e., compaction correction, delineation of sample intervals, and sample homogenization will occur). Note that preserving *in situ* conditions is not necessary for this core.
  - After the homogenization of sediment for each interval, each interval from Core A will be field screened by a properly trained field technician using an X-Ray Fluorescence (XRF) field tool. The values for arsenic will be recorded.
  - Based on the results of the XRF screening, two intervals will be identified for geochemistry. The elevations of these two intervals will be recorded: the interval associated with the highest XRF arsenic reading (interval A1), and the interval associated with an average or median XRF arsenic reading representative of typical conditions (interval A2).
  - All intervals from Core A will be submitted to the laboratory for bulk chemistry analysis of PCBs and arsenic, as described in Section 2 of this appendix. Processing will follow procedures outlined in the PDI QAPP and SOP E19.
- **Field processing procedures for Core B:**
  - Core B on Figure D-1 will <u>not</u> be cut open lengthwise for processing in the field to preserve *in situ* conditions.
  - Compaction correction for Core B will be calculated, and the two intervals from Core B that correspond to the elevations of Intervals A1 and A2 from Core A will be identified for geochemical sediment and porewater testing. These intervals will be labeled as Intervals H1 (high concentration) and T1 (typical concentration).[1]
  - While still within the rigid, plastic core tube or liner, Core B will be cut crosswise in the field to separate Intervals H1 and T1 (with at least 3 inches of material retained on either side of each designated interval to minimize exposure to air) and immediately re-capped. Tape will be placed around the edge of the cap. This sectioning of the core is necessary to facilitate shipping to the laboratory.
  - Core segments will be labeled and placed in mylar bags with oxygen absorbers. The bag will be partially sealed, leaving a small hole for air to escape, and the top will be rolled down to slowly push as much air out of the bags as possible prior to sealing the bag. Tape will be placed over the closed seal. The sealed bags will be labeled with the sample IDs.

[1] Additionally, 1-foot sections below intervals H1 and T1 will be submitted to the laboratory, in case additional volume is required for porewater analysis.

- Core B intervals will be shipped to Anchor QEA's Environmental Geochemistry Laboratory (located in Portland, Oregon) for further processing following standard shipping procedures outlined in the QAPP (Windward and Anchor QEA 2022).

Figure D-1.
Geochemistry Core Processing Schematic



Note: Core A processing will be similar to that of a typical sediment core. Core B processing will be performed so as to minimize exposure to air (thus preserving *in situ* conditions).

3.1.2 Laboratory Procedures

Once sediment core intervals are received by the Anchor QEA Environmental Geochemistry Laboratory, porewater will be extracted and geochemical parameters and arsenic speciation data will be collected for the test intervals to support cap design (if needed) in SMA 10. Analytes for sediment and porewater are as follows:

- **Sediment** – Arsenic (total and selective sequential extraction), metals (iron, manganese, and others as identified based on XRF screening), sulfide, and total organic carbon
- **Porewater** – Arsenic (dissolved concentration and speciation), dissolved iron, dissolved manganese, sulfide, pH, oxidation reduction potential, and specific conductivity.

Laboratory procedures are the same as those described in middle reach PDI QAPP Addendum No. 3 (for Phase III sampling) for remedial action areas 9A-9D (except that porewater extraction will occur at the laboratory rather than in the field). Details regarding sediment and porewater analyses are provided in Section 5.74 of the QAPP Addendum (as well as in the associated supporting standard operating procedures referenced in that section, E35 and E36).

3.2 Data for Water Quality Evaluation

Consistent with the approach described in Section 5.8.1 of the QAPP Addendum, dredging elutriate test results will be used as a line of evidence to assess the need for additional best management practices at SMA 10. While modeling for SMA 10 conducted as part of the upper reach 30% RD (Appendix K) (Anchor QEA and Windward 2022) indicated that the arsenic concentrations would not exceed water quality criteria during dredging, significantly higher concentrations of arsenic were detected in cores collected during Phase III of the upper reach PDI (the maximum concentration was more than four times higher than the modeled concentration). Given that modeling has not been performed using these higher concentrations, dredging elutriate testing will be conducted for SMA 10 using the interval with the highest arsenic concentration (to be determined following the sediment chemistry analysis described in Section 2). Procedures for this investigation are the same as those described in Section 5.8.1 of QAPP Addendum No. 3.

3.3 Sheen Testing

Consistent with the approach identified in Section 5.9 of QAPP Addendum No. 3, sheen testing will be conducted on a subset of the vertical extent cores collected from SMA 10 to determine if potential sheen-producing material is present. Three of the Phase III vertical extent cores were identified for sheen testing (Attachment D-1).[2] As described in Section 5.9, the field crew will identify one interval in each core for sheen testing during processing.

[2] If any of the vertical cores that are not identified for sheen testing meet the criteria described in Section 5.9 of the QAPP Addendum indicating the potential for sheen-producing material, sheen testing will also be conducted on those cores (one interval per core).

4 References

Anchor QEA, Windward. 2022. Preliminary (30%) remedial design basis of design report for Lower Duwamish Waterway upper reach. Submitted to EPA August 29, 2022. Anchor QEA and Windward Environmental LLC, Seattle, WA.

Anchor QEA, Windward. 2024a. Pre-Design Investigation Quality Assurance Project Plan Addendum No. 1 for the Lower Duwamish Waterway Middle Reach - Phase II Sampling. Final. Anchor QEA and Windward Environmental LLC, Seattle, WA.

Anchor QEA, Windward. 2024b. Quality assurance project plan addendum No. 2 for the Lower Duwamish Waterway middle reach - Phase II sampling for the Inlet at RM 2.2W. Draft. Submitted to the US Environmental Protection Agency April 19, 2024. Anchor QEA and Windward Environmental LLC, Seattle, WA.

Anchor QEA, Windward. 2025. Preliminary (30%) remedial design basis of design report for the Lower Duwamish Waterway Middle Reach. Submitted to EPA October 27, 2025. Anchor QEA and Windward Environmental LLC, Seattle, WA.

DOF. 2026. Pre-remedial design investigation work plan. Dalton Olmsted & Fuglevand.

Ecology. 2025. Cleanup action plan, Boeing Isaac-Thompson Site, Tukwila, Washington. Washington State Department of Ecology.

Windward, Anchor QEA. 2020. Lower Duwamish Waterway quality assurance project plan for remedial design of Upper Reach: pre-design investigation. Final. Submitted to EPA May 19, 2020. Windward Environmental LLC and Anchor QEA, Seattle, WA.

Windward, Anchor QEA. 2022. Pre-design investigation quality assurance project plan for the Lower Duwamish Waterway - Middle Reach. Final. Submitted to EPA November 21, 2022. Windward Environmental LLC and Anchor QEA, Seattle, WA.

Attachment D-1
Sample Location Details

This attachment provides detailed information regarding Phase III sediment sampling locations in SMA 10. The tables included in this attachment are:

- Table D1-1. Sample Location Objectives
- Table D1-2. Sample Location Rationale and Analytes
- Table D1-3. Sample Location Details

Tables D1-2 and D1-3 provide location-specific details regarding rationale for collection, analytes, and details for sample collection to be used by the field crew. Core profiles for the vertical extent samples (which show the intervals that will be analyzed at each location) are provided as part of Map D-2 and D-3.

Table D1-1
Summary of Sample Location Objectives for SMA 10

Location ID	RM	Tidal Category	Mudline (feet MLLW)	Sampling Objective(s) by Location		
				Sediment Chemistry?	Information for Cap Design?	Sheen Testing?[1]
850	3.7	Subtidal	-12.8	**Yes** – analyze 0–60-cm sample per EPA request to assess PCB concentrations outside of the probability bands.	No – Only the RAL interval sample is being collected at this location.	-
851	3.7	Intertidal	-1.0	**Yes** – Analyze vertical extent intervals to refine information regarding vertical extent of contamination near area with elevated concentrations of arsenic.	**Yes** – Paired core will be collected as part of geochemistry data collection.	**Yes**
852	3.7	Intertidal	-3.2	**Yes** – Analyze vertical extent intervals to refine information regarding vertical extent of contamination near area with elevated concentrations of arsenic.	**Yes** – Paired core will be collected as part of geochemistry data collection.	-
853	3.7	Intertidal	0.4	**Yes** – Analyze vertical extent intervals to refine information regarding vertical extent of contamination (particularly for arsenic). Location 853 is approximately co-located with PDI core location IT789, which had the highest arsenic concentrations in this area (location targeted to provided information for cap design).	**Yes** – Paired core will be collected as part of geochemistry data collection.	-
854	3.8	Subtidal	-8.4	**Yes** – Analyze vertical extent intervals to refine information regarding vertical extent of contamination near area with elevated concentrations of arsenic.	**Yes** – Paired core will be collected as part of geochemistry data collection.	**Yes**
855	3.8	Subtidal	-10.1	**Yes** – Analyze vertical extent intervals to refine information regarding vertical extent of contamination. Pre-PDI core SD-507 is unbounded for PCBs at this location.	No – Cap design information is not needed at this location because it is outside of the area where arsenic concentrations are highest.	-
856	3.8	Intertidal	0.6	**Yes** – Analyze vertical extent intervals to refine information regarding vertical extent of contamination.	No – Cap design information is not needed at this location because it is outside of the area where arsenic concentrations are highest.	**Yes**

Notes:
1. Locations selected for sheen testing were based on proximity to previously collected vertical extent cores where sheen florets were noted in sediment core processing field logs (sheen florets were noted at locations IT579, IT585, IT588, and IT597).
EPA: U.S. Environmental Protection Agency

ID: identification
MLLW: mean lower low water
PCB: polychlorinated biphenyl
PDI: Pre-Design Investigation
RAL: remedial action level
RM: river mile
SMA: sediment management area

Table D1-2
Sample Location Rationale and Analytes for SMA 10

Location ID	RM	Tidal Category	Interval Type(s)	Recovery Category	Estimated Number of Samples	In FNC?	Shoaling Area?	Potential Vessel Scour Area?	Mudline (feet MLLW)	Notes	Analytes[1]
850	3.7	Subtidal	0-60 cm	1	1	No	No	Yes	-12.8	-	PCBs, arsenic
851	3.7	Intertidal	Vertical extent	2	14	No	No	No	-1.0	-	PCBs, arsenic
852	3.7	Intertidal	Vertical extent	2	12	No	No	No	-3.2	-	PCBs, arsenic
853	3.7	Intertidal	Vertical extent	2	15	No	No	No	0.4	Approximately co-located with PDI core IT789 (2022) to target area with highest arsenic.	PCBs, arsenic
854	3.8	Subtidal	Vertical extent	1	9	No	No	Yes	-8.4	-	PCBs, arsenic
855	3.8	Subtidal	Vertical extent	1	16	No	No	Yes	-10.1	Approximately co-located with pre-PDI core SD-507 (2012)	PCBs, arsenic
856	3.8	Intertidal	Vertical extent	2	15	No	No	No	0.6		PCBs, arsenic

Notes:
1. All vertical extent intervals will be analyzed for the analytes listed in this table. In addition, all samples will be analyzed for TOC.
FNC: Federal Navigation Channel
ID: identification
MLLW: mean lower low water
PCB: polychlorinated biphenyl
PDI: Pre-Design Investigation
RM: river mile
SMA: sediment management area
TOC: total organic carbon

Table D1-3
Sample Location Details for SMA 10

Location ID	RM	Tidal Category	Interval Type(s)	Mudline (feet MLLW)	Target Core Elevation or Length	Estimated Core Length (feet)	Target Coordinates			
							X	Y	Longitude	Latitude
850	3.7	Subtidal	0–60-cm	-12.8	2 feet	2	1275943	195057	-122.308603	47.525162
851	3.7	Intertidal	Vertical extent	-1.0	-15 feet MLLW	14	1276022	195050	-122.308299	47.525151
852	3.7	Intertidal	Vertical extent	-3.2	-15 feet MLLW	12	1276017	194983	-122.308313	47.524969
853	3.7	Intertidal	Vertical extent	0.4	-15 feet MLLW	15	1276046	194991	-122.308196	47.524992
854	3.8	Subtidal	Vertical extent	-8.4	15 feet	15	1276016	194894	-122.308312	47.524724
855	3.8	Subtidal	Vertical extent	-10.1	-27 feet MLLW	17	1276031	194760	-122.308241	47.524358
856	3.8	Intertidal	Vertical extent	0.6	-15 feet MLLW	15	1276095	194776	-122.307983	47.524406

Notes:
ID: identification
MLLW: mean lower low water
RM: river mile
SMA: sediment management area