

CENWS-OD-TS-NR

MEMORANDUM FOR: RECORD

February 8, 2018

SUBJECT: ANTIDegradation EVALUATION FOR PROPOSED DREDGED MATERIAL FROM WENATCHEE WATERFRONT BOAT LAUNCH EXTENSION PROJECT WITH UPLAND DISPOSAL.

1. **Introduction.** This memorandum reflects the consensus determination of the Dredged Material Management Program (DMMP) agencies (U.S. Army Corps of Engineers, Washington Departments of Ecology and Natural Resources, and the Environmental Protection Agency) regarding the suitability of the exposed sediment surface after removal of approximately 2,000 cubic yards (CY) of dredged material from the Wenatchee Waterfront boat launch. All material will be removed from the water and disposed at an upland location, since open-water disposal on the upper reaches of the Columbia River is not permissible. Therefore, DMMP evaluation of the proposed dredged material for open-water disposal is unnecessary. However, to determine compliance with the State of Washington antidegradation policy, evaluation of the material within dredge prism is required.
2. **Background.** The Chelan Public Utility District (PUD) owns and operates the boat launch facility at the Wenatchee Riverfront Park (Figure 1). The launch is located in the impoundment of the Columbia River created by the Rock Island Dam, which controls water levels in this reach. In March of 2014, the operating pool elevation for the reservoir behind the dam was lowered in response to the drawdown required at the Wanapum Dam; the resulting pool elevation was 608 ft National Geodetic Vertical Datum of 1929 (NGVD29). At this elevation, the Wenatchee Riverfront Boat Launch has been rendered mostly inaccessible. Furthermore, the launch has not been dredged since its original construction and a significant amount of material has accumulated in the boat basin.

Chelan PUD proposes to extend the boat launch ramp and restore depths consistent with the original boat launch design to ensure full access and utility for users at all operational pool elevations. Approximately 2,000 CY of material is proposed for dredging to attain a new design depth of 604 ft NGVD29. The material will be disposed of at the Waste Management Greater Wenatchee Regional Landfill.

3. **Project Summary.** Table 1 includes project summary and tracking information.

Table 1. Project Summary

Project ranking	Moderate
Proposed dredging volume	2,000 CY
Proposed dredging depth	604 ft NGVD29
SAP received	August 14, 2017
DMMP comments on 1 st draft	August 28, 2017
Final SAP received	August 29, 2017
SAP approved	August 30, 2017
Sampling date(s)	October 24, 2017
Draft Sediment Characterization Report (SCR)	January 19, 2018

received	
DMMP comments on 1 st draft SCR	February 5, 2018
Final SCR received	February 5, 2018
SCR approved	February 5, 2018
DMMO tracking number	DMMP-WENAT-1-A-F-392
EIM study ID	WENAT17
Recency Determination (moderate rank = 5 years)	October 2022

4. **Project Ranking and Sampling Requirements.** Sediments in the project area are currently ranked “moderate” (DMMP, 2016). This ranking indicates that present or historical chemical sources exist in the vicinity of the project with some potential for causing adverse biological impacts. For a moderate-ranked project with heterogeneous sediment, the number of samples and analyses are calculated using the following guidelines (DMMP, 2016):

- Maximum volume of sediment represented by each field sample = 4,000 cy
- Maximum volume of sediment represented by each composite sample = 16,000 cy

Two field samples to form one DMMU were planned for this project. Given the maximum depth of the dredge prism (~5 feet), no subsurface DMMUs were required. The sampling design and frequency meets the DMMP requirements.

5. **Sampling.** Sediment cores were collected October 24, 2017 at the two locations shown in Figure 2 and detailed in Table 2. Sampling was conducted aboard the research vessel (R/V) *Peter R*, operated by MSS using a vibracore. Actual core locations, date, mudline elevation, drive penetration, water level, and recovery measurements are provided in Table 2. Two attempts were necessary for sufficient material recovery at location C-1. Location C-2 was moved after three failed attempts in the vicinity of the proposed location due to a sloped sediment surface and potential coarse material from the rip-rap shoreline. The fourth attempt was collected and accepted approximately 60 feet from the proposed locations closer to the end of the existing boat launch.

The two sediment cores were transferred to shore for processing and physical characterization. Material from 602 to 604 feet NGVD29 was collected and archived to represent the z-samples. Samples were then transported to Analytical Resources, Inc. (ARI) and submitted for analysis.

Percent recoveries for the accepted cores from locations C-1 and C-2 were 84 and 86 percent, respectively, with reduced recovery attributed to the loss of sand from the bottom of the cores during core retrieval. Cores lengths and sample intervals were corrected for compaction based on core recovery; cores were assumed to have uniform compaction through the core. Tables 2 and 3 provide the core collection data, and core sampling intervals and analyses.

6. **Analytical Results.**

The DMMU composite was analyzed for sediment conventionals and the standard DMMP chemicals of concern for freshwater projects. Since one compound exceeded a DMMP SL (Nickel) in the dredged material, the z-layer was subsequently analyzed for Nickel and physical parameters (TOC, TVS, and TS) to facilitate evaluation for compliance with Washington State’s antidegradation policy under the SMS rule. The conventional and chemical data results are summarized in Table 4.

Sediment Conventionals. Both composite samples were analyzed for total organic carbon, total solids, total volatile solids, and grain size. In addition, the DMMU composite was analyzed for ammonia and sulfides. Sediment conventional results for the DMMU and Z-sample are similar; TOC was 1.77% and 1.51%, respectively. Both the DMMU and Z-sample composites were primarily composed of sand and silt, with less contributions of clay and gravel. Total fines were 40.3 and 32.5%, respectively for the DMMU and Z-samples. Results for ammonia and sulfides in the DMMU were 63.2 and 872 mg/kg, respectively. Although not applicable to this anti-degradation determination, the sulfides concentration (872 mg/kg) does exceed the DMMP freshwater advisory guideline values of 39 mg/kg (SL1/SQS) and 61 mg/kg (SL2/CSL) and may be a potential concern for water quality.

Standard Chemicals of Concern. The surface DMMU sample was analyzed for standard DMMP freshwater COCs, including metals, organometallics, pesticides, semivolatile organic compounds, polycyclic aromatic hydrocarbons, and polychlorinated biphenyls (PCBs). Upon receipt of preliminary data for the surface interval and comparison to freshwater SLs, the Z-sample was analyzed only for analytes that exceeded SLs (Nickel) and physical parameters.

With the exception of Nickel, no chemistry results (detects and non-detects) exceeded the DMMP freshwater SL. Nickel concentrations were reported as 108 and 85.2 mg/kg, respectively for the DMMU and Z-sample composites, which is above the freshwater SL1/SCO of 38 mg/kg, but less than the freshwater SL2/CSL of 110 mg/kg.

All other detects and non-detect concentrations for the standard DMMP freshwater COCs are below the SL1 (Table 4).

Dioxins/furans. Dioxins/furan testing was not required for this project.

Data Validation. All chemistry data were validated to a minimum of EPA Stage 2b. Only minor issues were encountered during data validation, and all data were considered usable by the data validator for the study purpose.

7. **Biological Testing.** No biological testing was required for this project. The single exceedance of Nickel did not trigger bioassay testing, because the material will be disposed upland and an anti-degradation determination could be made with the z-sample chemistry.

Bioaccumulation triggers have not been set for freshwater sediments; therefore, bioaccumulation testing was not indicated.

8. **Sediment Exposed by Dredging.** Sediment exposed by dredging must meet either the State of Washington Sediment Quality Standards (SQS) (Ecology, 2013) or the State's anti-degradation standard (DMMP, 2008b). The nickel concentration in the project DMMU (108 mg/kg) exceeded the freshwater SL (38 mg/kg), triggering analysis of the z-sample composite. The concentration of nickel in the z-sample (85.2) still exceeded the freshwater SL, but was less than the concentration in the overlying dredge prism proposed for removal, indicating that concentrations decrease with depth. Sediments exposed after dredging would therefore be expected to have an overall lower nickel concentration than the current surface. Furthermore, the nickel concentrations in both the DMMU and

z-sample composite are less than the freshwater SL2 (110 mg/kg). Therefore, this project is in compliance with the State of Washington anti-degradation standard.

9. **Debris Management Evaluation.** The DMMP agencies implemented a debris screening requirement following the 2015 SMARM in order to prevent the disposal of solid waste and large debris at open-water disposal sites in Puget Sound (DMMP, 2015). A debris screen is not required for this project because all material will be going to an upland disposal location.

10. **Anti-Degradation Determination.**

Based on the results of the previously described testing, the DMMP agencies have concluded that the post-dredge surface for the proposed project meets the state antidegradation standard.

Since all dredged material must go to an upland disposal location due to lack of flow-lane disposal options on the upper Columbia River, a suitability determination for open-water disposal is not appropriate for this project.

This anti-degradation determination does ***not*** constitute final agency approval of the project. During the public comment period that follows a public notice, the resource agencies will provide input on the overall project. A final decision will be made after full consideration of agency input, and after an alternatives analysis is done under section 404(b)(1) of the Clean Water Act.

10. **References.**

Anchor QEA, 2017. Sampling and Analysis Plan for the Wenatchee Riverfront Park Boat Launch. Prepared for Public Utility District No. 1 of Chelan County, August 2017.

Anchor QEA, 2018. Sediment Characterization Report for the Wenatchee Riverfront Park Boat Launch. Prepared for Public Utility District No. 1 of Chelan County, February 2018.

DMMP, 2008b. *Quality of Post-Dredge Sediment Surfaces (Updated)*. A Clarification Paper Prepared by David Fox (USACE), Erika Hoffman (EPA) and Tom Gries (Ecology) for the Dredged Material Management Program, June 2008.

DMMP, 2015. *Debris Screening Requirements for Dredged Material Disposed at Open-Water Sites*. Prepared by Erika Hoffman (EPA), Celia Barton (WA DNR), and David Fox (USACE) for the DMMP agencies.

DMMP, 2016. *Dredged Material Evaluation and Disposal Procedures (User Manual)*. Prepared by the Seattle District Dredged Material Management Office for the Dredged Material Management Program, August 2016.

Ecology, 2013. *Sediment Management Standards – Chapter 173-204 WAC*. Washington State Department of Ecology, February 2013.

11. Agency Signatures.

signed copy on file in DMMO - Seattle District office

Concur:

Date Heather Fourie – U.S. Army Corps of Engineers, Seattle District

Date Erika Hoffman - Environmental Protection Agency

Date Laura Inouye, Ph.D. - Washington Department of Ecology

Date Celia Barton - Washington Department of Natural Resources

Copies furnished:
DMMP signatories
USACE, Seattle District Regulatory
Joy Dunay – Anchor QEA.

Table 2. Core Collection Data

DMMU	Station	Date	Location (NAD83 WASPN ¹)		Measured Water Depth (feet)	Water Level (feet NGVD29) ²	Mudline Elevation (feet NGVD29)	Drive Penetration (feet)	Recovery Measurement (feet)	Recovery (pct)
			X Coordinate	Y Coordinate						
DMMU-1	C-1	10/24/2017	1770978	155433	4.4	613.6	609.2	7.7	6.5	84
	C-2	10/24/2017	1771044	155479	4.4	613.1	608.7	6.3	5.4	86

Notes:

- Coordinates are in NAD83 WA State Plane North, U.S. Feet.
- Water levels at time of sampling were surveyed using a Trimble R8 GPS rover, which was connected to the Washington State Reference Network.

DMMU: Dredge Material Management Unit

NGVD29: National Geodetic Vertical Datum of 1929

NAD83: North American Datum of 1983

pct:
percent

WASPN: Washington State Plane North

Table 3. Core Sampling Intervals and Analyses (Anchor QEA, 2018)

DMMU	Station	Design Elevation (feet NGVD29)	Dredged Material Surface Sample (A) Elevation Interval (feet NGVD) ^{1,2}	Z-layer Sample Elevation Interval (feet NGVD29) ^{1,2}	Archive Samples ²	Composite Samples and Analyses
DMMU-1	C-1	604	604 to 609.2	602 to 604	C-1-A-171024 C-1-Z-171024	DU1-A-171024: Freshwater DMMP ³
	C-2	604	604 to 608.7	602.4 to 604	C-2-A-171024 C-2-Z-171024	DU1-Z-171024: Nickel, TOC, TS, TVS, Grain Size

Notes:

1. Sample intervals were corrected for length based on core recovery. Cores are assumed to have uniform compaction through the core.
2. Surface Sample and Z-layer sample intervals composited for analysis (C-1-A and C-2-A, C-1-Z and C-2-Z).
3. Freshwater DMMP testing parameters include SVOC, PAH, pesticide, PCB, butyltins, TPH, metals, sulfide, ammonia, TOC, grain size, TVS, and TS.

DMMU: dredge material management unit

NGVD29: National Geodetic Vertical Datum of 1929

PAH: polycyclic aromatic hydrocarbon

PCB: polychlorinated biphenyl

SVOC: semivolatile organic compound

TBT: tributyltin

TOC: total organic carbon

TPH: total petroleum hydrocarbons

TS: total solid

TVS: total volatile

solid

Table 4. Summary Analytical Results

Parameter	Method	Sample ID		DU1-A-171024	DU1-Z-171024
		Sample Date		10/24/2017	10/24/2017
		Matrix		SE	SE
		DMMP/SMS Freshwater Screening Levels			
		SL1/SCO	SL2/CSL		
Conventional Parameters (mg/kg)					
Ammonia as nitrogen ⁴	SM4500NH3H	230	300	63.2	--
Sulfide ⁴	SM4500S2D	39	61	872 J	--
Conventional Parameters (pct)					
Total organic carbon	Plumb 1981			1.77 J	1.51 J
Total solids	SM2540G			55.34	62.17
Total volatile solids	PSEP			5.41	6.79 J
Grain Size (pct retained by sieve size in microns)					
Gravel (>2000)	PSEP			0	0.7
Sand, very coarse (2000 to 1000)	PSEP			0.8	1.1
Sand, coarse (1000 to 500)	PSEP			1.6	1.9
Sand, medium (500 to 250)	PSEP			4.6	6.5
Sand, fine (250 to 125)	PSEP			24.8	32.9
Sand, very fine (125 to 62)	PSEP			27.8	24.4
Silt, coarse (62.5 to 31.0)	PSEP			16	11.2
Silt, medium (31.0 to 15.6)	PSEP			9.6	6.6
Silt, fine (15.6 to 7.8)	PSEP			5.5	4.4
Silt, very fine (7.8 to 3.9)	PSEP			3.9	3.7
Clay, coarse (3.9 to 2.0)	PSEP			1.9	2.4
Clay, medium (2.0 to 1.0)	PSEP			1.6	1.7
Clay, fine (<1.0)	PSEP			1.8	2.5
Total Fines (<62.5)	calculated			40.3	32.5
Metals (mg/kg dry weight)					
Arsenic	SW6020A	14	120	6.39	--
Barium	SW6020A			144	--
Cadmium	SW6020A	2.1	5.4	0.86	--
Chromium	SW6020A	72	88	71.4	--
Copper	SW6020A	400	1,200	35.9	--
Lead	SW6020A	360	>1,300	37.8	--
Mercury	SW7471B	0.66	0.8	0.0787	--
Nickel	SW6020A	38	110	108	85.2
Selenium	SW6020A	11	>20	0.85 U	--
Silver	SW6020A	0.57	1.7	0.17 J	--
Zinc	SW6020A	3,200	>4,200	174	--
Organometallic Compounds (µg/kg dry weight)					
Monobutyltin ion (bulk)	SW8270DMSIM	540	>4800	3.72 UJ	--
Dibutyltin ion (bulk)	SW8270DMSIM	910	130,000	5.27 UJ	--
Tributyltin ion (bulk)	SW8270DMSIM	47	320	3.52 UJ	--
Tetrabutyltin ion (bulk)	SW8270DMSIM	97	>97	4.56 U	--
Polycyclic Aromatic Hydrocarbons (µg/kg dry weight)					
Total LPAH ¹ (U = 0)	calculated			202.8 J	--
Naphthalene	SW8270D			38.5	--
1-Methylnaphthalene	SW8270D			29.8	--

Parameter	Method	Sample ID		DU1-A-171024	DU1-Z-171024
		Sample Date		10/24/2017	10/24/2017
		Matrix		SE	SE
		DMMP/SMS Freshwater Screening Levels			
		SL1/SCO	SL2/CSL		
2-Methylnaphthalene	SW8270D			45.4	--
Acenaphthylene	SW8270D			19.5 U	--
Acenaphthene	SW8270D			19.5 U	--
Fluorene	SW8270D			9.2 J	--
Phenanthrene	SW8270D			70.2	--
Anthracene	SW8270D			9.7 J	--
Total HPAH ² (U = 0)	calculated			403.4 J	
Fluoranthene	SW8270D			62	--
Pyrene	SW8270D			57.1	--
Benzo(a)anthracene	SW8270D			27.6	--
Chrysene	SW8270D			53.7	--
Total benzo(b,j,k)fluoranthenes	SW8270D			76.9	--
Benzo(a)pyrene	SW8270D			35.9	--
Indeno(1,2,3-c,d)pyrene	SW8270D			33.1 J	--
Dibenzo(a,h)anthracene	SW8270D			12.2 J	--
Benzo(g,h,i)perylene	SW8270D			44.9 J	--
Total PAHs ³ (U = 0)	calculated	17,000	30,000	606.2 J	--
Phthalates (µg/kg dry weight)					
Di-n-butyl phthalate	SW8270D	380	1,000	10.4 J	--
Bis(2-Ethylhexyl)phthalate	SW8270D	500	22,000	70.8	--
Di-n-octyl phthalate	SW8270D	39	>1,100	19.5 U	--
Phenols (µg/kg dry weight)					
Phenol	SW8270D	120	210	29.7	--
4-Methylphenol (p-Cresol)	SW8270D	260	2,000	71.3	--
Pentachlorophenol	SW8270D	1,200	>1,200	97.4 UJ	--
Miscellaneous Extractables (µg/kg dry weight)					
Benzoic acid	SW8270D	2,900	3,800	403	--
Dibenzofuran	SW8270D	200	680	19.5 U	--
Carbazole	SW8270D	900	1,100	19.5 U	--
Pesticides (µg/kg dry weight)					
2,4'-DDD (o,p'-DDD)	SW8081B			9.94 U	--
4,4'-DDD (p,p'-DDD)	SW8081B			15.4	--
Sum of 2,4'-DDD and 4,4'-DDD (U = 0)	calculated	310	860	15.4	--
2,4'-DDE (o,p'-DDE)	SW8081B			0.99 U	--
4,4'-DDE (p,p'-DDE)	SW8081B			18.7	--
Sum of 2,4'-DDE and 4,4'-DDE (U = 0)	calculated	21	33	18.7	--
2,4'-DDT (o,p'-DDT)	SW8081B			0.99 U	--
4,4'-DDT (p,p'-DDT)	SW8081B			2.56 J	--
Sum of 2,4'-DDT and 4,4'-DDT (U = 0)	calculated	100	8,100	2.56 J	--
beta-Hexachlorocyclohexane (beta-BHC)	SW8081B	7.2	11	0.5 U	--
Dieldrin	SW8081B	4.9	9.3	0.99 U	--
Endrin ketone	SW8081B	8.5	>8.5	0.99 U	--
PCB Aroclors (µg/kg dry weight)					
Aroclor 1016	SW8082A			4 U	--
Aroclor 1221	SW8082A			4 U	--

Parameter	Method	Sample ID		DU1-A-171024	DU1-Z-171024
		Sample Date		10/24/2017	10/24/2017
		Matrix		SE	SE
		DMMP/SMS Freshwater Screening Levels			
		SL1/SCO	SL2/CSL		
Aroclor 1232	SW8082A			4 U	--
Aroclor 1242	SW8082A			4 U	--
Aroclor 1248	SW8082A			9.4	--
Aroclor 1254	SW8082A			6.2 J	--
Aroclor 1260	SW8082A			2.5 J	--
Aroclor 1262	SW8082A			4 U	--
Aroclor 1268	SW8082A			4 U	--
Total PCB Aroclors (U = 0)	calculated	110	2,500	18.1 J	--
Total Petroleum Hydrocarbons (mg/kg dry weight)					
Diesel range hydrocarbons	NWTPHD	340	510	47.5	--
Motor oil range hydrocarbons	NWTPHD	3,600	4,400	220	--

Notes:

 Detected concentration is greater than DMMP SL1/SCO

 Detected concentration is greater than DMMP SL2/CSL

1. Total LPAH consists of the sum of naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, and anthracene
2. Total HPAH consists of the sum of fluoranthene, pyrene, benz(a)anthracene, chrysene, benzo(b,j,k)fluoranthenes, benzo(a)pyrene, indeno(1,2,3,-c,d)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene.
3. Total PAH consists of the sum of all PAHs listed.
4. The SL values for ammonia and sulfide are advisory in nature and do not impact a suitability determination.

Bold = Detected result

J: Estimated value

U: Compound analyzed, but not detected above detection limit

UJ: Compound analyzed, but not detected above estimated detection limit

µg/kg: microgram per kilogram

DMMP: Dredged Material Management Program

SL1/SCO: Screening Level 1 / sediment cleanup objective

SL2/CSL: Screening Level 1 / cleanup screening level

HPAH: high-molecular weight polycyclic aromatic hydrocarbon

LPAH: low-molecular weight polycyclic aromatic hydrocarbon

mg/kg: milligram per kilogram

PCB: polychlorinated biphenyl

pct: percent

Figure 1. Site Location Map (Anchor QEA, 2018)

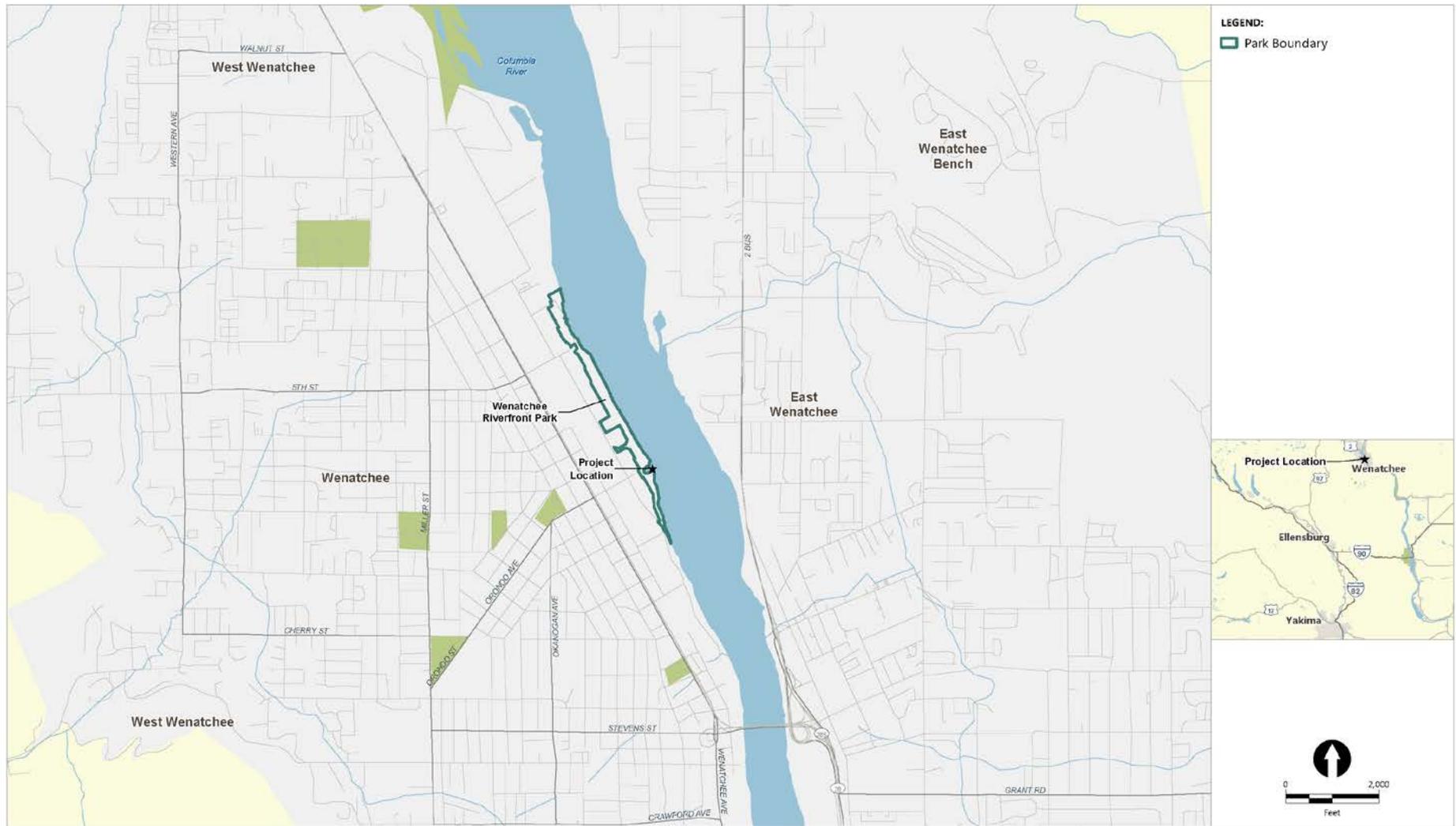


Figure 2. Proposed and Actual Sample Locations (Anchor QEA, 2018)

