

Attachment E

Geotechnical Data Collection Locations and Rationale

Table E-1, as referenced in Section 5.2 of the Lower Duwamish Waterway middle reach Pre-Design Investigation Quality Assurance Project Plan Addendum for Phase II, presents the Phase II geotechnical data collection locations, methods, target elevations for borings, and rationale. The planned field locations are shown on Maps 5-2a and 5-2b in the addendum.

**Table E-1
Phase II Geotechnical Field Investigation Locations**

Sampling Location ID	RM	Name of Nearest Site	Nearest RAL Exceedance Area(s)	Preliminary Remedial Technology Options	Geotechnical Data Location			Geotechnical Data Collection Method ¹			Target Depth (Feet BGS) or Elevation (Feet MLLW)	Rationale Note	Target Coordinates			
					Adjacent to FNC	Subtidal/Intertidal	Upland	SPT Boring	CPT	Vane Shear			Latitude	Longitude		
LDW23-GT01-GT	1.85	Seafreeze	28	Dredge, PD&C, AST	X			X	X		-40 feet MLLW	1	47.54389663	-122.3372944		
LDW23-GT02-GT	1.95				X			X	X		-40 feet MLLW	1	47.54307834	-122.3363867		
LDW23-GT03-GT	2.0				X			X	X		-40 feet MLLW	1	47.54237349	-122.3353341		
LDW23-GT04-GT	1.9	Duwamish Marine Center	29	Dredge, PD&C, AST			X	X			40 feet BGS	3	47.54387591	-122.3356463		
LDW23-GT05-GT	1.9		28 and 29		X			X	X			-40 feet MLLW	1	47.54354559	-122.3357062	
LDW23-GT06-GT	1.9				X	X				X	5 feet BGS	2	47.54354888	-122.3354094		
LDW23-GT07-GT	1.95		X				X	X				-40 feet MLLW	1	47.5433426	-122.3354106	
LDW23-GT08-GT	1.95		29					X	X			40 feet BGS	3	47.54357242	-122.3350242	
LDW23-GT09-GT	2.05	City of Seattle	28	Dredge, PD&C, AST	X			X	X		-30 feet MLLW	1	47.54159464	-122.3341348		
LDW23-GT10-GT	2.05				X			X	X				-30 feet MLLW	1	47.54207801	-122.3336393
LDW23-GT11-GT	2.15	AML Yard 2	21	Dredge, PD&C, ENR, AST			X	X			40 feet BGS	3	47.54028455	-122.3332977		
LDW23-GT12-GT	2.15		17 and 21		X			X	X			40 feet BGS	2	47.54050823	-122.3329024	
LDW23-GT13-GT	2.2		21				X	X				40 feet BGS	3	47.53968506	-122.3324734	
LDW23-GT14-GT	2.2		17 and 21		X			X	X			20 feet BGS	2	47.53995201	-122.3320216	
LDW23-GT15-GT	2.3	Bower Towing Inc.	16	Dredge, PD&C		X		X	X		40 feet BGS	2	47.53912696	-122.3307781		
LDW23-GT16-GT	2.35				X			X	X				20 feet BGS	2	47.53836593	-122.3299486
LDW23-GT17-GT	2.55		10	Dredging, PD&C	X			X	X		-30 feet MLLW	1	47.5366316	-122.3271733		
LDW23-GT18-GT	2.35	Seattle Iron & Metals	15	Dredge, PD&C, AST		X		X	X		20 feet BGS	2	47.53930375	-122.3279869		
LDW23-GT19-GT	2.55				X			X	X				20 feet BGS	2	47.5373424	-122.3264118
LDW23-GT20-GT	2.55		11		X			X	X			40 feet BGS	2	47.53726712	-122.3258729	
LDW23-GT21-GT	2.55				X			X					40 feet BGS	3	47.53710308	-122.3260834
LDW23-GT22-GT	2.55				X			X	X				20 feet BGS	2	47.53702758	-122.3258309
LDW23-GT23-GT	2.6	Pacific Pile and Marine	10	Dredge, PD&C, ENR, AST	X			X	X		-30 feet MLLW	1	47.5359781	-122.3261484		
LDW23-GT24-GT	2.7		5		X			X	X			20 feet BGS	2	47.53483496	-122.3246423	
LDW23-GT25-GT	2.75				X			X	X				40 feet BGS	2	47.53427148	-122.3235656
LDW23-GT26-GT	2.65	Recology Cleanscapes	9	Dredge, PD&C, AST, cap	X			X	X		-30 feet MLLW	1	47.53613916	-122.3250987		
LDW23-GT27-GT	2.7				X			X	X				-30 feet MLLW	1	47.53547402	-122.3240032
LDW23-GT28-GT	2.75				X			X	X				-30 feet MLLW	1	47.53503296	-122.3233008
LDW23-GT29-GT	2.75				X			X	X				40 feet BGS	2	47.53515449	-122.3231612
LDW23-GT30-GT	2.75				X			X	X				20 feet BGS	2	47.53550504	-122.3227555
LDW23-GT31-GT	2.75								X	X			40 feet BGS	3	47.53531073	-122.3230169

Rationale:

1. Geotechnical data collected adjacent to the FNC will focus on assessment of dredgeability and sediment strength for slope stability.
2. Geotechnical data collected in the subtidal and intertidal areas will focus on sediment properties to support dredging, capping, ENR, slope stability, and structural considerations (as applicable).

3. Geotechnical data collected in the upland area will be necessary to address access issues in the intertidal area.

Notes:

1. Where both SPT and CPT are indicated, the field geologist/geotechnical engineer and lead geotechnical engineer will evaluate which is the more appropriate investigation method based on field conditions. Only one method will be selected.

2. Assignment of *ex situ* geotechnical tests—as described in Sections 5.2.4 and 5.2.5 of the PDI QAPP Addendum for Phase II and Section 5.3.3, Table 5-1, of the PDI QAPP (Windward and Anchor QEA 2020)—will be coordinated by the field geologist/geotechnical engineer and lead geotechnical engineer and based on geologic conditions observed in the field.

AST: area-specific technology

BGS: below ground surface

CPT: cone penetration testing

ENR: enhanced natural recovery

FNC: Federal Navigation Channel

ID: identification

MLLW: mean lower low water

PD&C: partial dredge and cap

PDI: Pre-Design Investigation

QAPP: quality assurance project plan

RAL: remedial action level

RM: river mile

SPT: standard penetration testing

References

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.