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Lower Duwamish Waterway Group

Port of Seattle / City of Seattle / King County / The Boeing Company

QUALITY ASSURANCE PROJECT PLAN ADDENDUM FOR THE LOWER DUWAMISH WATERWAY UPPER REACH: PRE-DESIGN INVESTIGATION PHASE III

FINAL

For submittal to

The US Environmental Protection Agency
Region 10
Seattle, WA

November 22, 2022

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TITLE AND APPROVAL PAGE

Remedial Design of Upper Reach
Pre-Design Investigation Quality Assurance Project Plan
Addendum for Phase III Sampling

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ABBREVIATIONS

abbreviation	definition
BBP	butyl benzyl phthalate
BEHP	bis(2-ethylhexyl) phthalate
cPAH	carcinogenic polycyclic aromatic hydrocarbon
DQO	data quality objective
EcoChem	EcoChem, Inc.
EPA	US Environmental Protection Agency
FNC	Federal Navigation Channel
FS	feasibility study
ID	identification
LDW	Lower Duwamish Waterway
MLLW	mean lower low water
MNR	monitored natural recovery
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PDI	pre-design investigation
QA	quality assurance
QAPP	quality assurance project plan
QC	quality control
RAA	remedial action area
RAL	remedial action level
RD	remedial design
RI	remedial investigation
RM	river mile
ROD	Record of Decision
SCO	sediment cleanup objective
TOC	total organic carbon
USACE	US Army Corps of Engineers

1 Introduction

This document is an addendum to the quality assurance project plan (QAPP) for Phase III sampling and analysis associated with the pre-design investigation (PDI) in the upper reach[1] of the Lower Duwamish Waterway (LDW) (Map 1-1) (Windward and Anchor QEA 2020). This work supports the remedial design (RD) for the upper reach per the Fourth Amendment to the Administrative Order on Consent for the LDW (EPA 2018), in accordance with the US Environmental Protection Agency's (EPA's) November 2014 Record of Decision (ROD) (EPA 2014).

This QAPP addendum presents a detailed study design for PDI Phase III sampling, including sampling locations, intervals, and analytes, as well as updates to laboratory analysis methods and reporting requirements. All other aspects of the PDI sampling and analysis are the same as those specified in the PDI QAPP (Windward and Anchor QEA 2020) or the PDI QAPP Addendum for Phase II (Anchor QEA and Windward 2021a) and are not repeated in this document.

As part of Phase III efforts, additional topographic and outfall location data will be collected. Details are presented in a supplement to the survey QAPP addendum (Anchor QEA and Windward 2022c).

[1] The upper reach includes river mile (RM) 3.0 to RM 5.0 of the LDW.

2 Project Objectives and Description

2.1 Data Quality Objectives

Phase III sampling is being conducted to address data gaps remaining after Phase I and II sampling. The status of each Phase I and II data quality objective (DQO) is summarized in Table 2-1, and Phase I and II results are presented in the PDI data evaluation report (Anchor QEA and Windward 2022a). All DQOs have been fully met, except for DQOs 10, 11, and 12. The Phase III data collection defined in this addendum will satisfy DQOs 10 and 12 and bank chemical data requirements in DQO 11. Phase III topographic data, as defined in the supplement to the survey QAPP addendum, will satisfy the remaining data needs in DQO 11.

Table 1-2
DQOs for Phase I and II PDI in the Upper Reach

DQO	DQO Description	Activities Conducted to Address DQO
DQO1	Delineate 0–10-cm RAL exceedances in Recovery Category 2/3.	DQO was met through the collection and chemical analysis of surface sediment (0–10-cm) samples in Phases I and II.
DQO2	Delineate 0–10-cm RAL exceedances in Recovery Category 1.	
DQO3	Delineate 0–45-cm intertidal RAL exceedances in Recovery Category 2/3.	DQO was met through the collection and chemical analysis of subsurface intertidal sediment (0–45-cm) samples in Phases I and II.
DQO4	Delineate 0–45-cm intertidal RAL exceedances in Recovery Category 1.	
DQO5	Delineate 0–60-cm PCB RAL exceedances in potential vessel scour areas in Recovery Category 2/3.	DQO was met through the collection and chemical analysis of subsurface subtidal sediment (0–60-cm) samples in Phases I and II.
DQO6	Delineate 0–60-cm RAL exceedances in Recovery Category 1.	
DQO7	Delineate RAL exceedances in shoaling areas.	DQO was met through the collection and chemical analysis of shoaling interval samples in Phases I and II.
DQO8	Conduct a visual inspection of the banks in the upper reach to identify features relevant to design, such as the presence/absence of bank armoring, and to plan how to access banks and areas under structures for sampling purposes.	DQO was met through the visual bank inspection conducted throughout the upper reach in Phase I.
DQO9	If feasible, delineate RAL exceedances in areas under overwater structures.	DQO was met through Phase I and Phase II sampling, confirming that contamination does not extend under any overwater structures in the upper reach, with the exception of the South Park Bridge.

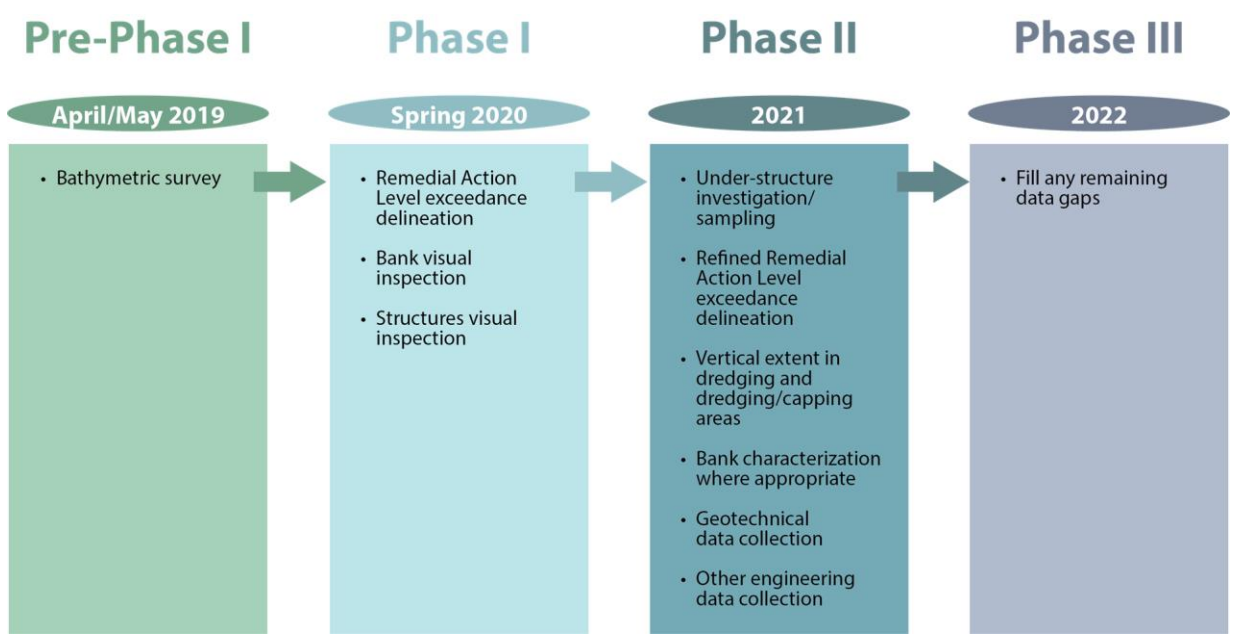
DQO	DQO Description	Activities Conducted to Address DQO
DQO10	Further delineate RAL exceedances, as needed for unbounded areas.	DQO was largely met through further delineation of RAL exceedance areas in Phase II. Additional data will be collected as part of Phase III to fully meet this DQO, including reducing uncertainty in data interpolations that may result in false positive or false negative errors.
DQO11	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 largely met through sampling and surveying of banks during Phase II within Phase I RAL exceedance areas. Additional chemical, topographic, and outfall data will be collected as part of Phase III to fully meet this DQO; see the supplement to the survey QAPP addendum for additional surveying.
DQO12	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 in Phase II. Additional data will be collected as part of Phase III to fully meet this DQO.
DQO13	Collect geotechnical data as needed depending on technology proposed and/or physical characteristics of RAL exceedance areas.	DQO was met through geotechnical investigations in Phase II.
DQO14	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 met through the following efforts during Phase I and Phase II PDI: • Inspecting structures and outfalls in Phase II near Phase I RAL exceedance areas • Measuring the thickness of sediment on top of armored banks to estimate the volume of sediment over armoring and identifying the toe of armored slopes (where applicable) in Phase II • Assessing extent of vegetation along banks to inform engineering design • Archiving samples for waste characterization to inform disposal options for engineering design

Notes:
DQO: data quality objective
PCB: polychlorinated biphenyl
PDI: pre-design investigation
QAPP: quality assurance project plan
RAL: remedial action level

2.2 Project Description and Schedule

Phase III sampling, as presented in this addendum, will involve the collection and chemical analysis of sediment and bank samples to further refine the delineation of remedial action level (RAL)[2] exceedances, and to further assess the vertical extent of contamination in dredging or partial dredging and capping areas to fill remaining data gaps after Phase II sampling (Figure 2-1). The results from these analyses will further refine the remedial action areas (RAAs) defined in 30% RD (Anchor QEA and Windward 2022b). Specifically, the Phase III results will be used to update the interpolations used to define RAL exceedance areas as part of 90% RD. The updated RAL exceedance areas will then be incorporated into the RAAs.

Figure 2-1
Design Sampling Phases



Phase III sampling will be conducted in November 2022 upon approval of this QAPP addendum. Sampling and analysis in earlier phases involved archiving some of the collected intervals for potential analysis pending initial results (i.e., tiering). Sample analysis for Phase III will not be tiered; thus, all samples will be analyzed following collection.

[2] As stated in the ROD (EPA 2014), a RAL is a contaminant concentration above which remedial action is required. RALs for the LDW are defined in ROD Table 28, titled *Remedial Action Levels, ENR Upper Limits, and Areas and Depths of Application* and in the explanation of significant differences (ESD) document (EPA 2021) for carcinogenic polycyclic aromatic hydrocarbons (cPAHs).

3 Project Organization and Responsibilities

This section and Figure 3-1 in the PDI QAPP (Windward and Anchor QEA 2020) present the overall project organization and the individuals responsible for the various tasks required for PDI sampling and analysis, including contact information. The only change to the information presented in the PDI QAPP is the addition of EcoChem, Inc. (EcoChem). EcoChem will provide independent third-party chemical data review and validation. The project manager at EcoChem can be reached as follows:

Ms. Alison Bodkin
EcoChem, Inc.
500 Union St., Suite 1010
Seattle, WA 98101
206.233.9332
Email: abodkin@ecochem.net

4 Data Generation and Acquisition for Sediment and Bank Analytical Samples

This section presents the design for Phase III sampling and sample collection identification protocols. Information regarding the following topics is presented in the PDI QAPP (Windward and Anchor QEA 2020) or PDI QAPP Addendum for Phase II (Anchor QEA and Windward 2021a):

- Sample collection methods, custody, and shipping requirements
- Decontamination procedures
- Field-generated waste disposal
- Laboratory methods
- Sediment chemistry analytical DQOs and criteria and quality assessment/quality control (QA/QC)
- Instrument/equipment testing, inspection, maintenance, and calibration
- Analytical data management

Tables with minor revisions to laboratory methods and QA/QC requirements are provided in Appendix A.

4.1 Sampling Design for Sediment and Bank Samples

To further address DQOs 10, 11, and 12, this section discusses the design for sediment and bank sampling, including approaches and rationale for depth intervals,[3] analytes, and sampling locations. Many of these elements are consistent with those in the Phase I and II PDI sampling designs, as described in the PDI QAPP (Windward and Anchor QEA 2020) and PDI QAPP Addendum for Phase II (Anchor QEA and Windward 2021a).

4.1.1 General Principles for Identification of Locations

To determine specific locations for Phase III sampling, the following four principles were applied using the existing design data[4] for the upper reach.

- **Refine horizontal boundaries of RAL exceedance areas** – Where needed, collect additional sediment and bank data around the RAL exceedance areas in RAAs defined in 30% RD (Anchor QEA and Windward 2022b). Sampling locations are based on improving the bounding of RAL exceedance areas and reducing uncertainty in data interpolations. Phase III analyses are not tiered. Vertical extent cores will be collected and analyzed at some locations that are being sampled to further refine RAL exceedance area boundaries.

[3] The term "depth" is used throughout this document to refer to the depth of the samples to be collected below the mudline.
[4] The design dataset contains data from the remedial investigation/feasibility study (RI/FS), post-FS data, and Phase I and II PDI data. Phase III data will be added to the design dataset when available.

Thus, if a RAL exceedance is detected in a RAL interval, vertical extent data will be available.

- **Gather data in RAL exceedance areas defined only by interpolation** – Collect samples in areas that are based on interpolated concentrations only (herein referred to as interpolation-only areas). Interpolation-only areas do not contain any sample locations with RAL exceedances, but they have been designated as RAAs in 30% RD because interpolated concentrations exceed RALs as the interpolation crosses recovery category or shoaling area boundaries that have different RALs.
- **Investigate locations in "monitored natural recovery (MNR) to benthic sediment cleanup objective (SCO)" area as appropriate** – Re-occupy locations that:
  - Include data older than 10 years
  - Are not within RAA boundaries
  - Have chemical concentrations greater than the benthic SCO but less than the RAL in Recovery Category 2/3 areas
- **Bound vertical extent** – Collect additional samples from locations adjacent to or within RAAs as needed for design (e.g., dredging or partial dredging/capping areas) to determine the vertical extent of contamination where it was not bounded adequately in Phase II, or where additional coverage is needed within RAAs. In addition, collect cores in the vicinity of shoaling cores collected by the US Army Corps of Engineers (USACE) in 2012 (LDW13, LDW14, LDW17)[5] and near shoaling location 148. The Phase III cores near USACE core locations LDW13, LDW14, and LDW17 are being collected to investigate the discrepancy between USACE cores and PDI cores. USACE cores were composites from several locations (3–22 ft apart). An additional PDI core will be collected and analyzed in Phase III in each of three areas where multiple cores were collected by USACE. See Appendix B for details. RAL exceedance areas will be delineated based on the PDI data.

Using these principles, Phase III sediment sampling is proposed at 74 locations, many of which have more than 1 sampling interval (Table 4-1). Phase III sampling locations are shown on the Map 4-1 series; different symbols are used to indicate the type(s) of samples to be collected at each location (as described in Table 4-1). The rationale for the placement of each sampling location, the sample intervals collected, and applicable analytes (see Section 4.1.4) are presented in Tables B-1 and B-2 in Appendix B. In addition, two surface sediment samples will be collected in the Turning Basin and analyzed for cPAHs to further define the cPAH-only area (see Appendix C).

[5] See Map 4-1b for the location of LDW13 and SC558, Map 4-1c for the location of LDW14 and SC564, and Maps 4-1d and 4-1e for the location of LDW17 and SC629.

Table 4-1
Summary of Phase III Upper Reach Sampling Locations

Sample Type	Count of Design Dataset Locations[1]			Map 4-1 Series Symbology
	Count Prior to Phase III	Count of Phase III Locations	Total Count After Phase III	
Surface (0–10 cm)	842	16[2]	858	Indicated on maps by orange circles (or yellow if MNR to benthic SCO location)
Intertidal subsurface (0–45 cm)[3]	146	18[4]	164	Indicated on maps by orange pentagons
Subtidal subsurface (0–60 cm) (not shoaling areas)[5]	149	20	169	Indicated on maps by orange squares
Shoaling area subsurface (variable)[6]	49	7	56	Indicated on maps by orange squares with yellow rims in dark green shoaling areas
Vertical extent cores	88[7]	45	133	Indicated on maps by orange Vs. Core profiles shown on the maps provide details regarding which intervals (orange) will be analyzed.

Notes:
1. This table presents the location counts by sample type for Phase III. The sample counts are greater than the location counts because many locations have results for multiple intervals. See Appendix B tables for details.
2. This count does not include the two surface sediment samples that will be collected to refine the cPAH-only areas (see Appendix C).
3. At each vertical extent location in an intertidal area where only a V is shown on the Map 4-1 series, a 0–45-cm archive sample will also be collected as part of that core (but is not included in the counts in this table). This 0–45-cm sample will not be analyzed in Phase III.
4. One of the Phase III intertidal subsurface locations (699X) is a PDI Phase II archive location. Thus, no sample collection is needed at this location.
5. At each vertical extent location in a subtidal area where only a V is shown on the Map 4-1 series, a 0–60-cm archive sample will also be collected as part of that core (but is not included in the counts in this table). This 0–60-cm sample will not be analyzed in Phase III.
6. Sampling depths for shoaling area cores vary depending on the thickness of shoal material at each location (see Figure 4-1).
7. This value is the count of PDI vertical extent cores collected in Phase II.
cPAH: carcinogenic polycyclic aromatic hydrocarbon
MNR: monitored natural recovery
PDI: pre-design investigation
RD: remedial design
SCO: sediment cleanup objective

4.1.2 Depth Intervals

4.1.2.1 Horizontal Delineation

To refine the horizontal extent of RAL exceedance areas, samples will be collected from one or more of the RAL exceedance intervals, which include the following:

- Intertidal areas – 0–10- and 0–45-cm intervals
- Subtidal areas – 0–10- and 0–60-cm intervals

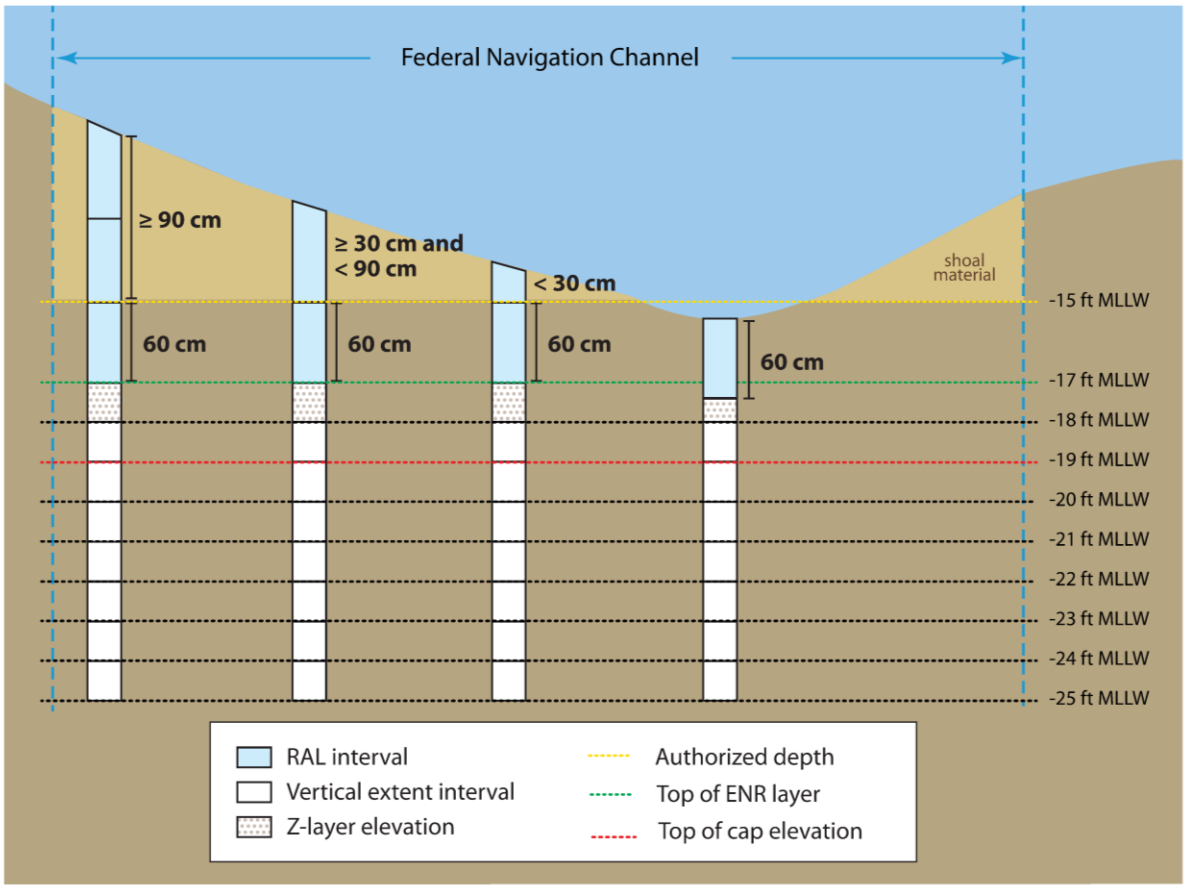
- Shoaling areas – the 0–10-cm interval and sediment down to -17 ft mean lower low water (MLLW); intervals will vary depending on the depth of the shoaled material, as discussed in the PDI QAPP (Windward and Anchor QEA 2020).

4.1.2.2 Vertical Extent Delineation

Cores deeper than 60 cm (referred to herein as vertical extent cores) will be collected to determine the depth of contamination below the sediment surface where needed for remedy design (i.e., in RAAs with 0–45- or 0–60-cm RAL exceedances that have the potential for dredging or partial dredging and capping technologies). Tables in Appendix B and Maps 4-1a through 4-1j show the depths of the cores to be collected at each location.

Shoaling core intervals are shown in Figure 4-1. As discussed in the QAPP Addendum for Phase II (Anchor QEA and Windward 2021a), vertical extent cores within the FNC will be collected to a target elevation of -25 ft MLLW, allowing for characterization of at least 1 ft of sediment below the anticipated maximum cap thickness. In some cases, the core may be collected deeper than -25 ft MLLW if the mudline elevation is deeper than -19 ft MLLW, or if there are other historical data suggesting contamination may be present below -25 ft MLLW. In addition, any sediment collected below the target elevation (or depth) will be archived in 30-cm (approximately 1-ft) intervals. Core intervals in native sediment will not be archived. Vertical extent diagrams are shown on Maps 4-1a through 4-1j; these diagrams show the targeted depths (i.e., below the mudline) for each core based on its location and current mudline elevation. Targeted core depths for the 14 vertical extent cores within the FNC range from about 6 to 16 ft.

Figure 4-1
Federal Navigation Channel Design Sampling



4.1.3 Analytes

The analyte list for each Phase III sample is dependent on nearby RAL exceedances in the design dataset (including contaminants with nearby exceedance factors of > 0.9), and on which RALs are applicable at a given location and interval. Locations where RALs apply are summarized in Figure 4-2 of the PDI QAPP (Windward and Anchor QEA 2020) and Table 28 in the ROD (EPA 2014) and are based on bathymetry (e.g., intertidal or subtidal), sample interval, recovery category, shoaling areas, and other location-specific factors. See Maps 4-1a through 4-1j for contaminant-specific exceedance factors.

Using these guidelines, all of the Phase III samples targeted for RAA refinement will be analyzed for polychlorinated biphenyls (PCBs) and total organic carbon (TOC) (Table 4-2). Analytes and sample-specific details are summarized in Appendix B tables for all Phase III locations. Grain size will not be analyzed in Phase III samples, because sufficient grain size data have already been collected for design.

Table 4-2
Summary of Phase III Analytes by RAA based on RAL Exceedances in the Design Dataset

30% Design RAA	Analytes in Phase III Samples[1]		
	Surface Sediment (0–10 cm)	Subsurface Sediment (0–45 cm, 0–60 cm, and shoal)	Vertical Extent Intervals
1/2/3	-	PCBs	PCBs
4/5, 6	-	PCBs	PCBs
11	-	PCBs, PAHs, mercury	PCBs, PAHs, mercury
Near 12	-	PCBs	PCBs
13	PCBs, 4-methylphenol	PCBs	-
Near 13	-	PCBs	PCBs
14 (and near 14)	-	PCBs	PCBs
15/16	-	PCBs	PCBs
18	-	PCBs, arsenic	PCBs, arsenic
19/20	-	PCBs	PCBs
21	-	PCBs	PCBs
Near 22	-	PCBs	PCBs
22	-	PCBs, BBP, dioxin/furan	PCBs, BBP
23	-	PCBs	PCBs
Between 24/25	-	PCBs, dioxin/furan	PCBs, dioxin/furan
26	-	PCBs, dioxin/furan	PCBs, BBP, dioxin/furan
28	-	PCBs	-
31	-	PCBs	PCBs
35	PCBs	-	-

Notes:
1. The analyte list is sample specific within a RAA; see Appendix B for details.
BBP: butyl benzyl phthalate
cPAH: carcinogenic polycyclic aromatic hydrocarbon
PAH: polycyclic aromatic hydrocarbon
PCB: polychlorinated biphenyl
RAA: remedial action area
RAL: remedial action level

Table 4-3 provides a summary of analytes at locations targeted because they have existing contaminant of concern concentrations greater than the benthic SCO but less than RALs in Recovery Category 2/3 areas. At these locations, 0–10-cm samples will be analyzed for PCBs and for the contaminant of concern with the concentration greater than the benthic SCO.

Table 4-3
Summary of Phase III Analytes for 0–10-cm MNR to Benthic SCO Re-occupation Samples

RM	Location	Existing Sample	SCO Exceedance	Phase III Analytes
3.3W	765	DR203 (1998)	Phenol	Phenol, PCBs

RM	Location	Existing Sample	SCO Exceedance	Phase III Analytes
3.7W	786	DR209 (1998)	Phenol	Phenol, PCBs
Slip 6	812	04-intsed-3 (1996)	Mercury	Mercury, PCBs
4.7E	818	R79 (1997)	Acenaphthene	PAHs, PCBs
4.8E	819	DR254 (1998)	Lead	Lead, PCBs
4.9E	823	NFK005 (1994)	BEHP	BEHP, PCBs

Notes
BEHP: bis(2-ethylhexyl) phthalate
MNR: monitored natural recovery
PAH: polycyclic aromatic hydrocarbon
PCB: polychlorinated biphenyl
RM: river mile
SCO: sediment cleanup objective

4.2 Sample Identification

Unique alphanumeric identifications (IDs) will be assigned to each sample and recorded on the collection and processing forms included in Attachment K of the PDI QAPP Addendum for Phase II (Anchor QEA and Windward 2021a).

The sample IDs for Phase III samples use the same convention as the Phase II sample IDs, except for the year, as follows:

- Project area ID (i.e., LDW) and two-digit year (i.e., 22 for Phase III samples)
- Sample type:
    - SS – surface sediment samples (0–10 cm)
    - IT – intertidal subsurface samples, including 0–45-cm and deeper vertical extent samples
    - SC – subtidal subsurface samples, including 0–60-cm, shoaling, and deeper vertical extent samples
- Location number (see Appendix B); location numbers will start at 750.
- For subsurface cores (i.e., SC and IT), a sequential letter (e.g., A, B, C) will be used to identify the sample interval if there is more than one. The letter A will be used to indicate the targeted surface-most interval (i.e., 0–45 or 0–60-cm interval), while B, C, etc., will be used to indicate each subsequently deeper interval.

For example, a surface sample from location 765 collected from the LDW in 2022 would be labeled LDW22-SS765. The first core interval sample (e.g., the 0–60-cm sample) from the subtidal core samples from location 750 would be labeled LDW22-SC750A, the next core interval sample would be labeled LDW22-SC750B, and so on.

The number of RAL intervals at shoaling locations is dependent on the depth of the shoal material (Figure 4-1). In a shoaling core with more than 90 cm of shoal material, the three surface-most intervals are all RAL intervals and would be labelled A, B, and C. In a shoaling core with less than 30 cm of shoal material, the surface-most interval is the only RAL interval and would be labelled A.

All field duplicate samples collected will have the same sample ID as its parent sample but will be appended with "-FD" to identify it as a field duplicate.

4.3 Sample Analysis

Analytical laboratory methods and requirements are generally the same as those outlined in Section 4.9 of the PDI QAPP (Windward and Anchor QEA 2020). Some analytical tables have been updated to include revisions from the Washington State Department of Ecology's sediment cleanup user's manual (Ecology 2021), including the revised temperature for frozen samples (-18°C) and revised holding times for TOC, metals, and mercury. In addition, Analytical Resources, LLC has updated the analytical method for metals to EPA 6020B and revised the required QC samples for metals and mercury. Updated tables with this information are presented in Appendix A.

5 Data Generation and Acquisition of Engineering PDI Elements

To address DQO 11, Phase III will include focused topographic and outfall surveys of any areas needed for design beyond the data collected in Phase II. In addition, the structural engineer may re-visit certain areas within the upper reach to obtain detailed information on structural components, as needed. The results of these surveys are the only remaining engineering data needed to address engineering PDI elements for RD. Details for the Phase III surveys are presented in the supplement to the survey QAPP addendum (Anchor QEA and Windward 2022c).

6 Assessment and Oversight

Protocols outlined in Sections 7.1 and 7.2 of the PDI QAPP (Windward and Anchor QEA 2020) for compliance assessments and response actions and reports to management will be followed. The Phase III data package will be submitted to EPA 10 days after validated data are received. After the Phase III PDI sample collection and analysis efforts are complete, the upper reach design dataset will be supplemented with the Phase III data and used in RD. A meeting will be scheduled with EPA to discuss how the Phase III results may affect design.

The Phase III data and the updated RAL exceedance area interpolation will be incorporated into 90% RD. The data and relevant field and analytical information will be presented in an appendix to the 90% RD document. The appendix will contain the following:

- Summary of all field activities, including descriptions of any deviations from the approved QAPP Addendum for Phase III
- Sampling locations reported in latitude and longitude to the nearest one-tenth of a second and in northing and easting to the nearest foot
- Sample elevations (ft MLLW) and depths below mudline
- Summary of the chemical data QA/QC review
- Summary of field QC result evaluation
- Results from the analyses of sediment and updated table with re-occupied results
- Copies of field logs and photographs (attachment)
- Copies of chain of custody forms (attachment)
- Laboratory and data validation reports (attachment)
- Results of focused topographic and outfall surveys

Once the 100% RD has been approved by EPA, the chemistry database export for all three PDI phases will be created from the project SQL Server database and submitted as specified in Section 7.3 of the PDI QAPP (Windward and Anchor QEA 2020).

7 References

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Appendix A
Updated Analytical Methods and Requirement Tables

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Appendix B
Phase III Sampling Locations and Rationale

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Appendix C
Phase III cPAH Sampling Locations