

Appendix C

Phase III cPAH Sampling Locations

1 Introduction

As described in the data evaluation report (DER) for the upper reach of the Lower Duwamish Waterway (LDW) (Anchor QEA and Windward 2022a), remedial action level (RAL) exceedance areas were developed by comparing data in the design dataset with RALs, as defined in the US Environmental Protection Agency's (EPA's) November 2014 LDW Record of Decision (ROD) (EPA 2014) for all contaminants of concern except carcinogenic polycyclic aromatic hydrocarbons (cPAHs). The LDW Explanation of Significant Differences (ESD) (EPA 2021) provides the RALs that require remedial action in the LDW for cPAHs. EPA's ESD for cPAHs updated the cPAH RALs, cleanup levels, and target tissue levels to reflect the latest scientific understanding of cPAH toxicity.

Appendix B of the DER (Anchor QEA and Windward 2022a) presented an evaluation of whether additional RAL exceedance areas would be identified if the 2014 ROD RALs for cPAHs were used, instead of those in the LDW ESD (EPA 2021). This evaluation was conducted because the Lower Duwamish Waterway Group (LDWG) is voluntarily preparing a design to address areas where only RAL exceedance areas identified using the 2014 ROD RALs for cPAHs (pre-ESD) occur. This appendix describes Phase III samples to be collected to inform the design for these additional cPAH-only areas.

2 Phase III PDI Sampling Locations

As was presented in Appendix B of the DER (Anchor QEA and Windward 2022a), use of the 2014 ROD RALs—rather than the RALs presented in the LDW ESD (EPA 2021)—identifies two additional RAL exceedance areas. These areas, shown as orange polygons on Map C-1, occur in areas with only cPAH ROD RAL exceedances in surface sediments. They result in a small increase in the size of Area 18 (river mile [RM] 3.8 East) and a new area in the Turning Basin (RM 4.7 West).

Data gaps were evaluated for the two areas to determine whether Phase III pre-design investigation (PDI) samples were needed:

- Area 18 (RM 3.8 East) – No Phase III data gaps were identified for cPAHs because the remedial action area identified in 30% remedial design (Anchor QEA and Windward 2022b) encompassed the entire area.¹
- Turning Basin (RM 4.7 West) – Two surface sediment samples will be collected as part of the Phase III PDI to refine the horizontal delineation between SS384 (i.e., the location with the cPAH ROD RAL exceedance) and the shoreline to avoid disturbing habitat, if possible.

These two surface sediment samples will be analyzed for cPAHs, total solids, and total organic carbon (TOC). Although TOC is not needed for the RAL comparison, since the cPAH RAL is presented on a dry weight basis, TOC will be analyzed so the individual polycyclic aromatic hydrocarbon (PAH) concentration data can be compared to RALs for individual PAHs, which are carbon-normalized values. Additional details regarding these two samples are presented on Map C-2 and in Tables C-1 and C-2.

¹ The cPAH ROD RAL exceedance area was encompassed in the remedial action area once engineering considerations were applied to RAL exceedance areas for other contaminants in Area 18.

Table C-1
Sample Location Rationale and Analytes

Location No.	RM	Tidal Category	Area ¹	Sample Type(s)					Recovery Category	In FNC?	Shoaling Area	Potential Vessel Scour Area	Mudline Elevation (ft MLLW)	Bathymetry Survey Year	Rationale and Notes	Analytes by Sample Type ²		
				RAL Intervals				Vertical Extent								Surface Sediment Samples (0-10 cm)	Subsurface Sediment Samples (0-45 cm, 0-60 cm, or Shoaling Intervals)	Analytes for Vertical Extent Samples
				0-10 cm	0-45 cm	0-60 cm	Shoal											
824	4.7	intertidal	cPAHs	x				3	No	No	No	8.0	2016 (LiDAR)	Refine horizontal delineation between SS384 and shoreline.	cPAHs	--	--	
825	4.7	intertidal	cPAHs	x				3	No	No	No	7.0	2016 (LiDAR)	Refine horizontal delineation between SS384 and shoreline.	cPAHs	--	--	

Notes:

1. The cPAH area is the area in the Turning Basin with only exceedances of the cPAH RALs in the 2014 ROD (EPA 2014).
2. The columns indicating analytes by sample type use green shading to show that sample intervals will be collected. A double dash (--) indicates that a given interval will not be collected..

cPAH: carcinogenic polycyclic aromatic hydrocarbon

FNC: Federal Navigation Channel

LiDAR: light detection and ranging

MLLW: mean lower low water

RAL: remedial action level

RM: river mile

ROD: Record of Decision

Table C-2
Sample Location Details

Location No.	RM	Tidal Category	Area ¹	Sample Type(s)					Reoccupation?	Vertical Extent Details ¹			In the FNC?	Mudline Elevation (ft MLLW)	Bathymetry Survey Year	Estimated Shoal Thickness (cm)	Target Coordinates			
				0-10 cm	0-45 cm	0-60 cm	Shoal	Vertical Extent		Target Depth	Intervals to Analyze	Estimated No. of Intervals					X	Y	Longitude	Latitude
824	4.7	intertidal	cPAHs	x					-	-	-	-	No	8.0	2016 (LiDAR)	-	1277246	189848	-122.30293	47.51095
825	4.7	intertidal	cPAHs	x					-	-	-	-	No	7.0	2016 (LiDAR)	-	1277248	189880	-122.30292	47.51104

Notes:

1. The cPAH area is the area in the Turning Basin with only exceedances of the cPAH RALs in the 2014 ROD (EPA 2014).

cPAH: carcinogenic polycyclic aromatic hydrocarbon

FNC: Federal Navigation Channel

LiDAR: light detection and ranging

MLLW: mean lower low water

RAL: remedial action level

RM: river mile

ROD: Record of Decision

3 References

- Anchor QEA, Windward. 2022a. Pre-Design Investigation data evaluation report for the Lower Duwamish Waterway upper reach. Draft. For submittal to US Environmental Protection Agency, February 21, 2022. Anchor QEA and Windward Environmental LLC, Seattle, WA.
- Anchor QEA, Windward. 2022b. 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.
- EPA. 2014. Record of Decision. Lower Duwamish Waterway Superfund Site. US Environmental Protection Agency.
- EPA. 2021. Proposed explanation of significant differences. Draft for public comment. Lower Duwamish Waterway Superfund site. US Environmental Protection Agency Region 10, Seattle, WA.