Permit Ref. # NWS-2014-247-WRD

CENWS-OD-TS-DMMO

MEMORANDUM FOR: RECORD February 27, 2014

SUBJECT: DETERMINATION REGARDING THE SUITABILITY OF PROPOSED DREDGED MATERIAL FROM CHESTER MORSE LAKE PUMP PLANT EVALUATED UNDER SECTION 404 OF THE CLEAN WATER ACT FOR UNCONFINED OPEN-WATER DISPOSAL WITHIN CHESTER MORSE LAKE.

1. Introduction. This memorandum reflects the consensus determination of the Dredged Material Management Program (DMMP) agencies (U.S. Army Corps of Engineers, Washington State Department of Ecology, Washington State Department of Natural Resources, and the Environmental Protection Agency) regarding the suitability of up to 4,200 cubic yards (cy) of dredged material from Chester Morse Lake Pump Plant for open-water disposal within Chester Morse Lake.

2. Background. Chester Morse Lake is managed by Seattle Public Utilities (SPU) as a water storage reservoir that provides drinking water for the greater Seattle area, see Figure 1-1. The surrounding Cedar River Watershed is a protected area owned by the City of Seattle. Under dry conditions, the level of Chester Morse Lake may decline to levels at which gravity flow at the outlet from the lake is not sufficient to meet demand for municipal water supply or to provide in-stream flows adequate to protect fish in the lower reaches of the Cedar River. Under these conditions, water must be pumped from deeper portions of the main lake into Masonry Pool.

   In order to meet water system demands and in-stream flows during dry conditions, SPU is proposing a replacement floating pumping plant to allow better access to water stored in Chester Morse Lake. Improvements to the outlet channel are also proposed, including dredging of the outlet channel to a depth of 1531 ft Chester Morse Lake datum (CMLD), which is 7.39 feet above NGVD 1929. Upstream of the #200 Road Bridge, installation of approximately 700 linear feet of sheet piling is proposed on both sides of the Outlet Channel to provide an approximately 29-foot wide channel with vertical sheet pile walls. The maximum elevation of the top of the sheet pile wall would be approximately 1,543 feet CMLD. Between 1 and 5 feet of sediment would be dredged between the installed sheet pile walls. Downstream of the #200 Road Bridge, a 600-foot long (approximate) trapezoidal channel would be constructed. The bottom of the trapezoidal channel would be approximately 23 feet wide and its side slopes would be armored with Armorflex® or riprap at a maximum slope of 2:1. Between 1 and 5 feet of sediment would be dredged from the trapezoidal channel. Dredging would remove up to 4,200 cubic yards of sediment from approximately 1 acre in the trapezoidal channel and sheet pile areas. Dredge depths and volumes are based on the most recent hydrographic survey performed in July 2012.

   The project proponent is proposing mechanical dredging with barge offloading to the proposed in-lake disposal location, see Figure 1-2. The proposed location is a 2-acre nearshore shallow water site. Sediment will be deposited to depths of 1 to 5 feet. This disposal location was selected in order to protect sensitive cultural resources that may be present in the dredged material, for easy barge access, and to reduce likelihood of the sediment migrating back into the channel.

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

Table 1. Project Summary

Project ranking	Low-moderate
Proposed dredging volume	4,200 cy
Proposed dredging depth	1531 feet Chester Morse Lake Datum
1st draft SAP received	December 19, 2013
Comments provided on 1st draft SAP	January 10, 2014
Final SAP received	January 22, 2014
SAP approved	January 22, 2014
Sampling dates	January 23, 2014
Draft data report received	February 19, 2014
Comments provided on draft report	February 25, 2014
Final data report received	February 27, 2014
EIM Study ID	CMLPP14
USACE Permit Application Number	
Recency Determination (low-moderate rank = 6 years)	January 2020

4. Project Ranking and Sampling Requirements. This project was ranked low-moderate by the DMMP agencies according to the guidelines set out in the User's Manual for areas removed from potential sources of contamination but with insufficient evidence to warrant a low ranking. In a low moderate-ranked area the number of samples and analyses are calculated using the following guidelines (DMMP, 2013):
    - Maximum volume of sediment represented by each field sample = 8,000 cubic yards
    - Maximum volume of sediment represented by each analysis in the upper 4-feet of the dredging prism (surface sediment) = 32,000 cubic yards
    - Maximum volume of sediment represented by each analysis in the subsurface portion of the dredging prism = 48,000 cubic yards

    Due to the small size of the project, a single DMMU composited from three grab samples was required by the DMMP agencies. Sample locations along with DMMU outline are shown in Figure 2-1.

5. Sampling. Sampling took place January 23, 2014 using a stainless steel Ekman grab sampler aboard SPU's Cedar Watershed boat. Coordinates of the sampling locations were recorded using a hand-held GPS (NAD83). Three grab samples were collected from within the dredge prism and composited into a single analytical sample according to the approved SAP.

    An additional sample was collected as a reference sediment sample in the event bioassay testing was needed (it was not). The reference sediment sample was collected from the very head of

Chester Morse Lake, near the site of sample CM-1 collected for Ecology's Baseline Characterization of Nine Proposed Freshwater Sediment Reference Sites (Ecology, 2009).

Table 2. Sampling coordinates and compositing table

		Latitude	Longitude	% fines [1]	DMMU 1	Total
SAP volume (CY):					4,200	4,200
Station	V-207	47.40784	121.72171	22	0 - 5 cm	
	V-209a	47.40901	121.72242	40	0 - 5 cm	
	V-210a	47.40962	121.72334	33	0 - 10 cm	
	CM-1	47.37685	121.65899	64	0 - 10 cm	

Notes:
[1] Percent fines (silt + clay) from wet sieving

6. Chemical Analysis. Chemical analysis was conducted by Analytical Resources, Inc. of Tukwila, WA. Chemical results were compared to the 2013 Freshwater guidelines adopted by the Department of Ecology in February 2013, as shown in Figure 3. Though the DMMP in general uses only guidelines which have been adopted through a public notification and comment process (such as SMARM), it also strives to use the most current relevant technical and project-specific information for sediment evaluations. The DMMP agencies decided to use the 2013 Freshwater guidelines and COC list because these guidelines were adopted by Ecology prior to the start of this project, and to maximize data comparability with future characterizations. The 2013 Freshwater guidelines will be presented at the 2014 SMARM for adoption by the DMMP agencies.

   The approved sampling and analysis plan (Herrera and URS, 2014) was followed and the quality control guidelines specified by the DMMP program were generally met. During the Tier 1 evaluation for the project, it was identified from previous sampling in the area that the background concentration of nickel in Chester Morse Lake is elevated above the 2013 Freshwater SL1 of 26 mg/kg. The average nickel concentration in the cores collected during SPU's summer 2013 geotechnical investigation of Chester Morse Lake Outlet Channel was 32 mg/kg. Ecology's baseline characterization of nine proposed sediment reference lakes identified four lakes (Lake Ozette, Mountain Lake, Morse Lake, and Lake Wenatchee) where sediment nickel concentrations exceed the SL1 (Ecology 2009). As noted by Ecology in development of freshwater sediment quality values, the SL1 for nickel may exceed background nickel concentrations in some areas, and SMS provides the option to use background values for comparison instead of screening levels (Ecology 2011). The DMMP agencies considered the available data (Herrera and URS, 2014) and the lack of potential sources of nickel in the vicinity of the project, and determined it was more appropriate to compare nickel concentrations against the background soil nickel concentration of 38 mg/kg established by Ecology for the Puget Sound region (Ecology, 1994).

   Results of the conventionals analysis demonstrated that the proposed dredged material is loamy sand, with 82.5% sand and 16.2 % total fines (silt + clay). Total organic carbon was relatively high at 5.91%. Chemical results showed that there were no detected exceedances of any of the 2013 Freshwater chemicals of concern. Analysis of silver using the standard method (EPA 6010C) showed it was undetected at 0.6 mg/kg, which was above the SL1 value of 0.57 mg/kg. In order to avoid the need for bioassays, and in accordance with the procedures outlined in the SAP, SPU elected to reanalyze the sample using a more sensitive ICP-MS method (EPA 6020A) to lower the reporting limit. The reanalysis of silver found it was undetected at 0.4 mg/kg. Therefore, silver was not a concern for this project and all COCs were found below the applicable SL1. Nickel was less than the soil background value of 38 mg/kg.

7. Sediment Exposed by Dredging. The sediment to be exposed by dredging must either meet the State of Washington Sediment Quality Standards (SQS) (Ecology, 2013) or the State's antidegradation standard (DMMP, 2008).

   As demonstrated by the results of the above analysis, there were no SL1 exceedances in the dredge prism. Since there is no reason to believe there may be historical contamination below the dredge prism, the sediment to be exposed by dredging is not considered to be degraded relative to the currently exposed sediment surface. On this basis the DMMP agencies conclude that this project is in compliance with the State of Washington anti-degradation policy.

8. Suitability Determination. This memorandum documents the evaluation of the suitability of sediment proposed for dredging from the Chester Morse Lake Pump Plant project for open-water disposal within Chester Morse Lake. The approved sampling and analysis plan was generally followed. The data gathered were deemed sufficient and acceptable for regulatory decision-making under the DMMP program.

   In summary, based on the results of the previously described testing, the DMMP agencies conclude that all 4,200 cy of proposed dredged material are suitable for unconfined, open-water disposal within Chester Morse Lake.

   This suitability 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.

   A pre-dredge meeting with Ecology and the Corps of Engineers is required at least 7 days prior to dredging. A dredging quality control plan must be developed and submitted to the Regulatory Branch of the Seattle District Corps of Engineers at least 7 days prior to the pre-dredge meeting.

9. References.

DMMP, 2013. *Dredged Material Evaluation and Disposal Procedures (Users Manual)*. Prepared by the Seattle District Dredged Material Management Office for the Dredged Material Management Program, July 2013.

DMMP, 2011. *Marine Sediment Quality Screening Levels: Adopting RSET Marine SLs for Use in*

DMMP. A Clarification Paper prepared by Laura Inouye (Ecology) and David Fox (USACE) for the Dredged Material Management Program, June 2011.

DMMP, 2008. *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.

Ecology, 2013. *Sediment Management Standards – Chapter 173-204 WAC*. Washington State Department of Ecology, December 1995, adopted February 2013, effective September 2013.

Ecology. 2011. Development of Benthic SQVs for Freshwater Sediments in Washington, Oregon, and Idaho. Washington State Department of Ecology, Toxics Cleanup Program, Olympia, Washington. Ecology Publication No. 11-09-054. November 2011.

Ecology. 2009. Baseline Characterization of Nine Proposed Freshwater Sediment Reference Sites, 2008. Washington State Department of Ecology, Environmental Assessment Program, Olympia, Washington. Ecology Publication No. 09-03-032. July 2009.

Ecology, 1994. Natural Background Soil Metals Concentrations in Washington State. Prepared by Washington State Department of Ecology, Toxics Cleanup Program, Olympia, Washington. Ecology Publication No. 94-115. October 1994.

Herrera and URS, 2014. Chester Morse Lake Dredged Material Characterization Sampling and Analysis Plan. Prepared for Seattle Public Utilities, Seattle, Washington, by Herrera Environmental Consultants, Inc., and URS Corporation, Seattle, Washington. January 22, 2014

10. Agency Signatures.

Signed copy is on file in the Corps of Engineers, DMMO.

Concur:

Date — Kelsey van der Elst - Seattle District Corps of Engineers

Date — Celia Barton – Washington Department of Natural Resources

Date — Justine Barton - Environmental Protection Agency

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

Copies furnished:

DMMP signatories

Jacalen Printz, Corps' Regulatory PM

Kay Yesuwan, Seattle Public Utilities

Karen Iwasaki, Seattle Public Utilities

Daniel Enrico, Seattle Public Utilities

Cameron Ochiltree, URS Corporation

Table 3. Chemical results compared to SMS regulatory guidelines.

CHEMICAL	Interim 2006 Freshwater Guidelines		2013 Freshwater Guidelines		DMMU 1	
	SL1	SL2	SQS/SL1	CSL/SL2	conc	LQ
CONVENTIONALS						
Gravel, %					1.3	
Sand, %					82.5	
Silt, %					13.1	
Clay, %					3	
Fines (Silt + Clay), %					16.1	
Total Solids, %					47.69	
Volatile Soilids, %					7.93	
Total Organic Carbon, %					5.91	
Total Sulfides, mg/kg			39	61	1.92	U
Total Ammonia, mg N/kg			230	300	2.82	
METALS (mg/kg dry)						
Arsenic	20	51	14	120	9	U
Cadmium	1.1	1.5	2.1	5.4	0.4	U
Chromium	95	100	72	88	32.6	
Copper	80	830	400	1,200	31	
Lead	340	430	360	>1300	5	
Mercury	0.3	0.8	0.7	0.8	0.1	
Nickel			38 [1]	110.0	29	
Selenium			11	>20	9	U
Silver	2.0	2.5	0.57	1.7	0.4	U
Zinc	130	400	3,200	>4200	51	
PAHs (ug/kg dry)						
Total PAHs [2]			17,000	30,000	19	U
Total LPAH	6,600	9,200				
Naphthalene	500	1,300			19	U
Acenaphthylene	470	640			19	U
Acenaphthene	1,100	1,300			19	U
Fluorene	1,000	3,000			19	U
Phenanthrene	6,100	7,600			19	U
Anthracene	1,200	1,600			19	U
1-Methylnaphthalene					19	U
2-Methylnaphthalene	470	560			19	U
Total HPAH	31,000	55,000				
Fluoranthene	11,000	15,000			19	U
Pyrene	8,800	16,000			19	U
Benzo(a)anthracene	4,300	5,800			19	U
Chrysene	5,900	6,400			19	U
Total benzofluoranthenes	600	4,000			19	U
Benzo[a]pyrene	3,300	4,800			19	U
Indeno(1,2,3-c,d)pyrene	4,100	5,300			19	U
Dibenzo(a,h)anthracene	800	840			19	U
Benzo(g,h,i)perylene	4,000	5,200			19	U

Table 3. Chemical results compared to SMS regulatory guidelines.

CHEMICAL	Interim 2006 Freshwater Guidelines		2013 Freshwater Guidelines		DMMU 1	
	SL1	SL2	SQS/SL1	CSL/SL2	conc	LQ
BULK PETROLEUM HYRDOCARBONS (mg/kg dry)						
TPH - Diesel			340	510	11	
TPH - Residual			3,600	4,400	59	
PHTHALATE ESTERS (ug/kg dry)						
Di-n-butyl phthalate	---	---	380	1,000	19	U
Bis(2-ethylhexyl)phthalate	220	320	500	22,000	48	U
Di-n-octyl phthalate	26	45	39	>1100	19	U
PHENOLS (ug/kg dry)						
Phenol	---	---	120	210	24	
4 Methylphenol	---	---	260	2,000	19	U
Pentachlorophenol	---	---	1,200	>1200	96	U
MISCELLANEOUS EXTRACTABLES (ug/kg dry)						
Benzoic acid	---	---	2,900	3,800	110	J
Dibenzofuran	400	440	200	680	19	U
Carbazole			900	1100	19	U
PESTICIDES (ug/kg dry)						
Beta-Hexachlorocyclohexane (beta-BHC)			7.2	11	0.49	U
Endrin ketone			8.5	> 8.5	0.99	U
Dieldrin			4.9	9.3	0.99	U
Total DDE (sum of o,p' and p,p' isomers)			21	33	0.99	U
Total DDD (sum of o,p' and p,p' isomers)			310	860	0.99	U
Total DDT (sum of o,p' and p,p' isomers)			100	8,100	0.99	U
PCBs (ug/kg dry)						
Total PCBs			110	2,500	9	U
Total PCBs (mg/kg OC)					0.152	U
DMMP DETERMINATION						
DMMU volume					4,200 CY	
Rank					Low-Moderate	
Mean sample depth					6 cm	
Maximum sampling depth					10 cm	

J = estimated concentration, less than MRL
U = undetected
OC = organic carbon
SL1 = sediment cleanup objective
SL2 = cleanup screening level
SL exceedance

[1] The SL1 for Nickel is increased from 26 to 38 mg/kg, which is based on the background soil concentration for Puget Sound soils (Ecology 1994)

[2] Total PAHs are the sum of: 1-methylnaphthalene, 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, benz(a)anthracene, benzo(a)pyrene, benzo(ghi)perylene, chrysene, dibenz(ah)anthracene, fluoranthene, fluorene, indeno(123-cd)pyrene, naphthalene, phenanthrene, pyrene, total benzofluoranthenes (b+k+j).

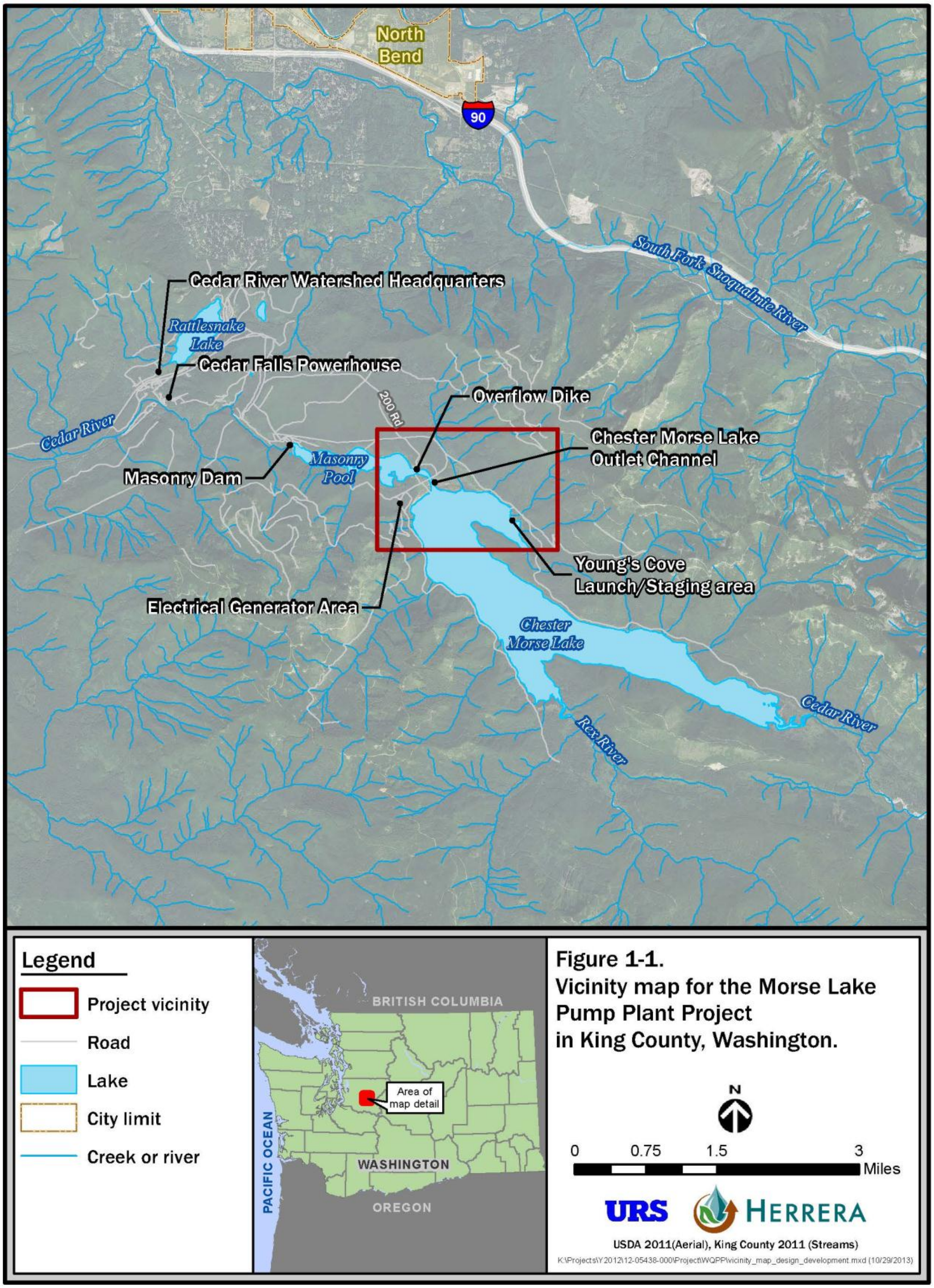

Figure 1-1. Vicinity Map for the Morse Lake Pump Plant Project in King County, Washington.

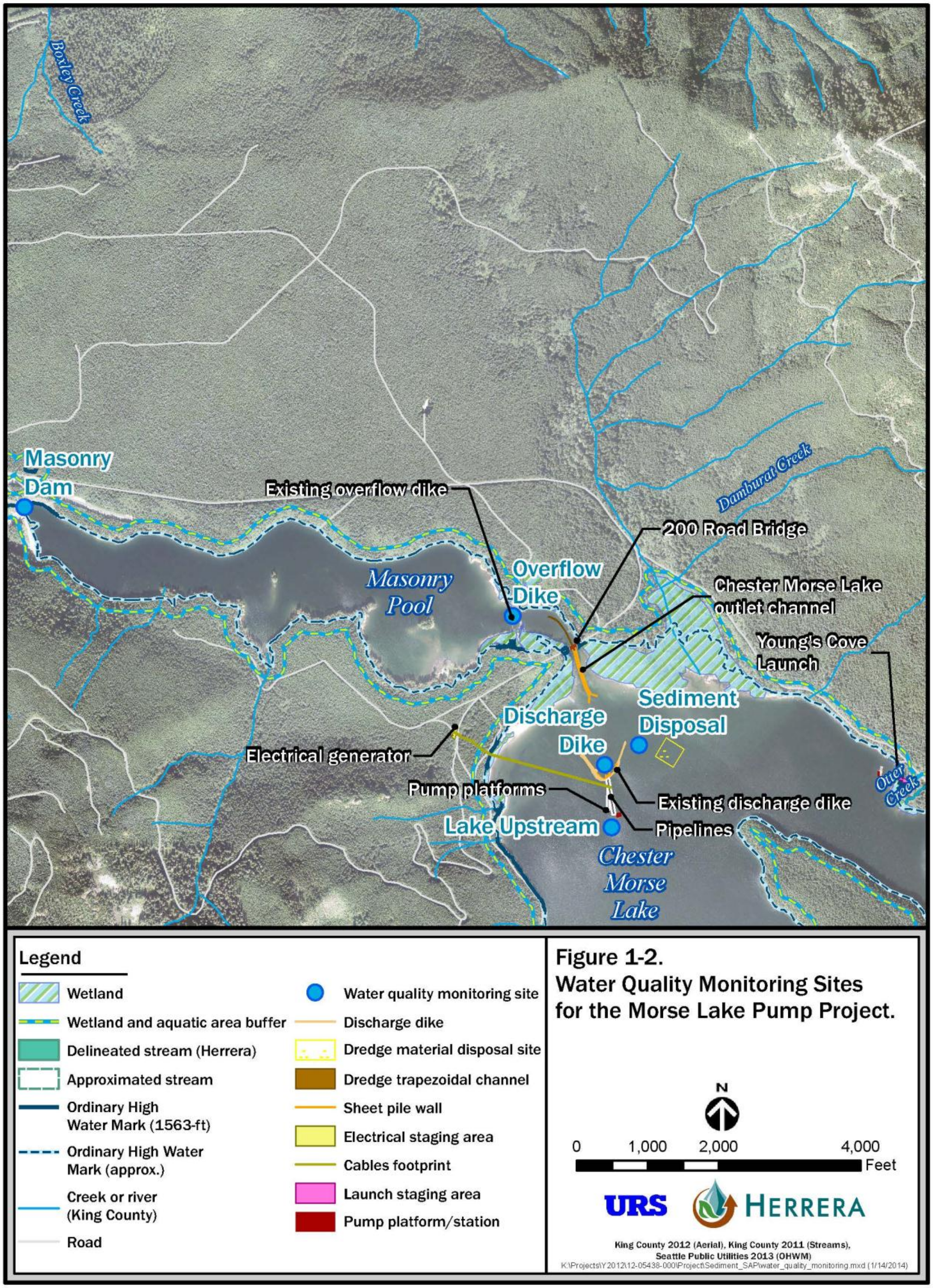

Figure 1-2. Project Elements and Water Quality Monitoring Sites for the Morse Lake Pump Plant Project.

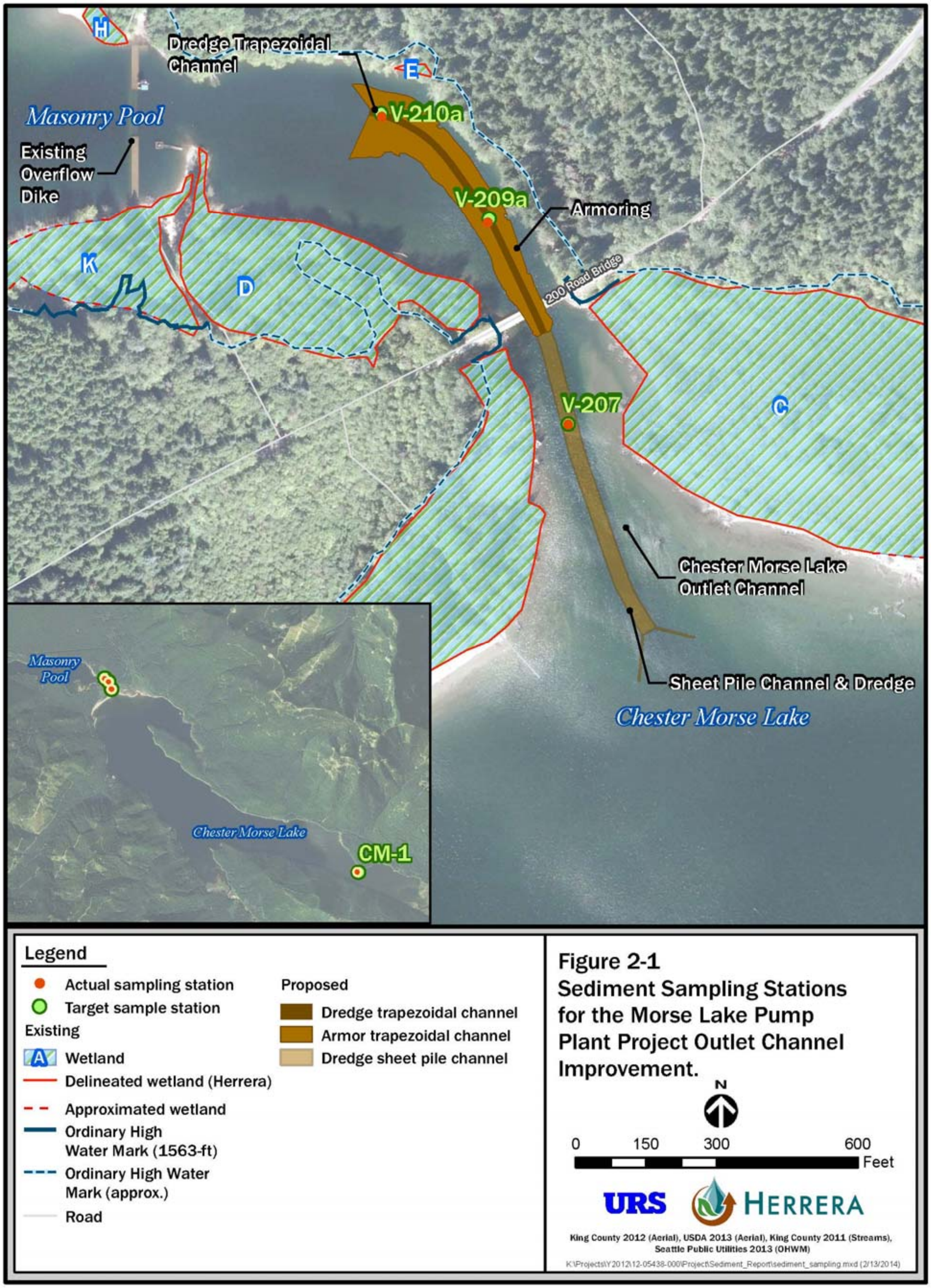

Figure 2-1
Sediment Sampling Stations for the Morse Lake Pump Plant Project Outlet Channel Improvement.